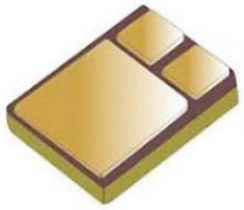
2N5151U3 & 2N5153U3

PNP Power Silicon Transistor

Rev. V5

Features

- Available in JAN, JANTX, JANTXV, JANS and JANSR per MIL-PRF-19500/545
- Lightweight & Low Power
- Ideal for Space, Military, and Other High Reliability Applications
- Surface Mount U3 Package



Electrical Characteristics (T_C = +25°C unless otherwise specified)

Parameter	Test Conditions	Symbol	Units	Min.	Max.
Collector - Emitter Breakdown Voltage	I_C = -100 mA dc; I_B = 0	$V_{(BR)CEO}$	V dc	-80	—
Emitter - Base Cutoff Current	V_{EB} = -4.0 V dc; I_C = 0 V_{EB} = -5.5 V dc; I_C = 0	I_{EBO1} I_{EBO2}	µA dc mA dc	—	-1.0 -1.0
Collector - Emitter Cutoff Current	V_{CE} = -60 V dc; V_{BE} = 0 V_{CE} = -100 V dc; V_{BE} = 0	I_{CES1} I_{CES2}	µA dc mA dc	—	-1.0 -1.0
Collector - Emitter Cutoff Current	V_{CE} = -40 V dc; I_B = 0	I_{CEO}	µA dc	—	-50
Forward Current Transfer Ratio	V_{CE} = -5.0 Vdc; I_C = -50 mA dc 2N5151U3 2N5153U3 V_{CE} = -5.0 Vdc; I_C = -2.5 A dc 2N5151U3 2N5153U3 V_{CE} = -5.0 Vdc; I_C = -5.0 A dc 2N5151U3 2N5153U3	h_{FE}	-	 20 50 30 70 20 40	 — — 90 200 — —
Collector - Emitter Saturation Voltage	I_C = -2.5 A dc; I_B = -250 mA dc I_C = -5.0 A dc; I_B = -500 mA dc	$V_{CE(sat)1}$ $V_{CE(sat)2}$	V dc	—	-0.75 -1.50
Base - Emitter Voltage (Non-Saturated)	V_{CE}= -5.0 V dc; I_C = -2.5 A dc	V_{BE}	V dc	—	-1.45
Base - Emitter Saturation Voltage	I_C = -2.5 A dc; I_B = -250 mA dc I_C = -5.0 A dc; I_B = -500 mA dc	$V_{BE(sat)1}$ $V_{BE(sat)2}$	V dc	—	-1.45 -2.20
Magnitude of Common Emitter Small-Signal Short-Circuit, Forward Current, Transfer Ratio	V_{CE} = -5.0 Vdc; I_C = -500 mA dc; f = 10 MHz 2N5151U3 2N5153U3	$\lvert h_{fe} \rvert$	-	 6 7	—
Common-Emitter, Small-Signal Short-Circuit Forward Current Transfer Ratio	V_{CE} = -5.0 V dc; I_C = -100 mA dc; f = 1 kHz 2N5151U3 2N5153U3	h_{fe}	-	 20 50	—
Open-Circuit Output Capacitance	V_{CB} = -10 V dc, I_E = 0, f = 1 MHz	C_{obo}	pF	—	250

Electrical Characteristics (T_C = +25°C unless otherwise specified)

Parameter	Test Conditions	Symbol	Units	Min.	Max.
Collector - Emitter Cutoff Current	T_C = +150°C V_{CE} = -60 V dc; V_{BE} = + 2 V dc	I_{CEX}	µA dc	—	-25
Forward - Current Transfer Ratio	T_C = -55°C V_{CE} = -5 V dc; I_C = -2.5 A dc 2N5151U3 2N5153U3	h_{FE4}	-	 15 25	

Absolute Maximum Ratings (T_C = +25°C unless otherwise specified)

Ratings	Symbol	Value
Collector - Emitter Voltage	V_{CEO}	-80 V dc
Collector - Base Voltage	V_{CBO}	-100 V dc
Emitter - Base Voltage	V_{EBO}	-5.5 Vdc
Collector Current	I_C	-2 A dc -10 A dc (3)
Reverse Pulse Energy(4)		15 mj
Total Power Dissipation (1) @ T_A = 25°C @ T_C = 25°C	P_T	 1.16 W 100 W
Operating & Storage Temperature Range	T_J, T_{STG}	-65°C to +200°C

Thermal Characteristics

Characteristics	Symbol	Max. Value
Thermal Resistance, Junction to Case(2)	$R_{\theta JC}$	1.75°C/W
Thermal Resistance, Junction to Ambient(2)	$R_{\theta JA}$	150°C/W(5)

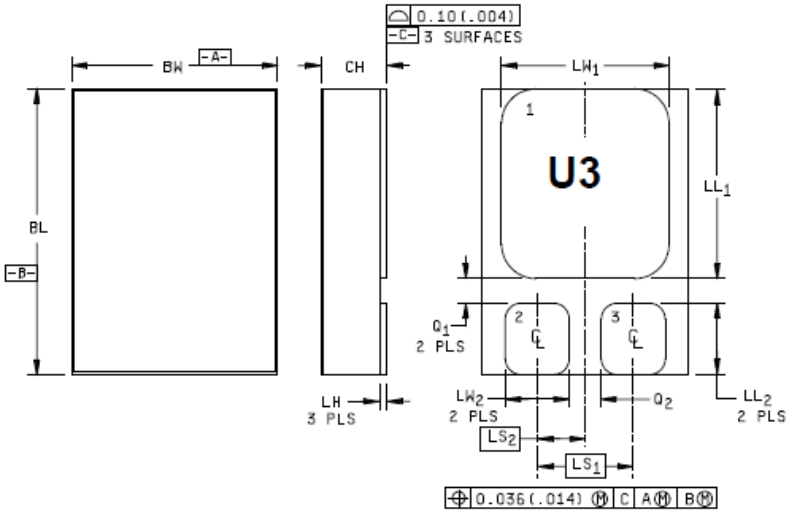
(1) See figures 6, 7, 8 and 9 of MIL-PRF-19500/545 for temperature-power derating curves.
(2) See figures 10, 11 and 12 of MIL-PRF-19500/545 for transient thermal impedance graph.
(3) The value applies for pw ≤ 8.3 ms, duty cycle ≤ 1 percent.
(4) This rating is based on the capability of the transistors to operate safely in the unclamped inductive load energy test circuit, see subgroup 5 of the group A inspection table and figure 13 of MIL-PRF-19500/545.
(5) Mounted on an FR4 printed circuit board.

Electrical Characteristics (T_C = +25°C unless otherwise specified)

Parameter	Test Conditions	Symbol	Units	Min.	Max.
Switching Characteristics					
Turn-On Time	I_C = -5 A dc; I_{B1} = -500 mA dc, R_L = 6 Ω, I_{B2} = -500 mA dc, $V_{BE(off)}$ = -3.7 Vdc	t_{on}	µs	—	0.5
Turn-Off Time		t_{off}	µs	—	1.5
Storage Time		t_s	µs	—	1.4
Fall Time		t_f	µs	—	0.5

Safe Operating Area	
DC Tests:	T_C = +25°C, I Cycle, t_p = 1 s
Test 1:	V_{CE} = -5.8 V dc; I_C = -2 A dc
Test 2:	V_{CE} = -32 Vdc; I_C = -360 mA dc
Test 3:	V_{CE} = -80 Vdc; I_C = -14.5 mA dc

Outline Drawing (U3)



Symbol	Dimensions			
	Inches		Millimeters	
	Min	Max	Min	Max
BL	.395	.405	10.04	10.28
BW	.291	.301	7.40	7.64
CH	.1085	.1205	2.76	3.06
LH	.010	.020	0.25	0.51
LL1	.220	.230	5.59	5.84
LL2	.115	.125	2.93	3.17
LS1	.150 BSC		3.81 BSC	
LS2	.075 BSC		1.91 BSC	
LW1	.281	.291	7.14	7.39
LW2	.090	.100	2.29	2.54
Q1	.030		0.762	
Q2	.030		0.762	

NOTES:
1. Dimensions are in inches.
2. Millimeters are given for general information only.
3. Terminal 1 - collector, terminal 2 - base, terminal 3 - emitter.

SCHEMATIC

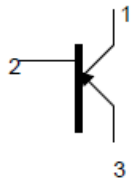


FIGURE 2. Physical dimensions and configuration for surface mount (U3).