

NPN DARLINGTON POWER SILICON TRANSISTOR

Qualified per MIL-PRF-19500/472

Devices

2N6350 2N6351 2N6352 2N6353

Qualified Level

JAN
JANTX
JANTXV

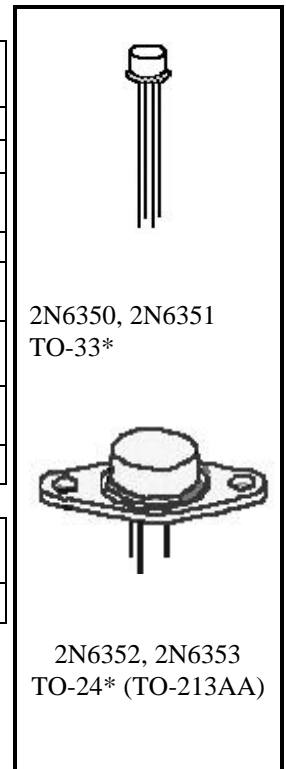
MAXIMUM RATINGS

Ratings	Symbol	2N6350 2N6352	2N6351 2N6353	Units
Collector-Emitter Voltage	V_{CER}	80	150	Vdc
Collector-Base Voltage	V_{CBO}	80	150	Vdc
Emitter-Base Voltage	V_{EBO}	12 6.0		Vdc Vdc
Base Current	I_B	0.5		Adc
Collector Current	I_C	5.0 10 ⁽¹⁾		Adc Adc
		2N6350 2N6351	2N6352 2N6353	
Total Power Dissipation @ $T_A = 25^{\circ}C$	P_T	1.0 ⁽²⁾	2.0 ⁽⁴⁾	W
@ $T_C = 100^{\circ}C$		5.0 ⁽³⁾	25 ⁽⁵⁾	W
Operating & Storage Junction Temperature Range	T_J, T_{stg}	-65 to +200		$^{\circ}C$

THERMAL CHARACTERISTICS

Characteristics	Symbol	2N6350 2N6351	2N6352 2N6353	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	20	4.0	$^{\circ}C/W$

- 1) Applies for $t_p \leq 10$ ms, Duty cycle $\leq 50\%$
- 2) Derate linearly @ 5.72 mW/ $^{\circ}C$ above $T_A > 25^{\circ}C$
- 3) Derate linearly @ 50 mW/ $^{\circ}C$ above $T_C > 100^{\circ}C$
- 4) Derate linearly @ 11.4 mW/ $^{\circ}C$ above $T_A > 25^{\circ}C$
- 5) Derate linearly @ 250 mW/ $^{\circ}C$ above $T_C > 100^{\circ}C$



*See Appendix A for package outline

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

Characteristics	Symbol	Min.	Max.	Unit
Collector-Emitter Breakdown Voltage $I_C = 25$ mAdc, $R_{B1E} = 2.2$ k Ω , $R_{B2E} = 100$ Ω	$V_{(BR)CER}$	80 150		Vdc

2N6350, 2N6351, 2N6352, 2N6353 JAN SERIES

ELECTRICAL CHARACTERISTICS (con't)

Characteristics	Symbol	Min.	Max.	Unit
Emitter-Base Breakdown Voltage I _{EB} = 12 mA _{dc} , Base 1 Open I _{EB} = 12 mA _{dc} , Base 2 Open	V _{(BR)EBO}	6.0 12		V _{dc}
Collector-Emitter Cutoff Current V _{EB1} = 2.0 V _{dc} , R _{B2E} = 100 Ω, V _{CE} = 80 V _{dc} 2N6350, 2N6352 V _{EB1} = 2.0 V _{dc} , R _{B2E} = 100 Ω, V _{CE} = 150 V _{dc} 2N6351, 2N6353	I _{CEX}		1.0 1.0	μA _{dc}

ON CHARACTERISTICS ⁽⁶⁾

Forward-Current Transfer Ratio I _C = 1.0 A _{dc} , V _{CE} = 5.0 V _{dc} , R _{B2E} = 1.0 Ω 2N6350, 2N6352 I _C = 5.0 A _{dc} , V _{CE} = 5.0 V _{dc} , R _{B2E} = 100 Ω I _C = 10 A _{dc} , V _{CE} = 5.0 V _{dc} , R _{B2E} = 100 Ω I _C = 1.0 A _{dc} , V _{CE} = 5.0 V _{dc} , R _{B2E} = 1.0 Ω 2N6351, 2N6353 I _C = 5.0 A _{dc} , V _{CE} = 5.0 V _{dc} , R _{B2E} = 100 Ω I _C = 10 A _{dc} , V _{CE} = 5.0 V _{dc} , R _{B2E} = 100 Ω	h _{FE}	2,000 2,000 400 1,000 1,000 200	10,000 10,000	
Collector-Emitter Saturation Voltage I _C = 5.0 A _{dc} , R _{B2E} = 100 Ω, I _{B1} = 5.0 mA _{dc} 2N6350, 2N6352 I _C = 5.0 A _{dc} , R _{B2E} = 100 Ω, I _{B1} = 10 mA _{dc} 2N6351, 2N6353	V _{CE(sat)}		1.5 2.5	V _{dc}
Base-Emitter Voltage I _C = 5.0 A _{dc} , V _{CE} = 5.0 V _{dc} , R _{B2E} = 100 Ω	V _{BE1(on)}		2.5	V _{dc}

DYNAMIC CHARACTERISTICS

Magnitude of Common Emitter Small-Signal Short-Circuit Forward Current Transfer Ratio I _C = 1.0 A _{dc} , V _{CE} = 10 V _{dc} , R _{B2E} = 100 Ω; f = 10 MHz	h _{fe}	5.0	25	
Output Capacitance V _{CB1} = 10 V _{dc} , 100 kHz ≤ f ≤ 1.0 MHz, Base 2 Open	C _{obo}		120	pF

SWITCHING CHARACTERISTICS

Turn-On Time V _{CC} = 30 V _{dc} ; I _C = 5.0 A _{dc} (See fig 4 for 2N6350, 2N6352) (See fig 5 for 2N6350, 2N6352)	t _{on}		0.5	μs
Turn-Off Time V _{CC} = 30 V _{dc} ; I _C = 5.0 A _{dc} (See fig 4 for 2N6350, 2N6352) (See fig 5 for 2N6350, 2N6352)	t _{off}		1.2	μs

SAFE OPERATING AREA

DC Tests T _C = +100°C, 1 Cycle, t ≥ 1.0 s, t _r + t _f = 10 μs, R _{B2E} = 100 Ω (See fig 6 for 2N6350, 2N6351)	
Test 1 V _{CE} = 1.5V _{dc} , I _C = 3.3 A _{dc}	2N6350, 2N6351
Test 2 V _{CE} = 30 V _{dc} , I _C = 167 mA _{dc}	2N6350, 2N6351
Test 3 V _{CE} = 80 V _{dc} , I _C = 35 mA _{dc}	2N6350
Test 4 V _{CE} = 150 V _{dc} , I _C = 13 mA _{dc}	2N6351
T_C = +100°C, 1 Cycle, t ≥ 1.0 s, t_r + t_f = 10 μs, R_{B2E} = 100 Ω (See fig 7 for 2N6352, 2N6353)	
Test 1 V _{CE} = 5.0V _{dc} , I _C = 5.0 A _{dc}	2N6352, 2N6353
Test 2 V _{CE} = 10 V _{dc} , I _C = 2.5 A _{dc}	2N6352, 2N6353
Test 3 V _{CE} = 80 V _{dc} , I _C = 95 mA _{dc}	2N6352
Test 4 V _{CE} = 150 V _{dc} , I _C = 35 mA _{dc}	2N6353

(6) Pulse Test: Pulse Width = 300μs, Duty Cycle ≤ 2.0%.