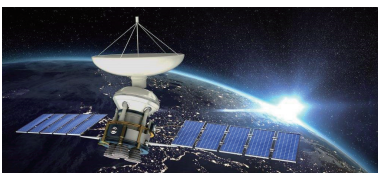
無錫市華高微電子有限公司

WUXI HUAGAO(HG) SEMICONDUCTOR COMPANY LIMITED



产品手册

HG SEMICONDUCTOR SELECTOR GUIDE

射频&微波（HF/VHF/UHF）晶体管
双极系列和MOS系列

RF & MICRO POWER TRANSISTORS
BIPOLAR & MOSFET

公司介绍

无锡市华高微电子有限公司是一家通过了 ISO9001：2015 国际质量体系认证的生产型企业，持续 25 年只专注于半导体行业的射频三极管的研发和生产。

我司的前身是无锡市华之杰微电子研究所成立于 1998 年，在 2010 年更名为无锡市华高微电子有限公司。经过 25 年的发展，我司产品从国产射频型号 3DA，3DK 系列，衍生到 2SC，BLF，MRF 等国外主流射频三极管型号系列。主要应用领域也从广播电视行业的电视发射机、差转机、调频广播，拓展到对讲机，军用和民用电台、卫星导航、激光器、单边带通讯、微波中继、遥感测量、测控等领域。我司部分型号的射频三极管在国内外市场有绝对的占有率，产品远销美国、意大利、台湾、印度、韩国，马来西亚等地。

标服认证

质量管理体系认证证书

兹证明

无锡市华高微电子有限公司

统一社会信用代码/组织机构代码证：91320211558067626L
注册地址：无锡市滨湖区绣溪路 53-20-501
经营地址：江苏省无锡市滨湖区绣溪路 53 号旭天科技园 20 栋 6 楼、5 楼

建立的管理体系，按照以下标准评审合格，特发此证。

认证标准

GB/T 19001-2016/ISO 9001:2015

认证范围：

晶体管的研发和制造

证 书 号：41621QZ0683R0S
颁证日期：2022 年 09 月 06 日
有效日期：2024 年 06 月 24 日

杭州标服认证有限公司

总经理

证书有效期内，每年至少进行一次监督审核，且两次的审核间隔不能超过 12 个月。每次监督审核合格后，BFRZ 将在本证书上加贴合格标签。

我司生产研发射频三极管，从芯片设计，芯片生产工艺的制定，晶圆生产过程的跟踪，配套管壳的研发生产，三极管成品的组装，以及测试、打标等所有工序全部都自主完成。晶圆代工也是在全部在国内的生产线完成，真正做到了知识产权 100%自主化，生产过程 100%的国产化。

我司给中国军工配套提供符合国家军用规范 QZJ840611、GJB33A 和 GJB128A 的射频晶体管，提高了军工产品的国产化率，同时也解决了国外型号停产对军工生产的影响。目前我司已正式进入 10 余家军工单位的合格供方名录，给中国军事现代化提供持续、稳定、可靠的产品，为中国抵御西方制裁做出了贡献。

我司具有健全的质量保证体系，用标准化的流程固化测试、检验，生产全过程。实现材料验收标准化，生产过程标准化，出厂检验测试标准化。根据 ISO9001 质量体系中的文件控制、采购、产品标示、过程控制、检验与试验、不合格品控制、纠正和预防措施、搬运、贮存、包装、交付、售后服务等要素，制定详细的质量计划，严格按照 ISO9001 质量体系要求运行。我司不断完善内部质量管理，采用国内外先进设备进行产品检测，确保质量控制准确无误，产品出厂合格率达到 100%。

我司秉持“服务用户、尽善尽美”的经营宗旨和“精细管理、持续改进、为客户提供满意的产品和服务”的质量方针，不断提升研发能力，开发先进的工艺技术，生产高性能的微电子产品，以卓越的品质、精湛的技术和优良的信誉服务社会，扎根市场，全心致力于电子电路制造业的发展。

1. 产品型号列表 / PRODUCT LIST

国内型号 / TYPE (CHINA)			国外型号 / TYPE						
3DA	3DA4060	3DA92	*2N*	2N6082	2SC2099	2SC2783	BFQ42	BLV103	BLW96
3DA038	3DA4503	3DA92C	2N2631	2N6083	2SC2101	2SC2879	BFQ43	BLV11	BLW97
3DA105	3DA47	3DA92L	2N2876	2N6084	2SC2131	2SC2879A	BFQ68	BLV12	BLW98
3DA106	3DA47AL	3DA93	2N3137	2N6166	2SC2133	2SC2893	*BFW*	BLV193	*BLX*
3DA110	3DA5109	*1ST*	2N3375	2N6199	2SC2166	2SC2904	BFW16A	BLV194	BLX13C
3DA121	3DA56	1ST017	2N3553	2N6200	2SC2178	2SC2905	*BLF*	BLV20	BLX15
3DA122	3DA56C	1ST018	2N3632	2N6204	2SC2181	2SC2932	BLF145	BLV21	BLX39
3DA123	3DA596	1ST019	2N3733	2N6255	2SC2221	2SC2933	BLF147	BLV25	BLX65S
3DA124	3DA597	1ST022	2N3866	2N6370	2SC2237	2SC2952	BLF175	BLV30	BLX93A
3DA125	3DA598	1ST023	2N3866A	2N6439	2SC2281	2SC2988	BLF177	BLV31	BLX94A
3DA125A	3DA643	1ST024	2N3926	*2SC*	2SC2289	2SC3001	BLF242	BLV32F	BLX94C
3DA125B	3DA809	1ST025	2N3927	2SC1165	2SC2290	2SC3017	BLF244	BLV33	BLX96
3DA126	3DA810	1ST029	2N4012	2SC1252	2SC2290A	2SC3018	BLF245	BLV33F	*BLY*
3DA132	3DA811	1ST030	2N4128	2SC1306	2SC2312	2SC3020	BLF245B	BLV36	BLY87A
3DA1460	3DA813	1ST048	2N4427	2SC1307	2SC2314	2SC3021	BLF246	BLV57	BLY87C
3DA150	3DA815	1ST1422	2N4428	2SC1590	2SC2329	2SC3022	BLF246B	BLV59	BLY88C
3DA18	3DA816	1ST1947	2N4429	2SC1687	2SC2379	2SC3101	BLF248	BLV75/12	BLY89A
3DA190	3DA817	1ST233	2N4440	2SC1729	2SC2381	2SC3102	BLF276	BLV80-28	BLY89C
3DA191	3DA818	1ST233	2N4932	2SC1944	2SC2395	2SC3103	BLF277	BLV910	BLY90
3DA192	3DA819	1ST234	2N5016	2SC1945	2SC2508	2SC3104	BLF278	BLV92	BLY91C
3DA193	3DA820	1ST234	2N5070	2SC1946	2SC2509	2SC3105	BLF346	BLV93	BLY92A
3DA1945	3DA821	1ST2630	2N5108	2SC1946A	2SC2510	2SC3133	BLF348	BLV97CE	BLY92C
3DA195	3DA823	1ST3240	2N5109	2SC1947	2SC2510A	2SC3147	BLF368	BLV98CE	BLY93C
3DA196	3DA824	1ST33	2N5589	2SC1955	2SC2527	2SC3240	BLF378	*BLW*	BLY93H
3DA197	3DA825	1ST364	2N5590	2SC1964	2SC2528	2SC3241	BLF522	BLW29	*D*UK*
3DA1970	3DA826	1ST375	2N5591	2SC1966	2SC2539	2SC3345	BLF542	BLW30	D1001UK
3DA1971	3DA830	*2G/FA*	2N5635	2SC1967	2SC2540	2SC3404	BLF543	BLW31	D1002UK
3DA1972	3DA831	2G711	2N5636	2SC1968	2SC2558	2SC3628	BLF544	BLW32	D1003UK
3DA198	3DA832	FA431	2N5637	2SC1968A	2SC2559	2SC3908	BLF544B	BLW33	D1004UK
3DA199	3DA833	FA531	2N5641	2SC1969	2SC2586	2SC4167	BLF545	BLW34	D1005UK
3DA21	3DA836	FA541	2N5642	2SC1970	2SC2627	2SC4200	BLF546	BLW50F	D1006UK
3DA22	3DA837	FA542	2N5643	2SC1971	2SC2628	2SC4240	BLF547	BLW60C	D1007UK
3DA22C	3DA838	FA543	2N5681	2SC1972	2SC2629	2SC4524	BLF548	BLW75	D1008UK
3DA23	3DA839	FA641	2N5682	2SC1974	2SC2630	2SC4624	*BLU*	BLW76	D1009UK
3DA24	3DA840	FA641TB	2N5697	2SC2036	2SC2638	2SC5125	BLU20/12	BLW77	D1010UK
3DA314	3DA841		2N5913	2SC2056	2SC2640	2SC549	BLU30/12	BLW78	D1011UK
3DA32	3DA851		2N5918	2SC2075	2SC2641	2SC730	BLU45/12	BLW81	D1012UK
3DA33	3DA852		2N5943	2SC2078	2SC2642	2SC741	BLU60/12	BLW83	D1013UK
3DA36	3DA856		2N5944	2SC2091	2SC2643	2SC998	BLU60/28	BLW85	D1014UK
3DA37	3DA857		2N5945	2SC2092	2SC2652	*BFQ*	BLU99/SL	BLW86	D1015UK
3DA3866	3DA858		2N5946	2SC2094	2SC2694	BFQ136	*BLV*	BLW87	D1016UK
3DA39	3DA866		2N6080	2SC2097	2SC2695	BFQ162	BLV10	BLW90	D1017UK
3DA4030	3DA89		2N6081	2SC2098	2SC2782	BFQ34	BLV100	BLW95	D1018UK

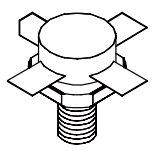
国外型号 / TYPE

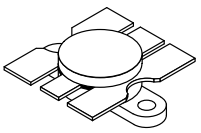
D*UK	***MRF***	MRF175GU	MRF412	MRF652	MS1402	SD1018	SD1460	TPV596
D1019UK	MRF1000M	MRF175GV	MRF421	MRF652S	MS1403	SD1019	SD1463	TPV597
D1020UK	MRF1001A	MRF175LU	MRF422	MRF653	MS1404	SD1019-2	SD1468	TPV598
D1021UK	MRF1002M	MRF175LV	MRF426	MRF654	MS1406	SD1019-5	SD1470	***UF***
D1022UK	MRF1002M	MRF176G	MRF427	MRF658	MS1408	SD1050	SD1477	UF2805B
D1023UK	MRF1004M	MRF176G	MRF428	MRF839F	MS1409	SD1127	SD1480	UF28100M
D1024UK	MRF1004M	MRF177	MRF429	MRF840	MS1426	SD1134	SD1487	UF28100V
D1025UK	MRF1008M	MRF1946	MRF433	MRF842	MS1451	SD1135	SD1488	UF2810P
D1027UK	MRF1015M	MRF1946A	MRF448	MRF846	MS1452	SD1136	SD1495	UF28150J
D1028UK	MRF1015M	MRF224	MRF449	MRF847	MS1453	SD1143	SD1496	UF2815B
D1033UK	MRF1029	MRF227	MRF449A	MRF891	MS1454	SD1143-01	SD1536-03	UF2820P
D1034UK	MRF1030	MRF230	MRF450	MRF891S	MS1455	SD1146	SD1726	UF2840G
D1036UK	MRF1031	MRF231	MRF450A	MRF892	MS1480	SD1219	SD1727	UF2840P
D1093UK	MRF1032	MRF232	MRF453	MRF894	MS1490	SD1224	SD1729	***VRF***
D1094UK	MRF1035M	MRF233	MRF453A	***MS***	MS1501	SD1224-02	SD1730	VRF141
D2007UK	MRF1035M	MRF234	MRF454	MS1000	MS1502	SD1224-10	SD1731	VRF141G
D2008UK	MRF1090M	MRF235	MRF455	MS1001	MS1503	SD1272	SD1733	VRF148A
D2014UK	MRF1090M	MRF237	MRF455A	MS1008	MS1504	SD1272-2	SD4011	VRF150
D2015UK	MRF1150M	MRF238	MRF458	MS1008A	MS1505	SD1274	SD4013	VRF151
D2022UK	MRF1150M	MRF239	MRF458A	MS1051	MS1506	SD1274-01	SD4017	VRF151E
D2026UK	MRF134	MRF240	MRF460	MS1076	MS1508	SD1275	***TH***	VRF151G
D5001UK	MRF136	MRF247	MRF464	MS1077	MS1509	SD1275-01	TH416	VRF152
D5002UK	MRF137	MRF260	MRF466	MS1078	MS1510	SD1285	TH513	VRF152E
D5006UK	MRF138	MRF2628	MRF475	MS1079	MS1511	SD1398	TH560	***Others***
D5007UK	MRF140	MRF264	MRF476	MS1080	MS1512	SD1400-2	TH562	GT4317
D5012UK	MRF141	MRF275G	MRF477	MS1202	MS1527	SD1405	THA15	VMP4
D5013UK	MRF141G	MRF275L	MRF485	MS1204	MS1533	SD1407	THX15	
D5017UK	MRF148	MRF314	MRF486	MS1226	MS1536	SD1414	***TP***	
D5018UK	MRF148A	MRF314A	MRF492	MS1227	MS1576	SD1420	TP2314	
D5021UK	MRF150	MRF315	MRF497	MS1251	MS1578	SD1422	TP2330	
D5028UK	MRF151	MRF315A	MRF517	MS1252	MS1579	SD1423	TP2330F	
DU	MRF151G	MRF316	MRF5174	MS1253	MS1581	SD1429	TP3020A	
DU2805S	MRF160	MRF317	MRF5175	MS1255	MS1649	SD1429-03	TP5002	
DU2810S	MRF161	MRF321	MRF5176	MS1261	MS2202	SD1433	TP5002S	
DU28120T	MRF162	MRF323	MRF544	MS1262	MS2204	SD1434	TP9380	
DU28120V	MRF163	MRF325	MRF545	MS1263	MS652	SD1439	TP9383	
DU28200	MRF166	MRF326	MRF586	MS1277	***RF***	SD1441	TP9386	
DU2820S	MRF166C	MRF327	MRF587	MS1278	RF1008	SD1444	TPM425	
DU2840S	MRF166W	MRF340	MRF5943	MS1279	RF1008A	SD1446	TPV375	
DU2860T	MRF171	MRF342	MRF607	MS1280	RF1076AMP	SD1448	TPV376	
DU2860U	MRF171A	MRF344	MRF641	MS1281	***SD***	SD1455	TPV385	
DU2880T	MRF172	MRF390	MRF644	MS1329	SD1013	SD1456	TPV387	
DU2880U	MRF173	MRF392	MRF646	MS1336	SD1013-3	SD1457	TPV394	
DU2880V	MRF173CQ	MRF393	MRF648	MS1337	SD1014-02	SD1458	TPV394A	
MRF	MRF174	MRF406	MRF650	MS1401	SD1015	SD1459	TPV593	

2. 部分产品简要参数列表 / CHARACTERISTICS OF TRANSISTORS

2 - 30 MHz HF TRANSISTORS / 2 - 30 MHz 短波晶体管

TYPE 国外型号	HG TYPE 华高型号	Pout (PEP) (W)	Vcc (Vdd) (V)	f_0 (MHz)	ft (MHz)	Gp min (dB)	IMD max (dB)	η_c min (%)	PACKAGE 国外外形	Related HG PACKAGE 对应华高外形
2SC1945	HG1945	14	12	27	-	14.5	-	60	T-30E	TO220E
2SC1969	HG1969	16	12	27	-	12.0	-	60	T-30	TO220
2SC2078	HG2078	4	12	27	-	-	-	60	TO-220	TO220
2SC2166	HG2166	6	12	27	-	13.8	-	55	T-30	TO220
2SC2290	HG2290	60	12.5	30	-	11.8	-	35	2-13B1A	SOT121
2SC2290A	HG2290A	60	12.5	30	-	11.8	-	35	2-13B1A	SOT121
2SC2312	HG2312	17	12	27	-	10.5	-	60	T-30	TO220
2SC2652	HG2652	200	50	30	-	13.0	-30	35	2-13B1A	SOT121
2SC2879	HG2879	100	12.5	30	-	13.0	-24	35	2-13B1A	SOT121
2SC2879A	HG2879A	100	12.5	30	-	13.0	-24	35	2-13B1A	SOT121
2SC2904	HG2904	100	12.5	30	-	11.5	-	55	T-40	SOT119
2SC3133	HG3133	13	12	27	-	14.0	-	60	T-30E	TO220E
2SC3240	HG3240	100	12.5	30	-	11.5	-	55	T-45E	SOT121
BLF145	HG145	30	28	28	-	20 typ	-	40 typ	SOT123	SOT123
BLF147	HG147	150	28	28	-	17.0	-	35	SOT121	SOT121
BLF175	HG175	30	50	28	-	24 typ	-	40 typ	SOT123	SOT123
BLF177	HG177	150	50	28	-	20.0	-	35	SOT121	SOT121
BLW50F	HG50F	65	50	28	-	18 typ	-	45 typ	SOT123	SOT123
BLW76	HG76	80	28	28	-	13.0	-	35	SOT121	SOT121
BLW77	HG77	130	28	28	-	12.0	-	37.5	SOT121	SOT121
BLW78	HG78	100	28	28	-	19 typ	-	42 typ	SOT121	SOT121
BLW83	HG83	30	28	28	-	21 typ	-	40 typ	SOT123	SOT123
BLW96	HG96	200	50	28	-	13.5	-	40	SOT121	SOT121
BLW97	HG97	175	28	28	-	11.5	-	40	SOT121	SOT121
BLX15	HG15	150	50	28	-	14.0	-30	-	SOT-55	M164
MRF140	HG140	150	28	30	-	6 typ	-30	40 typ	CASE211-11	SOT121
MRF141	HG141	150	28	30	-	16.0	-30	40	CASE211-11	SOT121
MRF148	HG148	30	50	30	-	18 typ	-35	40 typ	CASE211-07	SOT123
MRF148A	HG148A	30	50	30	-	18 typ	-35	40 typ	CASE211-07	SOT123
MRF150	HG150	150	50	30	-	17 typ	-32	45 typ	CASE211-11	SOT121
MRF151	HG151	150	50	30	-	18.0	-30	40	CASE211-11	SOT121
MRF421	HG421	100	12.5	30	-	10.0	-	40	CASE211-11	SOT121
MRF422	HG422	150	28	30	-	10.0	-30	40	CASE211-11	SOT121
MRF426	HG426	25	28	30	-	22.0	-30	35	CASE211-07	SOT123
MRF428	HG428	150	50	30	-	13.0	-30	45	CASE211-11	SOT121
MRF429	HG429	150	50	30	-	13.0	-32	45	CASE211-11	SOT121
MRF448	HG448	250	50	30	-	12.0	-30	45	CASE211-11	SOT121
MRF454	HG454	80	12.5	30	-	12.0	-	50	CASE211-11	SOT121
MRF455	HG455	60	12.5	30	-	13.0	-	55	CASE211-07	SOT123
MRF455A	HG455A	60	12.5	30	-	13.0	-	55	CASE145A-09	SOT120


M164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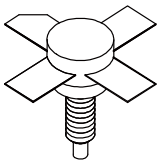
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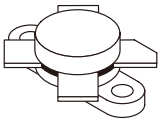
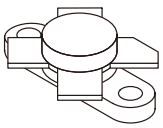

SOT121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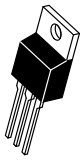
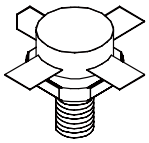
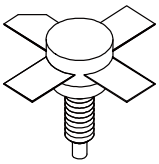
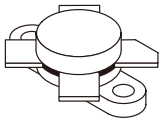

TO220(TO220E)

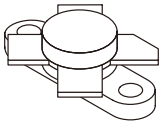
2 - 30 MHz HF TRANSISTORS / 2 - 30 MHz 短波晶体管

TYPE 国外型号	HG TYPE 华高型号	Pout (PEP) (W)	Vcc (Vdd) (V)	f_0 (MHz)	ft (MHz)	Gp min (dB)	IMD max (dB)	η_C min (%)	PACKAGE 国外外形	Related HG PACKAGE 对应华高外形
MRF477	HG477	40	12.5	30	-	15.0	-	40	TO220AB	TO220E
MRF485	HG485	15	28	30	-	10.0	-	40	TO220AB	TO220
MRF486	HG486	40	28	30	-	15.0	-30	40	TO220AB	TO220E
MS1008	HG1008	150	50	30	-	14.0	-	37	.550 4L STUD	M164
MS1008A	HG1008A	150	50	30	-	14.0	-	37	.550 4L STUD	M164
MS1051	HG1051	100	12.5	30	-	11.0	-30	-	.500 4L FL	SOT121
MS1076	HG1076	220	28	30	-	12.0	-30	40	.500 4L FL	SOT121
MS1226	HG1226	30	28	30	-	18.0	-28	-	.380 4L FL	SOT123
MS1227	HG1227	30	12.5	30	-	15.0	-30	-	.380 4L FL	SOT123
RF1008	HG1008	150	50	30	-	14.0	-	37	.550 4L STUD	M164
RF1008A	HG1008A	150	50	30	-	14.0	-	37	.550 4L STUD	M164
RF1076AMP	HG1076	220	28	30	-	12.0	-30	40	.500 4L FL	SOT121
SD1405	HG1405	75	12.5	30	-	13.0	-32	-	.500 4L FL	SOT121
SD1407	HG1407	125	28	30	-	15.0	-30	-	.500 4L FL	SOT121
SD1446	HG1446	70	12.5	50	-	10.0	-	55 typ	.380 4L FL	SOT123
SD1487	HG1487	100	12.5	30	-	11.0	-30	-	.500 4L FL	SOT121
SD1726(THA15)	HG1726	150	50	30	-	14.0	-30	37	.500 4L FL	SOT121
SD1727(THX15)	HG1727	150	50	30	-	14.0	-30	37	.550 4L STUD	M164
SD1729(TH416)	HG1729	130	28	30	-	12.0	-30	37	.500 4L FL	SOT121
SD1730(TH560)	HG1730	220	28	30	-	12.0	-30	40	.500 4L FL	SOT121
SD1731(TH562)	HG1731	220	50	30	-	13.0	-30	40	.500 4L FL	SOT121
SD1733(TH513)	HG1733	75	50	30	-	14.0	-30	37	.380 4L STUD	SOT120


M164


SOT120


SOT121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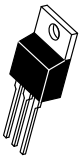
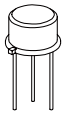

TO220(TO220E)

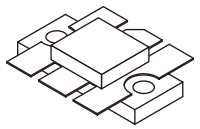

TO39(TO39E)

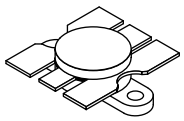
50 - 225 MHz VHF TRANSISTORS / 50 - 225 MHz V波段晶体管

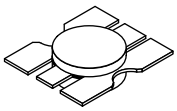
TYPE 国外型号	HG TYPE 华高型号	Pout (PEP) (W)	Vcc (Vdd) (V)	f_0 (MHz)	ft (MHz)	Gp min (dB)	IMD max (dB)	η_C min (%)	PACKAGE 国外外形	Related HG PACKAGE 对应华高外形
2N5641	HG5641	7	28	175	-	8.4	-	60	MT71	SOT120
2N5642	HG5642	20	28	175	-	8.2	-	60	MT72	SOT120
2N5643	HG5643	40	28	175	-	7.6	-	60	MT72	SOT120
2N6255	HG6255	3	12.5	175	-	7.8	-	50	TO39	TO39
2SC1947	HG1947	3.5	13.5	175	-	10.7	-	50	T-8E	TO39E
2SC1970	HG1970	1	13.5	175	-	9.2	-	50	T-30	TO220
2SC1971	HG1971	6	13.5	175	-	10.0	-	60	T-30E	TO220E
2SC1972	HG1972	14	13.5	175	-	7.5	-	60	T-30E	TO220E
BLF147	HG147	150	28	108	-	14 typ	-	70 typ	SOT121	SOT121
BLF175	HG175	30	50	108	-	20.0	-	65 typ	SOT123	SOT123
BLF177	HG177	150	50	108	-	19 typ	-	70 typ	SOT121	SOT121
BLF242	HG242	5	28	175	-	13.0	-	50	SOT123	SOT123
BLF244	HG244	15	28	175	-	13.0	-	50	SOT123	SOT123
BLF245	HG245	30	28	175	-	13.0	-	50	SOT123	SOT123

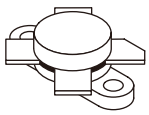
50 - 225 MHz VHF TRANSISTORS / 50 - 225 MHz V波段晶体管

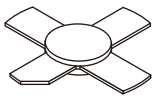
TYPE 国外型号	HG TYPE 华高型号	Pout (PEP) (W)	Vcc (Vdd) (V)	f_0 (MHz)	ft (MHz)	Gp min (dB)	IMD max (dB)	η_C min (%)	PACKAGE 国外外形	Related HG PACKAGE 对应华高外形
BLF245B	HG245B	30	28	175	-	14.0	-	55	SOT279	SOT279
BLF246	HG246	80	28	108	-	16.0	-	55	SOT121	SOT121
BLF246B	HG246B	60	28	175	-	14.0	-	55	SOT161	SOT161
BLF248	HG248	300	28	225	-	10.0	-	55	SOT262	SOT262
BLF276	HG276	100	50	225	-	13.0	-	50	SOT119D3	SOT119D3
BLF277	HG277	150	50	175	-	14.0	-	50	SOT119	SOT119
BLF278	HG278	250	50	225	-	14.0	-	50	SOT262	SOT262
BLF346	HG346	30(Class A)	28	224.5	-	14.0	-	-	SOT119	SOT119
BLF348	HG348	75(Class A)	28	224.25	-	11.0	-	-	SOT262	SOT262
BLF368	HG368	300	32	225	-	12.0	-	55	SOT262	SOT262
BLF378	HG378	250	50	225	-	14.0	-	50	SOT262	SOT262
BLV33	HG33	90 typ	28	224.5	-	6.5 typ	-	-	SOT147	SOT147
BLV33F	HG33F	85 typ	28	224.5	-	10.5 typ	-	-	SOT119	SOT119
BLW76	HG76	80	28	108	-	7.9 typ	-	70 typ	SOT121	SOT121
BLW77	HG77	130	28	87.5	-	7.5 typ	-	75 typ	SOT121	SOT121
BLW78	HG78	100	28	150	-	6.0	-	70	SOT121	SOT121
BLW96	HG96	200	50	108	-	6.5 typ	-	67 typ	SOT121	SOT121
D1001UK	HG1001UK	20	28	175	-	16.0	-	50	DA	SOT123
D1002UK	HG1002UK	40	28	175	-	16.0	-	50	DA	SOT123
D1003UK	HG1003UK	60	28	175	-	16.0	-	50	DM	SOT121
D1004UK	HG1004UK	80	28	175	-	16.0	-	50	DT	SOT119
D1005UK	HG1005UK	80	28	175	-	16.0	-	50	DM	SOT121
D1006UK	HG1006UK	120	28	175	-	14.0	-	50	DV	CASE333
D1019UK	HG1019UK	20	28	175	-	16.0	-	50	DW	SOT122D3
D1023UK	HG1023UK	60	28	175	-	16.0	-	50	DT	SOT119
D1027UK	HG1027UK	150	28	175	-	13.0	-	50	DR	SOT262
D1028UK	HG1028UK	300	28	175	-	13.0	-	60	DR	SOT262
D1036UK	HG1036UK	100	28	175	-	13.0	-	50	DM	SOT121
D5007UK	HG5007UK	150	50	175	-	13.0	-	40	DM	SOT121
DU2805S	HG2805S	5	28	175	-	11.0	-	55	-	SOT123
DU2810S	HG2810S	10	28	175	-	13.0	-	55	-	SOT123
DU28120T	HG28120T	120	28	175	-	13.0	-	60	-	SOT119
DU28200M	HG28200M	200	28	175	-	13.0	-	55	-	SOT262
DU2820S	HG2820S	20	28	175	-	13.0	-	60	-	SOT123
DU2840S	HG2840S	40	28	175	-	13.0	-	60	-	SOT123
DU2860T	HG2860T	60	28	175	-	13.0	-	60	-	SOT119
DU2860U	HG2860U	60	28	175	-	13.0	-	60	-	SOT121

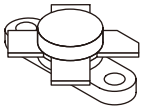

CASE333

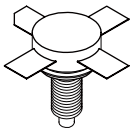

SOT119

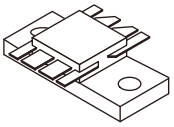

SOT119D3

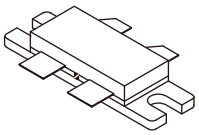

SOT121

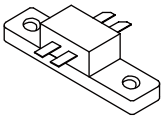

SOT122D3


SOT123


SOT147

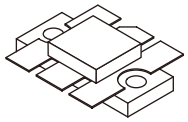

SOT161

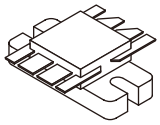

SOT262

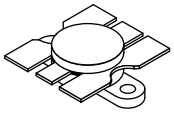

SOT279

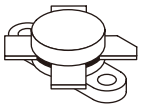
50 - 225 MHz VHF TRANSISTORS / 50 - 225 MHz V波段晶体管

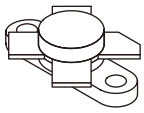
TYPE 国外型号	HG TYPE 华高型号	Pout (PEP) (W)	Vcc (Vdd) (V)	f_0 (MHz)	ft (MHz)	Gp min (dB)	IMD max (dB)	η_C min (%)	PACKAGE 国外外形	Related HG PACKAGE 对应华高外形
DU2880T	HG2880T	80	28	175	-	13.0	-	60	-	SOT119
DU2880U	HG2880U	80	28	175	-	13.0	-	60	-	SOT121
DU2880V	HG2880V	80	28	175	-	13.0	-	60	-	CASE744
MRF1001A	HG1001A	1 P_D	-	-	3000	-	-	-	TO39	TO39
MRF134	HG134	5	28	150	-	11.0	-	50	CASE211-07	SOT123
MRF136	HG136	15	28	150	-	13.0	-	50	CASE211-07	SOT123
MRF137	HG137	30	28	150	-	13.0	-	60	CASE211-07	SOT123
MRF138	HG138	30	28	175	-	14 typ	-30	-	CASE211-07	SOT123
MRF141	HG141	150	28	175	-	10 typ	-	-	CASE211-11	SOT121
MRF141G	HG141G	300	28	175	-	12.0	-	45	CASE375-04	SOT262
MRF148	HG148	30	50	175	-	15 typ	-	50 typ	CASE211-07	SOT123
MRF148A	HG148A	30	50	175	-	15 typ	-	50 typ	CASE211-07	SOT123
MRF151	HG151	150	50	175	-	13 typ	-	-	CASE211-11	SOT121
MRF151G	HG151G	300	50	175	-	14.0	-	50	CASE375-04	SOT262
MRF171	HG171	45	28	150	-	12.0	-	50	CASE211-07	SOT123
MRF171A	HG171A	45	28	150	-	17.0	-	60	CASE211-07	SOT123
MRF172	HG172	80	28	150	-	10.0	-	50	CASE211-11	SOT121
MRF173	HG173	80	28	150	-	11.0	-	55	CASE211-11	SOT121
MRF173CQ	HG173CQ	80	28	150	-	11.0	-	55	CASE316-01	SOT119
MRF174	HG174	125	28	150	-	9.0	-	50	CASE211-11	SOT121
MRF175LV	HG175LV	100	28	225	-	12.0	-	55	CASE333-04	CASE333
MRF176GV	HG176GV	200	28	225	-	17 typ	-	55 typ	CASE375-04	SOT262
MRF237	HG237	4	12.5	175	-	12.0	-	50	TO39	TO39E
MRF260	HG260	5	12.5	175	-	10.0	-	55	TO220	TO220E
MRF314	HG314	30	28	150	-	10.0	-	50	CASE211-07	SOT123
MRF340	HG340	8	27	136	-	13.0	-	55 typ	TO220	TO220E
MRF342	HG342	24	27	136	-	11.0	-	50	TO220	TO220E
MRF344	HG344	60	27	136	-	6.0	-	50	TO220	TO220E
MRF497	HG497	40	12.5	50	-	10.0	-	60	TO220AB	TO220E
MRF517	HG517	2.5 P_D	-	-	4000	10 typ	-	-	TO39	TO39
MRF586	HG586	1.0 P_D	-	-	3000	12.5 typ	-	-	TO39	TO39
SD1127	HG1127	4	12.5	175	-	10.0	-	-	CB-7	TO39E
SD1446	HG1446	70	12.5	50	-	10.0	-	55 typ	.380 4L FL	SOT123
TP9380	HG9380	75	28	108	-	10.0	-	65 typ	.500 4L FL	SOT121
TP9383	HG9383	150	28	108	-	9.2	-	70	.500 4L FL	SOT121
VMP4	HGP4	20	28	175	-	10.0	-	50	.380 4L FL	SOT123

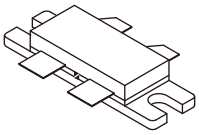

CASE333

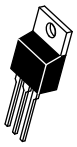

CASE744

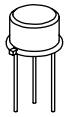

SOT119


SOT121


SOT123

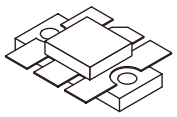

SOT262

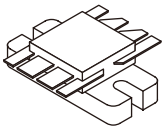

TO220(TO220E)

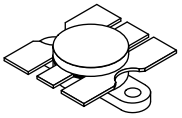

TO39(TO39E)

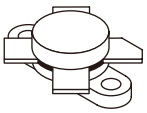
400 - 960 MHz UHF TRANSISTORS / 400 - 960 MHz U波段晶体管

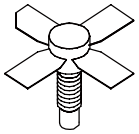
TYPE 国外型号	HG TYPE 华高型号	Pout (PEP) (W)	Vcc (Vdd) (V)	f_0 (MHz)	ft (MHz)	Gp min (dB)	IMD max (dB)	η_C min (%)	PACKAGE 国外外形	Related HG PACKAGE 对应华高外形
2N3866	HG3866	1	28	400	800	10	-	45	TO39	TO39
2N3866A	HG3866A	1	28	400	1000	10	-	45	TO39	TO39
2N5108	HG5108	1	28	-	1200	5	-	35	TO39	TO39
2N5109	HG5109	2.5 P_D	-	-	1200	12	-	-	TO39	TO39
2SC3101	HG3101	3	12.5	520	-	5.7	-	50	T-8E	TO39E
BLF522	HG522	5	12.5	500	-	10.0	-	50	SOT171	SOT171
BLF542	HG542	5	28	500	-	13.0	-	50	SOT171	SOT171
BLF543	HG543	10	28	960	-	8 typ	-	50 typ	SOT171	SOT171
BLF544	HG544	20	28	960	-	7 typ	-	50 typ	SOT171	SOT171
BLF544B	HG544B	20	28	500	-	12.0	-	50	SOT268	SOT268
BLF545	HG545	40	28	500	-	11.0	-	50	SOT268	SOT268
BLF546	HG546	80	28	500	-	11.0	-	50	SOT268	SOT268
BLF547	HG547	100	28	500	-	10.0	-	50	SOT262	SOT262
BLF548	HG548	150	28	500	-	10.0	-	50	SOT262	SOT262
BLW98	HG98	4.4	25	860	-	7 typ	-	-	SOT122	SOT122
BLX94C	HG94C	25	28	470	-	6.5	-	55	SOT122	SOT122
GT4317	HG4317	30	28	400	-	7.0	-	60	.280 4L STUD	SOT122
MRF1001A	HG1001A	1.0 P_D	-	-	3000	-	-	-	TO39	TO39
MRF160	HG160	4	28	400	-	15.0	-	45	CASE249-06	SOT122D3
MRF161	HG161	5	28	400	-	11.0	-	45	.500 4L FLG	SOT121
MRF162	HG162	15	28	400	-	11.0	-	50 typ	CASE244	SOT122
MRF163	HG163	25	28	400	-	10.0	-	50 typ	CASE244	SOT122
MRF166	HG166	20	28	400	-	14.0	-	50	CASE211-07	SOT123
MRF166C	HG166C	20	28	400	-	14.0	-	50	CASE319-07	SOT171
MRF166W	HG166W	40	28	400	-	11.0	-	45	CASE412-01	SOT268
MRF175LU	HG175LU	100	28	400	-	8.0	-	50	CASE333-04	CASE333
MRF176GU	HG176GU	150	28	400	-	14 typ	-	50 typ	CASE375-04	SOT262
MRF177	HG177A	100	28	400	-	10.0	-	55	CASE744A-01	CASE744
MRF321	HG321	10	28	400	-	12.0	-	50	CASE244-04	SOT122
MRF323	HG323	20	28	400	-	10.0	-	50	CASE244-04	SOT122
MRF326	HG326	40	28	400	-	9.0	-	50	CASE316-01	SOT119
MRF517	HG517	2.5 P_D	-	-	4000	10 typ	-	-	TO39	TO39
MRF586	HG586	1.0 P_D	-	-	3000	12.5 typ	-	-	TO39	TO39
TPV593	HG593	2 ClassA	25	860	-	10.0	-	-	.280 4L STUD	SOT122
TPV596	HG596	0.5 ClassA	28	860	-	11.5	-	-	.280 4L STUD	SOT122
TPV597	HG597	1 ClassA	28	860	-	10.5	-	-	.280 4L STUD	SOT122
TPV598	HG598	4 ClassA	28	860	-	7.0	-	-	.280 4L STUD	SOT122

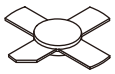

CASE333

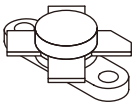

CASE744

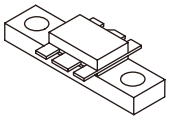

SOT119

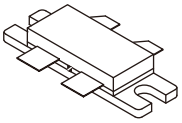

SOT121

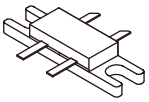

SOT122


SOT122D3


SOT123


SOT171

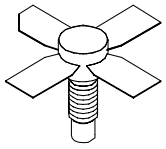

SOT262


SOT268

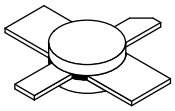

TO39(TO39E)

1090 MHz UHF TRANSISTORS / 1090 MHz U波段晶体管

TYPE 国外型号	HG TYPE 华高型号	Pout (PEP) (W)	Vcc (Vdd) (V)	f_0 (MHz)	ft (MHz)	Gp min (dB)	IMD max (dB)	η_C min (%)	PACKAGE 国外外形	Related HG PACKAGE 对应华高外形
MRF1000MB	HG1000MB	0.2 Class A	18	1090	-	10.0	-	-	CASE 322A	CASE332
MRF1002MA	HG1002MA	2	35	1090	-	10.0	-	40	CASE 322	SOT122
MRF1002MB	HG1002MB	2	35	1090	-	10.0	-	40	CASE 322A	CASE332
MRF1004MA	HG1004MA	4	35	1090	-	10.0	-	40	CASE 322	SOT122
MRF1004MB	HG1004MB	4	35	1090	-	10.0	-	40	CASE 322A	CASE332
MRF1008MA	HG1008MA	8	50	1090	-	10.0	-	50	CASE 322	SOT122
MRF1015MA	HG1015MA	15	50	1090	-	10.0	-	30	CASE 322	SOT122
MRF1015MB	HG1015MB	15	50	1090	-	10.0	-	30	CASE 322A	CASE332
MRF1035MA	HG1035MA	35	50	1090	-	10.0	-	30	CASE 322	SOT122
MRF1035MB	HG1035MB	35	50	1090	-	10.0	-	30	CASE 322A	CASE332
MRF1090MA	HG1090MA	90	50	1090	-	8.4	-	35	CASE 322	SOT122
MRF1090MB	HG1090MB	90	50	1090	-	8.4	-	35	CASE 322A	CASE332
MRF1150MA	HG1150MA	150	50	1090	-	7.8	-	35	CASE 322	SOT122
MRF1150MB	HG1150MB	150	50	1090	-	7.8	-	35	CASE 322A	CASE332



SOT122



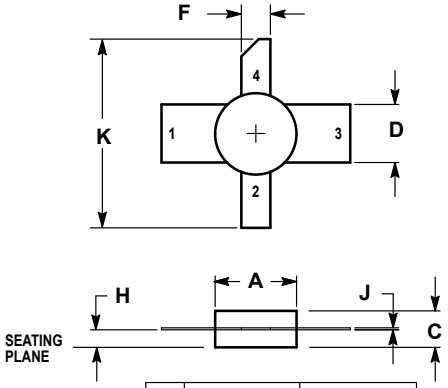
CASE332

Low-Noise TRANSISTORS / 低噪声晶体管

TYPE 国外型号	HG TYPE 华高型号	Pout (PEP) (W)	Vcc (Vdd) (V)	f_0 (MHz)	ft (MHz)	Gp min (dB)	IMD max (dB)	η_C min (%)	PACKAGE 国外外形	Related HG PACKAGE 对应华高外形
BFQ34	HG34	26dBm	15	-	4000	-	-	-	SOT122	SOT122

3. 外形尺寸 / PACKAGE OUTLINES

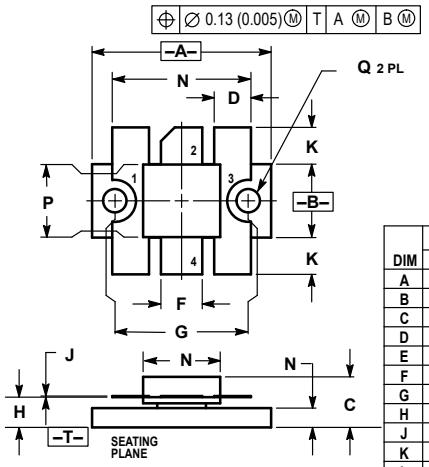
CASE 332



DIM	INCHES MIN	INCHES MAX	MILLIMETERS MIN	MILLIMETERS MAX
A	0.270	0.290	6.86	7.36
C	0.115	0.135	2.93	3.42
D	0.195	0.205	4.96	5.20
F	0.095	0.105	2.42	2.66
H	0.050	0.070	1.27	1.77
J	0.003	0.007	0.08	0.17
K	0.600	—	15.24	—

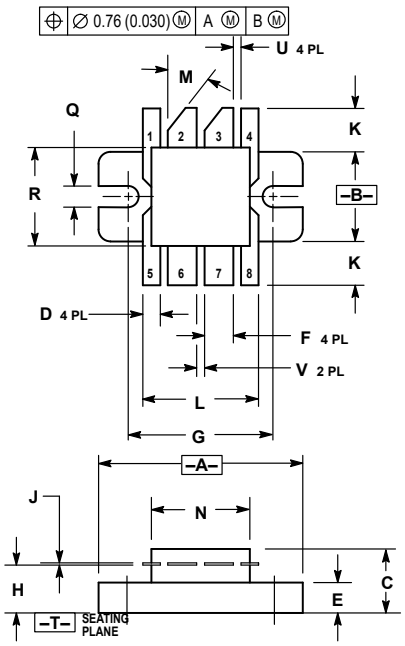
STYLE 1:
PIN 1. BASE
2. EMITTER
3. BASE
4. COLLECTOR

CASE 333



DIM	INCHES MIN	INCHES MAX	MILLIMETERS MIN	MILLIMETERS MAX
A	0.965	0.985	24.51	25.02
B	0.390	0.410	9.91	10.41
C	0.250	0.290	6.73	7.36
D	0.190	0.210	4.83	5.33
E	0.095	0.115	2.42	2.92
F	0.215	0.235	5.47	5.96
G	0.725 BSC		18.42 BSC	
H	0.155	0.175	3.94	4.44
J	0.004	0.006	0.10	0.15
K	0.195	0.205	4.95	5.21
L	0.740	0.770	18.80	19.55
N	0.415	0.425	10.54	10.80
P	0.390	0.400	9.91	10.16
Q	0.120	0.135	3.05	3.42

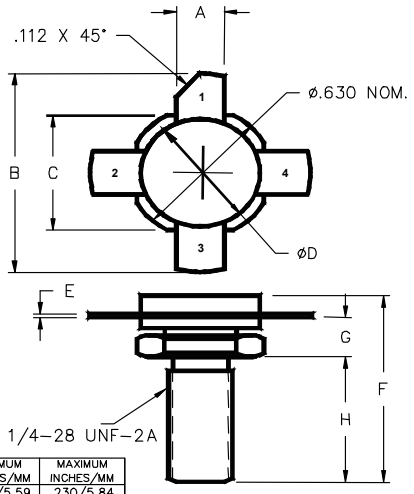
CASE 744



PIN 1. EMITTER (SOURCE)
2. COLLECTOR (DRAIN)
3. COLLECTOR (DRAIN)
4. EMITTER (SOURCE)
5. EMITTER (SOURCE)
6. BASE (GATE)
7. BASE (GATE)
8. EMITTER (SOURCE)

	MILLIMETERS		INCHES	
DIM	MIN	MAX	MIN	MAX
A	22.60	23.11	0.890	0.910
B	9.52	10.03	0.375	0.395
C	6.65	7.16	0.262	0.282
D	1.60	1.95	0.063	0.077
E	2.94	3.40	0.116	0.134
F	2.87	3.22	0.113	0.127
G	16.51 BSC		0.650 BSC	
H	4.01	4.36	0.158	0.172
J	0.07	0.15	0.003	0.006
K	4.34	4.90	0.171	0.193
L	12.45	12.95	0.490	0.510
M	45°NOM		45°NOM	
N	1.051	11.02	0.414	0.434
Q	3.04	3.35	0.120	0.132
R	9.90	10.41	0.390	0.410
U	1.02	1.27	0.040	0.050
V	0.64	0.89	0.025	0.035

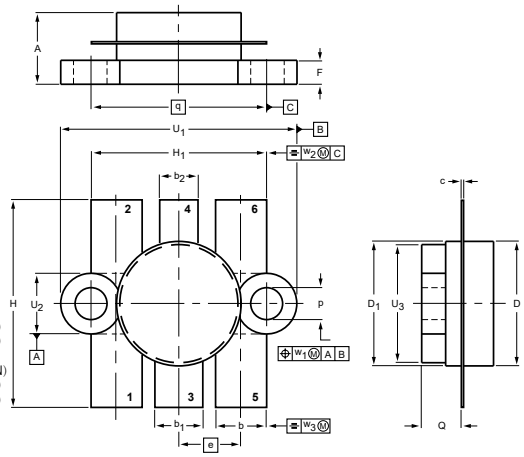
M164



	MINIMUM INCHES/MM	MAXIMUM INCHES/MM
A	.220/5,59	.230/5,84
B		1.050/26,67
C	.545/13,84	.555/14,10
D	.495/12,57	.505/12,83
E	.003/0,08	.007/0,18
F		.810/20,57
G	.185/4,70	.198/5,03
H	.497/12,62	.530/13,46

PIN 1. COLLECTOR (DRAIN)
2. EMITTER (SOURCE)
3. BASE (GATE)
4. EMITTER (SOURCE)

SOT119

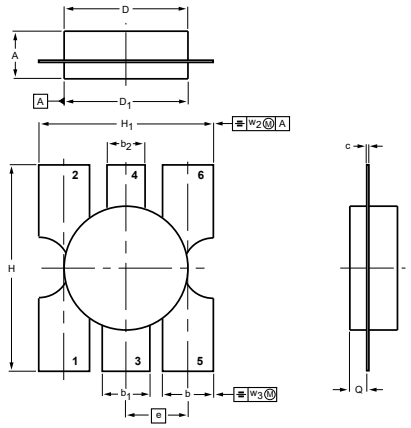


PIN 1. EMITTER (SOURCE)
2. EMITTER (SOURCE)
3. BASE (GATE)
4. COLLECTOR (DRAIN)
5. EMITTER (SOURCE)
6. EMITTER (SOURCE)

DIMENSIONS

UNIT	A	b	b_1	b_2	c	D	D_1	e	F	H	H_1	p	Q	q	U_1	U_2	U_3	w_1	w_2	w_3
mm	7.39 6.32	5.59 5.33	5.34 5.08	4.07 3.81	0.18 0.07	12.86 12.59	12.83 12.57	6.48	2.54 2.28	22.10 21.08	18.55 18.28	3.31 2.97	4.58 3.98	18.42	25.23 23.95	6.48 6.07	12.76 12.06	0.51	1.02	0.26
inches	0.291 0.249	0.220 0.210	0.210 0.200	0.160 0.150	0.007 0.003	0.505 0.496	0.505 0.495	0.255	0.100 0.090	0.870 0.830	0.730 0.720	0.130 0.117	0.180 0.157	0.725	0.993 0.943	0.255 0.239	0.502 0.475	0.02	0.04	0.01

SOT119D3

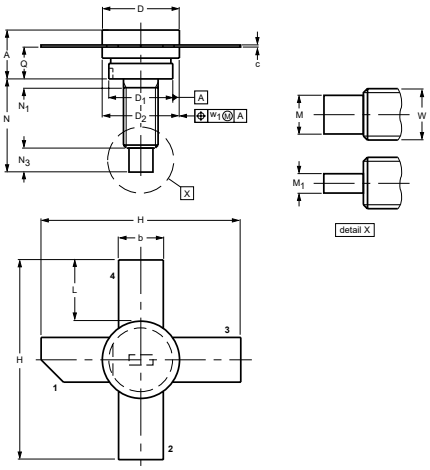


PIN 1. EMITTER (SOURCE)
2. EMITTER (SOURCE)
3. BASE (GATE)
4. COLLECTOR (DRAIN)
5. EMITTER (SOURCE)
6. EMITTER (SOURCE)

DIMENSIONS

UNIT	A	b	b_1	b_2	c	D	D_1	e	H	H_1	Q	w_2	w_3
mm	4.53 3.70	5.59 5.33	5.34 5.08	4.07 3.81	0.16 0.10	12.86 12.59	12.83 12.57	6.48	21.97 21.20	18.55 18.28	1.71 1.44	0.51	0.26
inches	0.178 0.146	0.220 0.210	0.210 0.200	0.160 0.150	0.006 0.004	0.506 0.496	0.505 0.495	0.255	0.865 0.835	0.730 0.720	0.067 0.057	0.02	0.01

SOT120

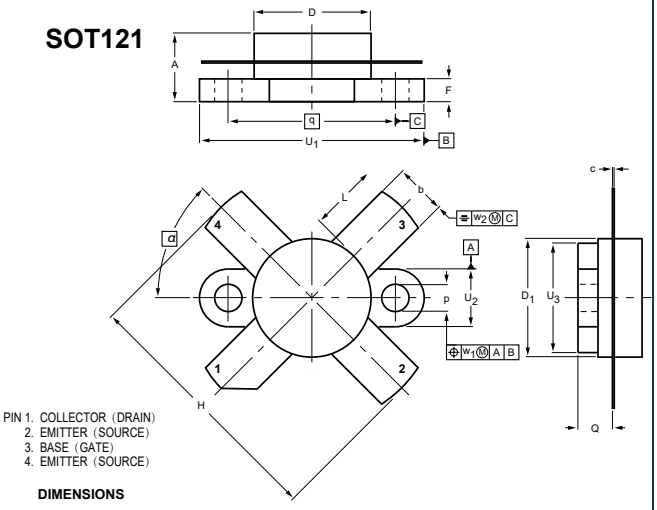


PIN 1. COLLECTOR (DRAIN)
2. EMITTER (SOURCE)
3. BASE (GATE)
4. EMITTER (SOURCE)

DIMENSIONS

UNIT	A	b	c	D	D_1	D_2	H	L	M	M_1	N	N_1	N_3	Q	W	w_1
mm	5.97 4.74	5.90 5.48	0.18 0.14	9.73 9.47	8.39 8.12	9.66 9.39	27.44 25.78	9.00 8.00	3.41 2.92	1.66 1.39	12.83 11.17	1.60 0.00	3.31 2.54	4.35 3.98	8-32 UNC	0.38
inches	0.283 0.248	0.232 0.216	0.007 0.004	0.383 0.373	0.330 0.320	0.380 0.370	1.080 1.015	0.354 0.315	0.134 0.115	0.065 0.055	0.505 0.440	0.063 0.000	0.130 0.100	0.171 0.157		0.015

SOT121

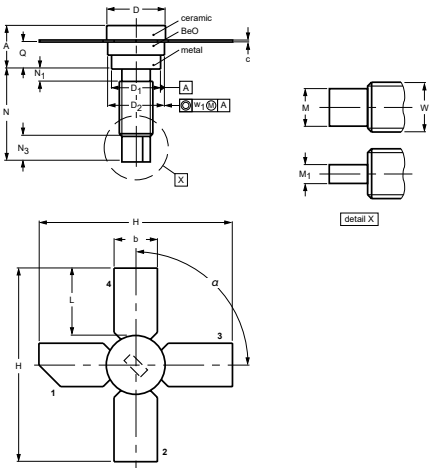


PIN 1. COLLECTOR (DRAIN)
2. EMITTER (SOURCE)
3. BASE (GATE)
4. EMITTER (SOURCE)

DIMENSIONS

UNIT	A	b	c	D	D_1	F	H	L	p	Q	q	U_1	U_2	U_3	w_1	w_2	α
mm	7.27 6.17	5.82 5.56	0.16 0.10	12.86 12.59	12.83 12.57	2.67 2.41	28.45 25.52	7.93 6.32	3.30 3.05	4.45 3.91	18.42	24.90 24.63	6.48 6.22	12.32 12.06	0.51	1.02	45°
inches	0.286 0.243	0.229 0.219	0.006 0.004	0.506 0.496	0.505 0.495	0.105 0.095	1.120 1.005	0.312 0.249	0.130 0.120	0.175 0.154	0.725	0.98 0.97	0.255 0.245	0.485 0.475	0.02	0.04	

SOT122

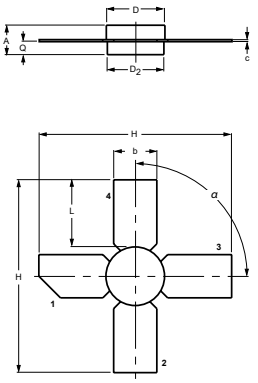


PIN 1. COLLECTOR (DRAIN)
2. EMITTER (SOURCE)
3. BASE (GATE)
4. EMITTER (SOURCE)

DIMENSIONS

UNIT	A	b	c	D	D_1	D_2	H	L	M_1	M	N	N_1 max.	N_3	Q	W	w_1	α
mm	5.97 4.74	5.85 5.58	0.18 0.14	7.50 7.23	6.48 6.22	7.24 6.93	27.56 25.78	9.91 9.14	3.18 2.66	1.66 1.39	11.82 11.04	1.02	3.86 2.92	3.38 2.74	8-32 UNC	0.381	90°

SOT122D3

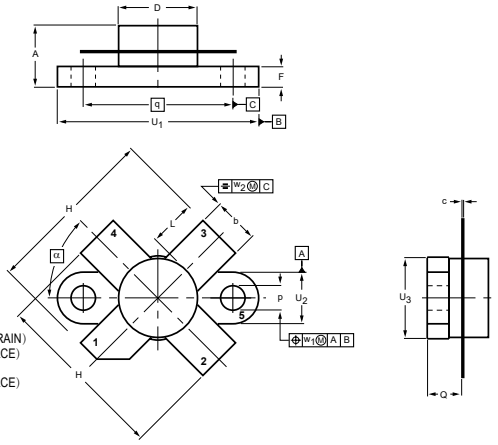


PIN 1. COLLECTOR (DRAIN)
2. EMITTER (SOURCE)
3. BASE (GATE)
4. EMITTER (SOURCE)

DIMENSIONS

UNIT	A	b	c	D	D_2	H	L	Q	α
mm	4.17 3.27	5.85 5.58	0.18 0.14	7.50 7.23	7.24 6.98	27.56 25.78	9.91 9.14	1.58 1.27	90°

SOT123



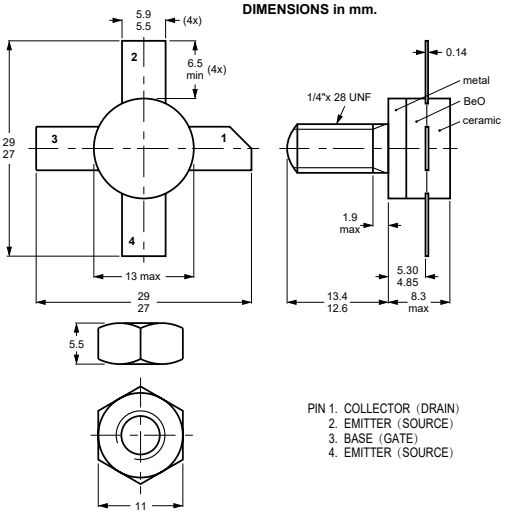
PIN 1. COLLECTOR (DRAIN)
2. EMITTER (SOURCE)
3. BASE (GATE)
4. EMITTER (SOURCE)

DIMENSIONS

UNIT	A	b	c	D	D_1	F	H	L	p	Q	q	U_1	U_2	U_3	w_1	w_2	α
mm	7.47 6.37	5.82 5.56	0.18 0.10	9.73 9.47	9.63 9.42	2.72 2.31	20.71 19.93	5.61 5.16	3.33 3.04	4.63 4.11	18.42	25.15 24.38	6.61 6.09	9.78 9.39	0.51	1.02	45°
inches	0.294 0.251	0.229 0.219	0.007 0.004	0.383 0.373	0.397 0.371	0.107 0.091	0.815 0.785	0.221 0.203	0.131 0.120	0.182 0.162	0.725	0.99 0.96	0.26 0.24	0.385 0.370	0.02	0.04	

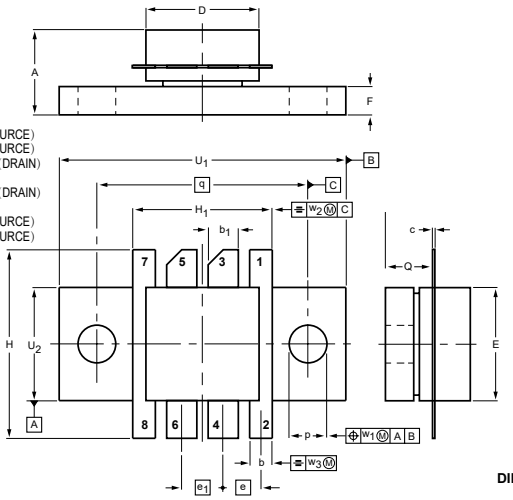
SOT147

DIMENSIONS in mm.



PIN 1. COLLECTOR (DRAIN)
2. EMITTER (SOURCE)
3. BASE (GATE)
4. EMITTER (SOURCE)

SOT161

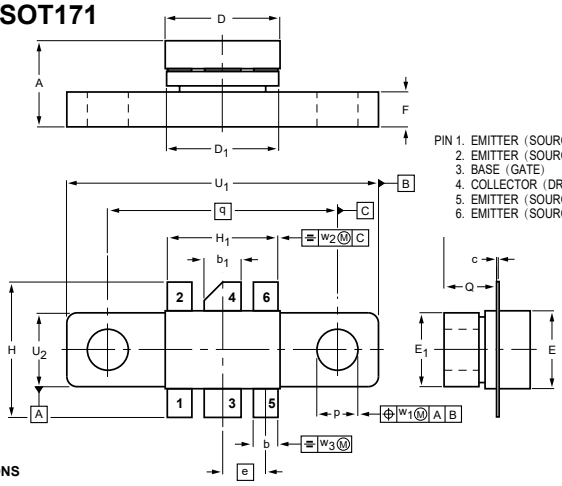


PIN 1. EMITTER (SOURCE)
2. EMITTER (SOURCE)
3. COLLECTOR (DRAIN)
4. BASE (GATE)
5. COLLECTOR (DRAIN)
6. BASE (GATE)
7. EMITTER (SOURCE)
8. EMITTER (SOURCE)

DIMENSIONS

UNIT	A	b	b_1	c	D	E	e	e_1	F	H	H_1	p	Q	q	U_1	U_2	w_1	w_2	w_3
mm	7.27 6.47	2.04 1.77	2.93 2.66	0.18 0.10	10.22 10.00	10.22 10.00	3.50	3.80	2.70 2.08	17.00 16.00	12.83 12.57	3.36 2.92	4.32 4.06	18.42	24.97 24.71	10.34 10.08	0.51	1.02	0.26
inches	0.286 0.255	0.080 0.070	0.115 0.105	0.007 0.004	0.402 0.394	0.402 0.394	0.138	0.150	0.106 0.082	0.669 0.630	0.505 0.495	0.132 0.120	0.170 0.160	0.725	0.983 0.973	0.407 0.397	0.02	0.04	0.01

SOT171

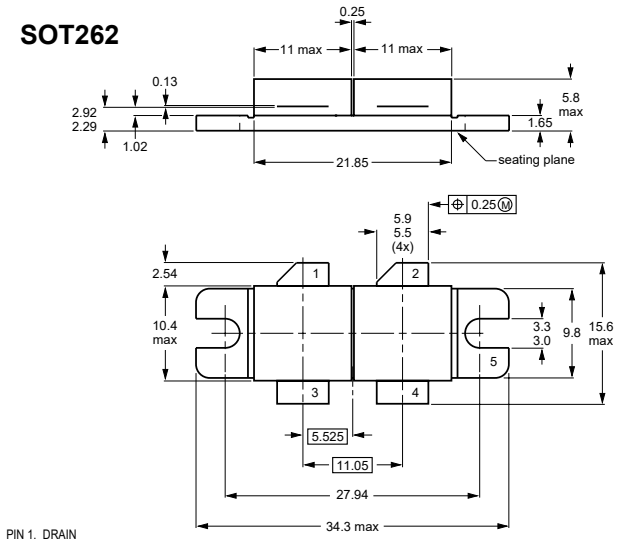


PIN 1. EMITTER (SOURCE)
2. EMITTER (SOURCE)
3. BASE (GATE)
4. COLLECTOR (DRAIN)
5. EMITTER (SOURCE)
6. EMITTER (SOURCE)

DIMENSIONS

UNIT	A	b	b_1	c	D	D_1	E	E_1	e	F	H	H_1	p	Q	q	U_1	U_2	w_1	w_2	w_3
mm	6.81 6.07	2.15 1.85	3.20 2.89	0.16 0.07	9.25 9.04	9.30 8.99	5.95 5.74	6.00 5.70	3.58	3.05 2.54	11.31 10.54	9.27 9.01	3.43 3.17	4.32 4.11	18.42	24.90 24.63	6.00 5.70	0.51	1.02	0.26
inches	0.268 0.239	0.085 0.073	0.126 0.114	0.006 0.003	0.364 0.356	0.366 0.354	0.234 0.226	0.236 0.224	0.140	0.120 0.100	0.445 0.415	0.365 0.355	0.135 0.125	0.170 0.162	0.725	0.980 0.970	0.236 0.224	0.02	0.04	0.01

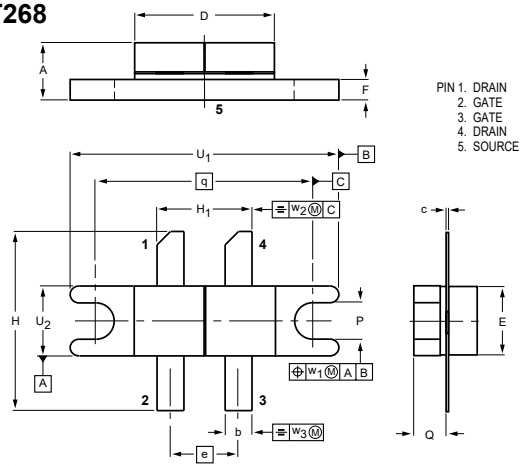
SOT262



PIN 1. DRAIN
2. DRAIN
3. GATE
4. GATE
5. SOURCE

DIMENSIONS in mm.

SOT268

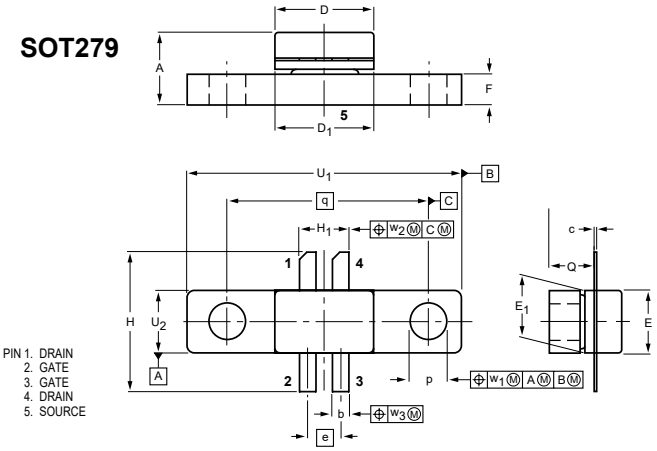


PIN 1. DRAIN
2. GATE
3. GATE
4. DRAIN
5. SOURCE

DIMENSIONS

UNIT	A	b	c	D	E	e	F	H	H_1	p	Q	q	U_1	U_2	w_1	w_2	w_3
mm	4.91 4.19	1.66 1.39	0.13 0.07	12.96 12.44	6.48 6.22	6.45	2.04 1.77	17.02 16.00	8.23 7.72	3.43 3.17	2.67 2.41	18.42	24.90 24.63	6.61 6.35	0.51	1.02	0.26
inches	0.193 0.165	0.065 0.055	0.005 0.003	0.510 0.490	0.255 0.245	0.254	0.080 0.070	0.670 0.630	0.324 0.304	0.135 0.125	0.105 0.095	0.725	0.980 0.970	0.260 0.250	0.02	0.04	0.01

SOT279

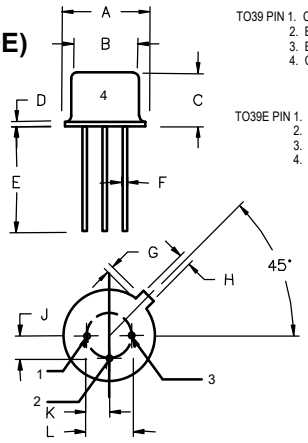


PIN 1. DRAIN
2. GATE
3. GATE
4. DRAIN
5. SOURCE

DIMENSIONS

UNIT	A	b	c	D	D_1	E	E_1	e	F	H	H_1	p	Q	q	U_1	U_2	w_1	w_2	w_3
mm	6.84 6.01	1.65 1.40	0.15 0.10	9.25 9.04	9.27 9.02	5.94 5.74	5.97 5.72	3.05	3.05 2.54	12.96 11.94	4.96 4.19	3.48 3.23	4.34 4.04	18.42	24.90 24.64	5.97 5.72	0.25	0.51	0.25
inches	0.269 0.237	0.065 0.055	0.006 0.004	0.364 0.356	0.365 0.355	0.234 0.226	0.235 0.225	0.120	0.120 0.100	0.510 0.470	0.195 0.165	0.137 0.127	0.171 0.159	0.725	0.980 0.970	0.235 0.225	0.010	0.020	0.010

TO39(TO39E)



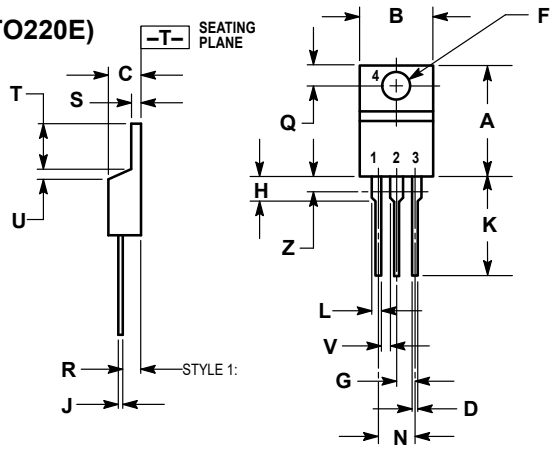
TO39 PIN 1. COLLECTOR (DRAIN)
2. BASE (GATE)
3. EMITTER (SOURCE)
4. COLLECTOR (DRAIN)

TO39E PIN 1. COLLECTOR (DRAIN)
2. BASE (GATE)
3. EMITTER (SOURCE)
4. EMITTER (SOURCE)

DIMENSIONS

UNIT	A	B	C	D	E	F	G	H	J	K	L
mm	9.40	8.51	6.60	1.14	12.70	0.48	1.02	0.86	2.67	2.67	5.33
	8.89	8.00	6.10	0.38		0.41	0.74	0.71	2.41	2.41	4.83
inches	0.370	0.335	0.260	0.045	0.500	0.019	0.040	0.034	0.105	0.105	0.210
	0.350	0.315	0.240	0.015		0.016	0.029	0.028	0.095	0.095	0.190

TO220(TO220E)



TO220 PIN 1. BASE (GATE)
2. COLLECTOR (DRAIN)
3. EMITTER (SOURCE)
4. COLLECTOR (DRAIN)

TO220E PIN 1. BASE (GATE)
2. EMITTER (SOURCE)
3. COLLECTOR (DRAIN)
4. EMITTER (SOURCE)

DIMENSIONS

UNIT	A	B	C	D	F	G	H	J	K	L	N	Q	R	S	T	U	V	Z
mm	15.75	10.28	4.82	0.88	3.73	2.66	3.93	0.64	14.27	1.52	5.33	3.04	2.79	1.39	6.47	1.27	--	2.04
	14.48	9.66	4.07	0.64	3.61	2.42	2.8	0.46	12.70	1.15	4.83	2.54	2.04	1.15	5.97	0.00	1.15	--
inches	0.620	0.405	0.19	0.035	0.147	0.105	0.155	0.025	0.562	0.060	0.210	0.12	0.11	0.055	0.255	0.05	--	0.08
	0.570	0.380	0.16	0.025	0.142	0.095	0.110	0.018	0.500	0.045	0.190	0.10	0.08	0.045	0.235	0.00	0.045	--

4. 军品筛选说明

我司已进入10余家军工单位的合格供方名录，给中国军工提供符合国家军用标准：QZJ840611，GJB33A，GJB128A 的产品。为了提高军品的可靠性，我司按照军用电子元器件规范 GJB128A 规定的方法以及客户专门的筛选要求进行产品筛选试验。

筛选试验是指为选择具有一定特性的产品或剔除早期失效的产品而进行的试验。在一定条件下，虽然通过严格的筛选是提高元器件批质量的有效措施之一，但必须指出筛选只能提高批产品的使用可靠性，不能提高产品的固有可靠性。也就是说，产品的固有可靠性是设计进去的，制造出来的，而不是筛选出来的。只有当芯片本身的性能和可靠性没有问题的前提下，这种筛选才有意义。

华高军品筛选试验方法

一）检查筛选

检查筛选可采取镜检、红外线筛选、X 射线筛选。红外线筛选可以剔除体内或表面热缺陷严重的器件，X 射线筛选主要用于检查管壳内有无外来物和装片、键合或封装工序的缺陷以及芯片裂纹。

二）密封性筛选

如气泡法、氦质谱仪法、放射性气体、示踪检漏法，用于剔除管壳及密封工艺中所在的缺陷（如裂纹、微小漏孔、气孔以及封装对位欠佳）。

三）环境应力筛选

如振动加速度、冲击加速度、离心加速度、温度循环和热冲击等

四）寿命筛选

高温贮存、低温贮存、老练筛选、精密筛选、线性判别

五）电测试筛选

依照据产品规格书和客户的筛选要求

军品筛选项目及条件

试验项目 / 常见缺陷	镜检	非破坏性键合拉力	检漏	恒定加速度	进行冲击	变频振动	振动疲劳	温度循环	湿热试验	X射线检查	PIND	高温贮存	高温老练
可动电荷													●
反型层沟道导通													●
键合松动或键合断开	●	●		●	●	●	●	●		●	●		
键合强度不能达到标准要求		●										●	
键合位置不当	●	●		●	●	●	●	●		●			●
芯片与管座连接不好	●	●		●	●	●	●	●		●		●	●
布线缺陷	●			●	●	●	●	●		●			
金属化缺陷	●												●
氧化层缺陷	●												●
芯片裂纹	●			●	●	●	●	●		●		●	●
装配缺陷	●			●	●	●	●	●		●			●
内部残存可动多余物	●									●	●		
管壳缺陷			●	●	●	●	●	●	●	●			

军品筛选程序

序号	筛 选 项 目	方 法 GJB128A	筛选条件或测量参数 I	II	III	说 明
1	编序列号 1)					
2	电参数测试(室温) 双极型放大晶体管 双极型开关晶体管 场效应晶体管	—	h_{FE}、$V_{(BR)CBO}$、I_{CBO}、$V_{(BR)CBO}$、I_{CBO} h_{FE}、$V_{(BR)CBO}$、I_{CBO}、V_{CES} g_m、$V_{CS(OFF)}$、I_{DSS}			测量参数及合格标准按合同、详细规范或产品手册规定
3	温度循环	1051	条件：B；循环 5 次			玻封器件转换时间为不大于 5min
4	恒定加速度	2006	Y1 方向、196000m/s²； 额定功率不小于 10W的器件 98000m/s²			无空腔的器件不要求 LTPD=5；不通过时全检
5	外观及机械检查	2071	用 10 倍放大镜或显微镜			可在筛选开始时增加一次
6	粒子碰撞噪声检测(PIND)	2052	试验条件： A			LTPD=10；不通过时全检
7	高温反偏(HTRB) 开关晶体管 PNP 晶体管 场效应晶体管	1038	反偏温度：125±2℃ 反偏电压：0.75 V_R 96h 240h	72h 160h	48h 96h	其它晶体管不要求做高温反偏筛选，高温反偏时间为表列时间减去生产方已进行的高温反偏。
8	老练前电参数测试（室温）	同序号 2				
9	老练(室温) 2)	1038	试验条件：B 240h	160h	96h	老练时间为表列时间减去生产方已进行的老练时间，但不得少于 48h
10	老练后电参数测试（室温）	同序号 2，对合同或详细规范要求的参数计算其Δ值 计算不合格品率				Ⅰ级 PDA≤5%(或 1 只取大值)；Ⅱ级PDA≤10%(或1只取大值)；Ⅲ级 PDA≤15%(或 1 只取大值)。
11	电参数测试(高温)	同序号 2：温度按合同或详细规范规定				LTPD=10 不通过时全检
12	电参数测试(低温) 双极型放大晶体管 双极型开关晶体管 场效应晶体管	温度按合同或详细规范规定，测量参数： h_{FE}、$V_{(BR)CBO}$、I_{CBO}、$V_{(BR)CBO}$、I_{CEO} h_{FE}、I_{CBO} g_m、I_{DSS}				LTPD=10 不通过时全检
13	密封 a. 细检漏 b. 粗检漏	1071	a. 试验条件：G或 H b. 试验条件：A、C、或 F			无空腔的器件不要求: 内腔体积人于 lcm³ 仅要求做粗检漏
14	外观及机械检查	207l	用 10 倍放大镜或显微镜			

注：1）当要求计算器件电参数的△值时应编序列号。

2）额定功率大于 1W 的器件可按规定加散热器老练，也可不加散热器按峰值结温老练。

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