

## NPN POWER SILICON TRANSISTOR

Qualified per MIL-PRF-19500/544

### DEVICES

2N5152      2N5154  
 2N5152L    2N5154L  
 2N5152U3   2N5154U3

### LEVELS

JAN  
 JANTX  
 JANTXV  
 JANS

### ABSOLUTE MAXIMUM RATINGS ( $T_C = +25^\circ\text{C}$ unless otherwise noted)

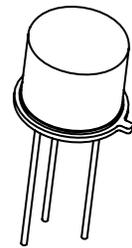
Parameters / Test Conditions	Symbol	Value	Unit
Collector-Emitter Voltage	$V_{CEO}$	80	Vdc
Collector-Base Voltage	$V_{CBO}$	100	Vdc
Emitter-Base Voltage	$V_{EBO}$	5.5	Vdc
Collector Current	$I_C$	2.0	Adc
Total Power Dissipation <sup>(1)</sup> @ $T_A = +25^\circ\text{C}$ @ $T_C = +25^\circ\text{C}$	$P_T$	1.0 10	W
Operating & Storage Junction Temperature Range	$T_J, T_{stg}$	-65 to +200	$^\circ\text{C}$
Thermal Resistance, Junction-to Case <sup>(1)</sup>	$R_{\theta JC}$	10 1.7 (U3)	$^\circ\text{C/W}$

#### Note:

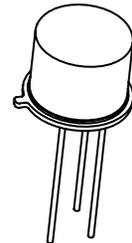
- See 19500/544 for thermal derating curves.
- This value applies for  $P_W \leq 8.3\text{ms}$ , duty cycle  $\leq 1\%$ .

### ELECTRICAL CHARACTERISTICS ( $T_A = +25^\circ\text{C}$ , unless otherwise noted)

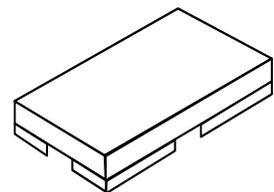
Parameters / Test Conditions	Symbol	Min.	Max.	Unit
<b>OFF CHARACTERISTICS</b>				
Collector-Emitter Breakdown Voltage $I_C = 100\text{mAdc}, I_B = 0$	$V_{(BR)CEO}$	80		Vdc
Emitter-Base Cutoff Current $V_{EB} = 4.0\text{Vdc}, I_C = 0$ $V_{EB} = 5.5\text{Vdc}, I_C = 0$	$I_{EBO}$		1.0 1.0	$\mu\text{Adc}$ 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	$\mu\text{Adc}$ mAdc
Collector-Emitter Cutoff Current $V_{CE} = 40\text{Vdc}, I_B = 0$	$I_{CEO}$		50	$\mu\text{Adc}$
<b>ON CHARACTERISTICS</b>				
Forward-Current Transfer Ratio $I_C = 50\text{mAdc}, V_{CE} = 5\text{Vdc}$	$h_{FE}$	20	---	
2N5154		50	---	
$I_C = 2.5\text{Adc}, V_{CE} = 5\text{Vdc}$		30	90	
2N5154		70	200	



TO-5  
2N5152L, 2N5154L



TO-39 (TO-205AD)  
2N5152, 2N5154



U-3  
2N5152U3, 2N5154U3

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### ELECTRICAL CHARACTERISTICS (con't)

Parameters / Test Conditions	Symbol	Min.	Max.	Unit
$I_C = 5\text{A dc}$ , $V_{CE} = 5\text{V dc}$ 2N5152 2N5154	$h_{FE}$	20 40		
Collector-Emitter Saturation Voltage $I_C = 2.5\text{A dc}$ , $I_B = 250\text{mA dc}$ $I_C = 5.0\text{A dc}$ , $I_B = 500\text{mA dc}$	$V_{CE(sat)}$		0.75 1.5	Vdc
Base-Emitter Voltage Non-Saturation $I_C = 2.5\text{A dc}$ , $V_{CE} = 5\text{V dc}$	$V_{BE}$		1.45	Vdc
Base-Emitter Saturation Voltage $I_C = 2.5\text{A dc}$ , $I_B = 250\text{mA dc}$ $I_C = 5.0\text{A dc}$ , $I_B = 500\text{mA dc}$	$V_{BE(sat)}$		1.45 2.2	Vdc

### DYNAMIC CHARACTERISTICS

Parameters / Test Conditions	Symbol	Min.	Max.	Unit
Magnitude of Common Emitter Small-Signal Short-Circuit Forward Current Transfer Ratio $I_C = 500\text{mA dc}$ , $V_{CE} = 5\text{V dc}$ , $f = 10\text{MHz}$ 2N5152 2N5154	$ h_{fe} $	6 7		
Small-signal short Circuit Forward-Current Transfer Ratio $I_C = 100\text{mA dc}$ , $V_{CE} = 5\text{V dc}$ , $f = 1\text{KHz}$ 2N5152 2N5154	$h_{fe}$	20 50		
Output Capacitance $V_{CB} = 10\text{V dc}$ , $I_E = 0$ , $f = 1.0\text{MHz}$	$C_{obo}$		250	pF

### SWITCHING CHARACTERISTICS

Parameters / Test Conditions	Symbol	Min.	Max.	Unit
Turn-On Time $I_C = 5\text{A dc}$ , $I_{B1} = 500\text{mA dc}$	$t_{on}$		0.5	$\mu\text{s}$
Turn-Off Time $R_L = 6\Omega$	$t_{off}$		1.5	$\mu\text{s}$
Storage Time $I_{B2} = -500\text{mA dc}$	$t_s$		1.4	$\mu\text{s}$
Fall Time $V_{BE(OFF)} = 3.7\text{V dc}$	$t_f$		0.5	$\mu\text{s}$

### SAFE OPERATING AREA

<b>DC Tests</b> $T_C = +25^\circ\text{C}$ , 1 Cycle, $t_p = 1.0\text{s}$ <b>Test 1</b> $V_{CE} = 5.0\text{V dc}$ , $I_C = 2.0\text{A dc}$ <b>Test 2</b> $V_{CE} = 32\text{V dc}$ , $I_C = 310\text{mA dc}$ <b>Test 3</b> $V_{CE} = 80\text{V dc}$ , $I_C = 12.5\text{mA dc}$
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