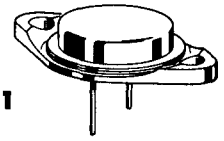
2N108–1N184

TYPE	MATERIAL	POLARITY	REPLACEMENT	PAGE NUMBER	USE	MAXIMUM RATINGS						ELECTRICAL CHARACTERISTICS								
						P_D @ 25°C	Ref Point	T_J °C	V_{CB} (volts)	V_{CE-} (volts)	Subscript	h_{FE} @ I_C (min)	(max)	Units	$V_{CE(SAT)}$ @ I_C (volts)	Units	h_{f-}	Subscript	f_- Units	Subscript
2N108	G	P			AFA	50M	A													
2N109	G	P	2N1192	6-30	AFC	165M	A	71	35	25	O	65	115	50M	0.15	50M	50	E		
2N110	G	P			MSS	0.2W	A	85	50						2.5	18M				
2N111	G	P			RFA	150M	A	85	30	15	O	15		1.0M						
2N111A	G	P			RFA	150M	A	85	30	15	O	15		1.0M						
2N112	G	P			RFA	150M	A	85	30	15	O	15		1.0M						
2N112A	G	P			RFA	150M	A	85	30	15	O	15		1.0M						
2N113	G	P			RFA	96M	A	85	10											
2N114	G	P			RFA	96M	A	85	10											
2N115	G	P			PMS	50W	C	75	32	32	R		110	30M						
2N117	S	N			HSA	150M	C	150	30								0.9	B	1.0M	B
2N118	S	N			HSA	150M	C	150	30								0.95	B	2.0M	B
2N118A	S	N			HSA	150M	C	150	45											
2N119	S	N			HSA	150M	C	150	30								0.974	B	2.0M	B
2N120	S	N			RFA	150M	C	175	45			76	333				0.987	B		
2N122	S	N			LPA	8.75W	C	150	120			3.0		100M						
2N123	G	P			HSA	50M	J	85	20	15	O						0.98	B	5.0M	B
2N124	G	N			MSS	50M	A	75	10			12	24	5.0M	0.3	5.0M			0.3M	B
2N125	G	N			MSS	50M	A	75	10			24	48	5.0M	0.3	5.0M			5.0M	B
2N126	G	N			MSS	50M	A	75	10			48	100	5.0M	0.3	5.0M			5.0M	B
2N127	G	N			MSS	50M	A	75	10			100	200	5.0M	0.3	5.0M			5.0M	B
2N128	G	P			RFA	30M	A	85	10	4.5	U						19	E	45M	M
2N129	G	P			RFA	30M	A	85	10	4.5	U						11.5	E	30M	M
2N130	G	P	2N1191	6-30	AFA	85M	A	85	44											
2N130A	G	P	2N650	6-20	AFA	100M	A	85	45	40	O						14	E		
2N131	G	P	2N1192	6-30	AFA	85M	A	85	30											
2N131A	G	P	2N651	6-20	AFA	100M	A	85	45	30	O						27	E		
2N132	G	P	2N1192	6-30	AFA	85M	A	85	24											
2N132A	G	P	2N651	6-20	AFA	100M	A	85	35	20	O									
2N133	G	P	2N1192	6-30	AFA	85M	A	85	30											
2N133A	G	P	2N651	6-20	LNA	100M	A	85	35	20	O									
2N135	G	P			RFA	100M	A	85	20	12	R						20	E	4.5M	B
2N136	G	P			RFA	100M	A	85	20	12	R						40	E	6.5M	B
2N137	G	P			RFA	100M	A	85	10	6.0	R						60	E	10M	B
2N138	G	P			AFA	50M	A	50	24											
2N138A	G	P			AFA	150M	A	85	45	30	O	10		50M						
2N138B	G	P			AFA	100M	A	85	45											
2N139	G	P			AFC	80M	A	70	16											
2N140	G	P			AFC	80M	A	70	16											
2N141	G	P			LPA	1.5W	A	25	60	30										
2N142	G	N			LPA	1.5W	A	25	60	30										
2N143	G	P			LPA	1.0W	A	25	60	30										
2N144	G	N			LPA	1.0W	A	25	60	30										
2N145	G	N			RFA	65M	A	75		20	U									
2N146	G	N			RFA	65M	A	75		20	U									
2N147	G	N			RFA	65M	A	75		20	U									
2N148	G	N			RFA	65M	A	75		16	U									
2N148A	G	N			RFA	65M	A	75		32	U									
2N149	G	N			RFA	65M	A	75		16	U									
2N149A	G	N			RFA	65M	A	75		32	U									
2N150	G	N			RFA	65M	A	75		16	U									
2N150A	G	N			RFA	65M	A	75		32	U									
2N155	G	P	2N176	7-20	LPA	1.5W	A	85	30			24		0.5A	0.65	0.5A				
2N156	G	P	2N176	7-20	LPA	1.5W	A	85	30			24		0.5A	0.6	1.0A			145K	B
2N157	G	P	2N1531	7-60	LPA	1.5W	A	85	60			20		0.5A					100K	B
2N157A	G	P	2N1532	7-60	LPA	1.5W	A	85	90			20		0.5A					100K	B
2N158	G	P	2N2139	7-78	LPA	1.5W	A	85	60			21		0.5A	0.75	1.0A			145K	B
2N158A	G	P	2N2141	7-78	LPA	1.5W	A	95	80	60	O	21		0.5A	0.75	1.0A			4.0K	E
2N159																				
2N160	S	N			AFA	0.15W	A		40			9.0	19							
2N160A	S	N			AFA	0.15W	A		40			9.0	19							
2N161	S	N			AFA	0.15W	A		40			19	39							
2N161A	S	N			AFA	0.15W	A		40			19	39							
2N162	S	N			AFA	0.15W	A		40			19	199							
2N162A	S	N			AFA	0.15W	A		40			19	199							
2N163	S	N			AFA	0.15W	A		40			39	199							
2N163A	S	N			AFA	0.15W	A		40			39	199							
2N166	G	N			RFC	25M	A	50		6.0	O									
2N167	G	N			HSA	75M	A	85	30	30	O						0.952	B	5.0M	B
2N167A	G	N			HSA	75M	A	85	30	30	O	17	90	8.0M			0.952	B	5.0M	B
2N168	G	N			RFC	55M	A	75	15	15	O						20	E		
2N168A	G	N			RFC	65M	A	85	15	15	O						20	E		
2N169	G	N			RFC	65M	A	85	15	15	O						30	E		
2N169A	G	N			AFC	65M	A	85	25	25	O						30	E		
2N170	G	N			RFC	25M	A	50		6.0	O									
2N172	G	N			RFA	65M	A	75		16	U									
2N173	G	P		7-25	LPA	10W	C	95	60	50	S	35	70	5.0A	1.0	12A				
2N174	G	P		7-17	PMS	100W	C	95	80	70	S	25	50	5.0A	0.9	12A				
2N174A	G	P			PMS	100W	C	95	80	70	S	40	80	1.2A	0.7	12A			100K	B
2N175	G	P	2N1192	6-30	AFC	50M	A	71	10											
2N176	G	P		7-20	AFC	90W	C	80	40	30	R	25		0.5A	0.4	3.0A			4.0K	E
2N178	G	P		7-22	AFA	40W	C	90	30	30	R	15	45	0.5A	0.6	3.0A			5.0K	E
2N179	G	P	2N176	7-20	AFA															
2N180	G	P	2N1192	6-30	AFA	0.15W	A	75	30											
2N181	G	P	2N1192	6-30	AFA	0.25W	A	75	30											
2N182	G	N			MSS	0.1W	A	75	25											
2N183	G	N			MSS	0.1W	A	75	25											
2N184	G	N			MSS	0.1W	A	75	25											

2N178 (GERMANIUM)
2N554
2N555

V_{CB} = 15-30 V
I_C = 3 A
P_D = 10 W



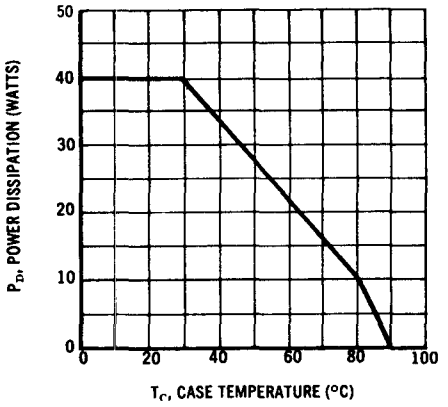
CASE 11
(TO-3)

PNP germanium power transistor for non-critical power amplifier and power switching applications requiring economical components.

MAXIMUM RATINGS

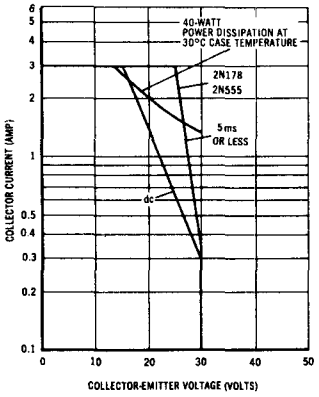
Rating	Symbol	2N178	2N554	2N555	Unit
Collector-Emitter Voltage	V_{CER}	30	16	30	Vdc
Collector-Base Voltage	V_{CB}	30	15	30	Vdc
Emitter-Base Voltage	V_{EB}	20	15	15	Vdc
Collector Current	I_C	3.0			Adc
Total Device Dissipation @ T_C = 80°C	P_D	10			Watts
Operating and Storage Junction Temperature Range	T_J, T_{stg}	-40 to +90			°C

POWER-TEMPERATURE DERATING CURVE
(All Types)

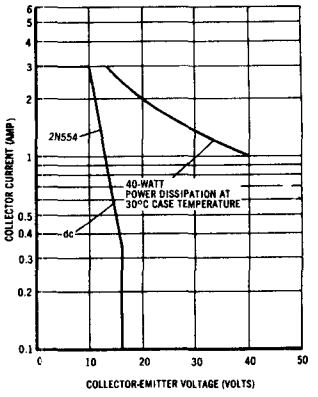


SAFE OPERATING AREAS

2N178, 2N555



2N554



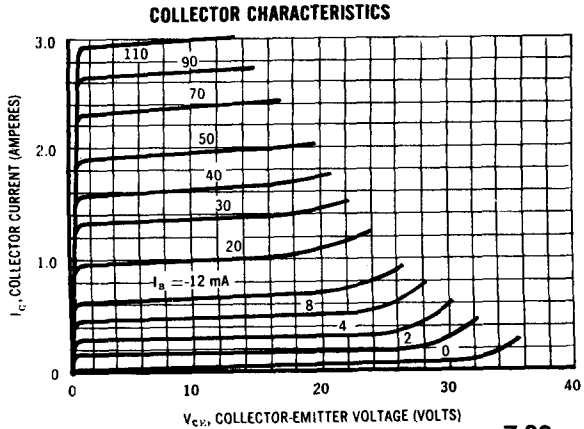
The Safe Operating Area Curves indicate I_C — V_{CE} limits below which the device will not go into secondary breakdown. Collector load lines for specific circuits must fall within the applicable Safe Area to avoid causing a collector-emitter short. (Duty cycle of the excursions make no significant change in these safe areas.) To insure operation below the maximum T_J, the power-temperature derating curve must be observed for both steady state and pulse power conditions.

2N178, 2N554, 2N555 (continued)

ELECTRICAL CHARACTERISTICS (T_C = 25°C unless otherwise noted)

Characteristic		Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Collector-Emitter Breakdown Voltage (I_C = 330 mAdc, R_{BE} = 10Ω)	2N178	BV_{CER}	30	-	-	Vdc
	2N554		16	-	-	
	2N555		30	-	-	
Collector-Base Cutoff Current (V_{CB} = 2.0 Vdc, I_E = 0)	2N178	I_{CBO}	-	0.05	-	mA
(V_{VB} = 30 Vdc, I_E = 0)	2N178		-	-	3.0	
(V_{CB} = 15 Vdc, I_E = 0)	2N554		-	-	10.0	
(V_{CB} = 30 Vdc, I_E = 0)	2N555		-	-	20.0	
(V_{CB} = 30 Vdc, I_E = 0, T_C = 90°C)	2N178		-	-	20.0	
Emitter-Base Cutoff Current (V_{BE} = 10 Vdc, I_C = 0)	2N178	I_{EBO}	-	-	2.0	mA
ON CHARACTERISTICS						
DC Current Gain (I_C = 0.5 Adc, V_{CE} = 2.0 Vdc)	2N178	h_{FE}	15	-	45	-
	2N554		-	50	-	
	2N555			50		
Collector-Emitter Saturation Voltage (I_C = 3.0 Adc, I_B = 300 mAdc)		$V_{CE(sat)}$	-	0.6	-	Vdc
SMALL-SIGNAL CHARACTERISTICS						
Common-Emitter Cutoff Frequency (I_C = 0.5 Adc, V_{CE} = 12 Vdc, f = 1.0 kHz ref)	2N178	$f_{\alpha e}$	5.0	-	-	kHz
	2N554		-	6.0	-	
	2N555		-	6.0	-	
Small-Signal Current Gain (I_C = 0.5 Adc, V_{CE} = 2.0 Vdc, f = 1.0 kHz ref)	2N178	h_{fe}	-	30	-	-
	2N554		-	55	-	
	2N555		-	55	-	
Input Impedance (I_C = 0.5 Adc, V_{CE} = 2.0 Vdc, f = 1.0 kHz)	2N178	h_{ie}	8.0	25	-	Ohms
	2N554		-	25	-	
	2N555		-	25	-	
FUNCTIONAL TESTS						
Power Gain (V_{CE} = 12 Vdc, I_C = 0.5 Adc, P_{out} = 2.0 Watts, f = 1.0 kHz, R_S = 10 Ohms, R_L = 26.6 Ohms)	2N178	G_{PE}	28	-	33	dB
	2N554		20	35	-	
	2N555		25	35	-	
Total Harmonic Distortion (Under same conditions as power gain)	2N178		-	-	5.0	%

COLLECTOR CHARACTERISTICS



INPUT CURRENT versus INPUT DRIVE VOLTAGE