

## NPN DARLINGTON POWER SILICON TRANSISTOR

Qualified per MIL-PRF-19500/523

### Devices

2N6383

2N6384

2N6385

### Qualified Level

JAN, JANTX  
JANTXV

### MAXIMUM RATINGS

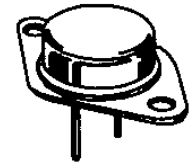
Ratings	Symbol	2N6383	2N6384	2N6385	Unit
Collector-Emitter Voltage	$V_{CEO}$	40	60	80	Vdc
Collector-Base Voltage	$V_{CBO}$	40	60	80	Vdc
Emitter-Base Voltage	$V_{EBO}$	5.0			Vdc
Base Current	$I_B$	0.25			Adc
Collector Current	$I_C$	10			Adc
Total Power Dissipation	$P_T$	@ $T_A = +25^{\circ}C$ <sup>(1)</sup>			W
		@ $T_C = +25^{\circ}C$ <sup>(2)</sup>			W
Operating & Storage Temperature	$T_{op}, T_{stg}$	-55 to +175			$^{\circ}C$

### THERMAL CHARACTERISTICS

Characteristics	Symbol	Max.	Unit
Thermal Resistance Junction-to-Case	$R_{\theta JC}$	1.75	$^{\circ}C/W$

1) Derate linearly 34.2 mW/ $^{\circ}C$  above  $T_A > +25^{\circ}C$

2) Derate linearly 571 mW/ $^{\circ}C$  above  $T_C > +25^{\circ}C$



TO-3\* (TO-204AA)

\*See Appendix A for package outline

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

Characteristics	Symbol	Min.	Max.	Unit
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### OFF CHARACTERISTICS

Collector-Emitter Breakdown Voltage $I_C = 200$ mAdc	2N6383	$V_{(BR)CEO}$	40	Vdc
	2N6384		60	
	2N6385		80	
Collector-Emitter Breakdown Voltage $I_C = 200$ mAdc, $R_{BB} = 100 \Omega$	2N6383	$V_{(BR)CER}$	40	Vdc
	2N6384		60	
	2N6385		80	
Collector-Base Cutoff Current $V_{CE} = 40$ Vdc	2N6383	$I_{CBO}$		mAdc
	2N6384		1.0	
	2N6385		1.0	

**ELECTRICAL CHARACTERISTICS (con't)**

Characteristics	Symbol	Min.	Max.	Unit
Emitter-Base Cutoff Current $V_{EB} = 5.0 \text{ Vdc}$	$I_{EBO}$		5.0	mAdc
Collector-Emitter Cutoff Current $V_{CE} = 40 \text{ Vdc}$ 2N6383 $V_{CE} = 60 \text{ Vdc}$ 2N6384 $V_{CE} = 80 \text{ Vdc}$ 2N6385	$I_{CEO}$		1.0 1.0 1.0	mAdc
Collector-Emitter Cutoff Current $V_{CE} = 40 \text{ Vdc}, V_{BE} = 1.5 \text{ Vdc}$ 2N6383 $V_{CE} = 60 \text{ Vdc}, V_{BE} = 1.5 \text{ Vdc}$ 2N6384 $V_{CE} = 80 \text{ Vdc}, V_{BE} = 1.5 \text{ Vdc}$ 2N6385	$I_{CEX}$		0.3 0.3 0.3	mAdc

**ON CHARACTERISTICS <sup>(3)</sup>**

Forward-Current Transfer Ratio $I_C = 5.0 \text{ Adc}, V_{CE} = 3.0 \text{ Vdc}$ $I_C = 10 \text{ Adc}, V_{CE} = 3.0 \text{ Vdc}$	$h_{FE}$	1,000 100	20,000	
Collector-Emitter Saturation Voltage $I_C = 5.0 \text{ Adc}, I_B = 10 \text{ mAdc}$ $I_C = 10 \text{ Adc}, I_B = 0.1 \text{ Adc}$	$V_{CE(sat)}$		2.0 3.0	Vdc
Base-Emitter Voltage $I_C = 5.0 \text{ Adc}, V_{CE} = 3.0 \text{ Vdc}$ $I_C = 10 \text{ Adc}, V_{CE} = 3.0 \text{ Vdc}$	$V_{BE(on)}$		2.8 4.5	Vdc

**DYNAMIC CHARACTERISTICS**

Small-Signal Short-Circuit Forward Current Transfer Ratio $I_C = 1.0 \text{ Adc}, V_{CE} = 5.0 \text{ Vdc}, f = 1.0 \text{ MHz}$	$ h_{fe} $	20	300	
Output Capacitance $V_{CB} = 10 \text{ Vdc}, I_E = 0, 100 \text{ kHz} \leq f \leq 1.0 \text{ MHz}$	$C_{obo}$		200	pF

**SWITCHING CHARACTERISTICS**

Turn-On Time $V_{CC} = 30 \text{ Vdc}; I_C = 5.0 \text{ Adc}; I_{B1} = 20 \text{ mAdc}$	$t_{on}$		2.5	$\mu\text{s}$
Turn-Off Time $V_{CC} = 30 \text{ Vdc}; I_C = 5.0 \text{ Adc}; I_{B1} = -I_{B2} = 20 \text{ mAdc}$	$t_{off}$		10	$\mu\text{s}$

**SAFE OPERATING AREA**

<b>DC Tests</b> $T_C = +25^\circ\text{C}, 1 \text{ Cycle}, t = 1.0 \text{ s}$	
<b>Test 1</b> $V_{CE} = 10 \text{ Vdc}, I_C = 10 \text{ Adc}$	All Types
<b>Test 2</b> $V_{CE} = 30 \text{ Vdc}, I_C = 3.33 \text{ Adc}$	All Types
<b>Test 3</b> $V_{CE} = 40 \text{ Vdc}, I_C = 1.5 \text{ Adc}$	2N6383
$V_{CE} = 60 \text{ Vdc}, I_C = 0.4 \text{ Adc}$	2N6384
$V_{CE} = 80 \text{ Vdc}, I_C = 0.16 \text{ Adc}$	2N6385

(3) Pulse Test: Pulse Width = 300 $\mu\text{s}$ , Duty Cycle  $\leq 2.0\%$ .