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NPN DARLINGTON POWER SILICON TRANSISTOR

Devices

2N6350 2N6351 2N6352 2N6353

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 @ $T_A = 25^0C$ @ $T_C = 100^0C$	P_T	1.0(2) 5.0(3)	2.0(4) 25(5)	W W
Operating & Storage Junction Temperature Range	T_J, T_{stg}	-65 to +200		^0C

2N6350, 2N6351
TO-33*

2N6352, 2N6353

*See Appendix A for package outline

THERMAL CHARACTERISTICS

Characteristics	Symbol	2N6350 2N6351	2N6352 2N6353	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	20	4.0	$^0C/W$

1) Applies for $t_p \leq 10$ ms, Duty cycle $\leq 50\%$
2) Derate linearly @ 5.72 mW/^{0}C above $T_A > 25^0C$
3) Derate linearly @ 50 mW/^{0}C above $T_C > 100^0C$
4) Derate linearly @ 11.4 mW/^{0}C above $T_A > 25^0C$
5) Derate linearly @ 250 mW/^{0}C above $T_C > 100^0C$

ELECTRICAL CHARACTERISTICS ($T_C = 25^0C$ unless otherwise noted)

Characteristics		Symbol	Min.	Max.	Unit
OFF CHARACTERISTICS					
Collector-Emitter Breakdown Voltage I_C = 25 mAdc, R_{B1E} = 2.2 kΩ, R_{B2E} = 100 Ω	2N6350, 2N6352 2N6351, 2N6353	$V_{(BR)CER}$	80 150		Vdc

ELECTRICAL CHARACTERISTICS (con't)

Characteristics		Symbol	Min.	Max.	Unit
Emitter-Base Breakdown Voltage					
I_{EB} = 12 mAdc, Base 1 Open		$V_{(BR)EBO}$	6.0		Vdc
I_{EB} = 12 mAdc, Base 2 Open			12		
Collector-Emitter Cutoff Current					
V_{EB1} = 2.0 Vdc, R_{B2E} = 100 Ω, V_{CE} = 80 Vdc	2N6350, 2N6352	I_{CEX}		1.0	μAdc
V_{EB1} = 2.0 Vdc, R_{B2E} = 100 Ω, V_{CE} = 150 Vdc	2N6351, 2N6353			1.0	
ON CHARACTERISTICS [6]					
Forward-Current Transfer Ratio					
I_C = 1.0 Adc, V_{CE} = 5.0 Vdc, R_{B2E} = 1.0 Ω	2N6350, 2N6352		2,000		
I_C = 5.0 Adc, V_{CE} = 5.0 Vdc, R_{B2E} = 100 Ω		h_{FE}	2,000	10,000	
I_C = 10 Adc, V_{CE} = 5.0 Vdc, R_{B2E} = 100 Ω			400		
I_C = 1.0 Adc, V_{CE} = 5.0 Vdc, R_{B2E} = 1.0 Ω	2N6351, 2N6353		1,000		
I_C = 5.0 Adc, V_{CE} = 5.0 Vdc, R_{B2E} = 100 Ω			1,000	10,000	
I_C = 10 Adc, V_{CE} = 5.0 Vdc, R_{B2E} = 100 Ω			200		
Collector-Emitter Saturation Voltage					
I_C = 5.0 Adc, R_{B2E} = 100 Ω, I_{B1} = 5.0 mAdc	2N6350, 2N6352	$V_{CE(sat)}$		1.5	Vdc
I_C = 5.0 Adc, R_{B2E} = 100 Ω, I_{B1} = 10 mAdc	2N6351, 2N6353			2.5	
Base-Emitter Voltage					
I_C = 5.0 Adc, V_{CE} = 5.0 Vdc, R_{B2E} = 100 Ω		$V_{BE1(on)}$		2.5	Vdc
DYNAMIC CHARACTERISTICS					
Magnitude of Common Emitter Small-Signal Short-Circuit Forward Current Transfer Ratio		$\lvert h_{fe} \rvert$			
I_C = 1.0 Adc, V_{CE} = 10 Vdc, R_{B2E} = 100 Ω; f = 10 MHz			5.0	25	
Output Capacitance					
V_{CB1} = 10 Vdc, 100 kHz ≤ f ≤ 1.0 MHz, Base 2 Open		C_{obo}		120	pF
SWITCHING CHARACTERISTICS					
Turn-On Time					
V_{CC} = 30 Vdc; I_C = 5.0 Adc	(See fig 4 for 2N6350, 2N6352) (See fig 5 for 2N6350, 2N6352)	t_{on}		0.5	μs
Turn-Off Time					
V_{CC} = 30 Vdc; I_C = 5.0 Adc	(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} = 1.5Vdc, I_C = 3.3 Adc — 2N6350, 2N6351

Test 2

V_{CE} = 30 Vdc, I_C = 167 mAdc — 2N6350, 2N6351

Test 3

V_{CE} = 80 Vdc, I_C = 35 mAdc — 2N6350

Test 4

V_{CE} = 150 Vdc, I_C = 13 mAdc — 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} = 5.0Vdc, I_C = 5.0 Adc — 2N6352, 2N6353

Test 2

V_{CE} = 10 Vdc, I_C = 2.5 Adc — 2N6352, 2N6353

Test 3

V_{CE} = 80 Vdc, I_C = 95 mAdc — 2N6352

Test 4

V_{CE} = 150 Vdc, I_C = 35 mAdc — 2N6353