

PNP POWER SILICON TRANSISTOR

Qualified per MIL-PRF-19500/545

Devices

2N5151
2N5151L

2N5153
2N5153L

Qualified Level

JAN
JANTX
JANTXV

MAXIMUM RATINGS

Ratings	Symbol	All Units	Units
Collector-Emitter Voltage	V_{CEO}	80	Vdc
Collector-Base Voltage	V_{CBO}	100	Vdc
Emitter-Base Voltage	V_{EBO}	5.5	Vdc
Collector Current	$I_C^{(3,4)}$	2.0	Adc
Total Power Dissipation @ $T_A = +25^\circ\text{C}^{(1)}$ @ $T_C = +25^\circ\text{C}^{(2)}$	P_T	1.0 11.8	W W
Operating & Storage Temperature Range	T_j, T_{stg}	-65 to +200	$^\circ\text{C}$

THERMAL CHARACTERISTICS

Characteristics	Symbol	Max.	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	15	$^\circ\text{C/W}$

1) Derate linearly 5.7 mW/ $^\circ\text{C}$ for $T_A > +25^\circ\text{C}$

2) Derate linearly 66.7 mW/ $^\circ\text{C}$ for $T_C > +25^\circ\text{C}$

3) Derate linearly 6.67 mW/ $^\circ\text{C}$ for $T_A > +25^\circ\text{C}$

4) Derate linearly 80 mW/ $^\circ\text{C}$ for $T_C > +25^\circ\text{C}$



TO- 5*
2N5151L, 2N5153L



2N5151, 2N5153
TO-39*
(TO-205AD)

*See appendix A for package outline

ELECTRICAL CHARACTERISTICS ($T_C = 25^\circ\text{C}$ unless otherwise noted)

Characteristics	Symbol	Min.	Max.	Unit
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OFF CHARACTERISTICS

Collector-Emitter Breakdown Voltage $I_C = 100 \text{ mAdc}, I_B = 0$	$V_{(BR)CEO}$	80		Vdc
Emitter-Base Cutoff Current $V_{EB} = 4.0 \text{ Vdc}, I_C = 0$ $V_{EB} = 5.5 \text{ Vdc}, I_C = 0$	I_{EBO}		1.0 1.0	μAdc mAdc
Collector-Emitter Cutoff Current $V_{CE} = 60 \text{ Vdc}, V_{BE} = 0$ $V_{CE} = 100 \text{ Vdc}, V_{BE} = 0$	I_{CES}		1.0 1.0	μAdc mAdc
Collector-Base Cutoff Current $V_{CE} = 40 \text{ Vdc}, I_B = 0$	I_{CEO}		50	μAdc

2N5151, 2N5153 JAN SERIES

ELECTRICAL CHARACTERISTICS (con't)

Characteristics	Symbol	Min.	Max.	Unit
ON CHARACTERISTICS				
Forward Current Transfer Ratio $I_C = 50 \text{ mAdc}, V_{CE} = 5 \text{ Vdc}$ 2N5151 2N5153 $I_C = 2.5 \text{ Adc}, V_{CE} = 5 \text{ Vdc}$ 2N5151 2N5153 $I_C = 5 \text{ Adc}, V_{CE} = 5 \text{ Vdc}$ 2N5151 2N5153	h_{FE}	20 50 30 70 20 40	90 200	
Collector-Emitter Saturation Voltage $I_C = 2.5 \text{ Adc}, I_B = 250 \text{ Adc}$ $I_C = 5 \text{ Adc}, I_B = 500 \text{ Adc}$	$V_{CE(sat)}$		0.75 1.5	Vdc
Base-Emitter Voltage nonsaturated $V_{CE} = 5 \text{ Vdc}, I_C = 2.5 \text{ Adc}$	V_{BE}		1.45	Vdc
Base-Emitter Saturation Voltage $I_C = 2.5 \text{ Adc}, I_B = 250 \text{ mAdc}$ $I_C = 5 \text{ Adc}, I_B = 500 \text{ mAdc}$	$V_{BE(sat)}$		1.45 2.2	Vdc

DYNAMIC CHARACTERISTICS

Magnitude of Common Emitter Small-Signal Short Circuit Forward-Current Transfer Ratio $I_C = 500 \text{ mAdc}, V_{CE} = 5 \text{ Vdc}, f = 10 \text{ MHz}$ 2N5151 2N5153	$ h_{fe} $	6 7		
Common-Emitter Small-Signal Short-Circuit Forward-Current Transfer Ratio $I_C = 100 \text{ mAdc}, V_{CE} = 5 \text{ Vdc}, f = 1 \text{ kHz}$ 2N5151 2N5151	h_{fe}	20 50		
Output Capacitance $V_{CB} = 10 \text{ Vdc}, I_E = 0, f = 1.0 \text{ MHz}$	C_{obo}		250	pF

SWITCHING CHARACTERISTICS

Turn-On Time $I_C = 5 \text{ Adc}, I_{B1} = 500 \text{ mAdc}$	t_{on}		0.5	μs
Turn-Off Time $R_L = 6\Omega$	t_{off}		1.5	μs
Storage Time $I_{B2} = -500 \text{ mAdc}$	t_s		1.4	μs
Fall Time $V_{BE(OFF)} = 3.7 \text{ Vdc}$	t_f		0.5	μs

SAFE OPERATING AREA

DC Tests $T_C = +25^\circ\text{C}, 1 \text{ Cycle}, t_p = 1.0 \text{ s}$ Test 1 $V_{CE} = 5.8 \text{ Vdc}, I_C = 2.0 \text{ Adc}$ Test 2 $V_{CE} = 32 \text{ Vdc}, I_C = 340 \text{ mAdc}$ Test 3 $V_{CE} = 80 \text{ Vdc}, I_C = 20 \text{ mAdc}$	
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