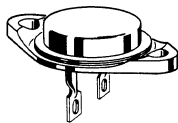


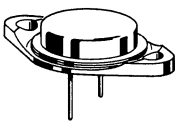
2N1651 thru 2N1653 (Germanium)

2N2285 thru 2N2287 (Germanium)



CASE 161
(TO-41)

2N1651 thru 2N1653
Collector connected to case



CASE 3A
(TO-3 modified)

2N2285 thru 2N2287

PNP Germanium power transistors designed for high-current switching applications requiring low saturation voltages and fast switching times in addition to good safe operating area.

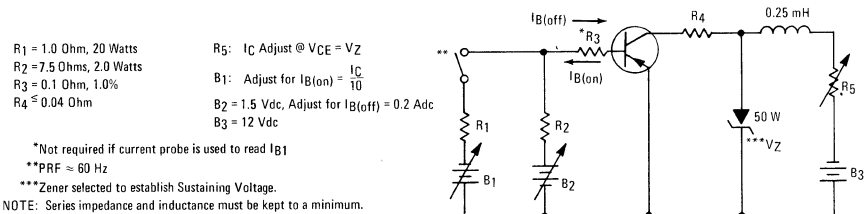
MAXIMUM RATINGS

Rating	Symbol	2N1651 2N2285	2N1652 2N2286	2N1653 2N2287	Unit
Collector-Emitter Voltage	V_{CEO}	30	60	80	Vdc
Collector-Base Voltage	V_{CB}	60	100	120	Vdc
Emitter-Base Voltage	V_{EB}	← 1.5 →			Vdc
Collector Current - Continuous	I_C	← 25 →			Adc
Base Current - Continuous	I_B	← 5.0 →			Adc
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C	P_D	← 106 1.25 →			Watts W/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	T_J, T_{stg}	← -65 to +110 →			$^\circ\text{C}$

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	θ_{JC}	0.8	$^\circ\text{C}/\text{W}$

FIGURE 1 – SUSTAINING VOLTAGE TEST CIRCUIT



2N1651 thru 2N1653/2N2285 thru 2N2287 (continued)

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

Characteristic		Symbol	Min	Max	Unit
OFF CHARACTERISTICS					
Collector-Emitter Breakdown Voltage ($I_C = 100 \text{ mA}$, $I_B = 0$)	2N1651, 2N2285 2N1652, 2N2286 2N1653, 2N2287	BV_{CEO}	30 60 80	- - -	Vdc
Collector-Emitter Sustaining Voltage (See Figure 1) ($I_C = 25 \text{ A}$)	2N1651, 2N2285 2N1652, 2N2286 2N1653, 2N2287	$V_{CE(sus)}$	40 45 50	- - -	Vdc
Collector Cutoff Current ($V_{CB} = 2.0 \text{ Vdc}$, $I_E = 0$)		I_{CBO1}	-	200	μA
Collector Cutoff Current ($V_{CB} = 40 \text{ Vdc}$, $I_E = 0$)	2N1651, 2N2285	I_{CBO2}	-	5.0	mA
($V_{CB} = 80 \text{ Vdc}$, $I_E = 0$)	2N1652, 2N2286		-	5.0	
($V_{CB} = 100 \text{ Vdc}$, $I_E = 0$)	2N1653, 2N2287		-	5.0	
Collector Cutoff Current ($V_{CB} = 40 \text{ Vdc}$, $I_E = 0$, $T_C = 100^\circ\text{C}$) (+0, -3.0°C)	2N1651, 2N2285	I_{CBO3}	-	35	mA
($V_{CB} = 80 \text{ Vdc}$, $I_E = 0$, $T_C = 100^\circ\text{C}$) (+0, -3.0°C)	2N1652, 2N2286		-	35	
($V_{CB} = 100 \text{ Vdc}$, $I_E = 0$, $T_C = 100^\circ\text{C}$) (+0, -3.0°C)	2N1653, 2N2287		-	35	
Collector Cutoff Current ($V_{CB} = 60 \text{ Vdc}$, $I_E = 0$)	2N1651, 2N2285	I_{CBO4}	-	20	mA
($V_{CB} = 100 \text{ Vdc}$, $I_E = 0$)	2N1652, 2N2286		-	20	
($V_{CB} = 120 \text{ Vdc}$, $I_E = 0$)	2N1653, 2N2287		-	20	
Emitter Cutoff Current ($V_{EB} = 1.5 \text{ Vdc}$, $I_C = 0$)		I_{EBO}	-	50	mA

ON CHARACTERISTICS

DC Current Gain $(I_C = 10 \text{ Adc}, V_{CE} = 2.0 \text{ Vdc})$ $(I_C = 25 \text{ Adc}, V_{CE} = 1.5 \text{ Vdc})$	h_{FE}	35 20	140 -	-
Collector-Emitter Saturation Voltage $(I_C = 25 \text{ Adc}, I_B = 2.5 \text{ Adc})$	$V_{CE(sat)}$	-	0.30	Vdc
Base-Emitter Saturation Voltage $(I_C = 25 \text{ Adc}, I_B = 2.5 \text{ Adc})$	$V_{BE(sat)}$	-	0.65	Vdc

SMALL-SIGNAL CHARACTERISTICS

Small-Signal Current Gain ($I_C = 0.5 \text{ A dc}$, $V_{CE} = 6.0 \text{ V dc}$, $f = 30 \text{ kHz}$)	h_{fe}	20	-	-
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SWITCHING CHARACTERISTICS

Rise Time	(I _C = 25 Adc, I _{B(on)} = 2.5 Adc, I _{B(off)} = 2.5 Adc) (See Figure 2)	t _r	-	12	μs
Storage Time		t _s	-	10	μs
Fall Time		t _f	-	8.0	μs

FIGURE 2 – SWITCHING TIME TEST CIRCUIT

