2N6383 2N6384 2N6385

NPN Silicon Power Darlington Transistors

Rev. V3

Features

- Available in JAN, JANTX, JANTXV per MIL-PRF-19500/523
- TO-3 (TO-204AA) Package
- Designed for Power Amplifier and Shunt and Series Regulator Applications

Electrical Characteristics (T_A = +25°C unless otherwise noted)

Parameter	Test Conditions	Symbol	Units	Min.	Max.
Collector - Emitter Breakdown Voltage	I_C = 200 mA dc 2N6383 2N6384 2N6385	$V_{(BR)CEO}$	V dc	 40 60 80	—
Collector - Emitter Breakdown Voltage	I_C = 200 mA dc, R_{BB} = 100Ω 2N6383 2N6384 2N6385	$V_{(BR)CER}$	V dc	 40 60 80	—
Collector - Base Cutoff Current	V_{CE} = 40 V dc, 2N6383 V_{CE} = 60 V dc, 2N6384 V_{CE} = 80 V dc, 2N6385	I_{CBO1}	mA dc	—	1.0
Emitter - Base Cutoff Current	V_{EB} = 5 V dc	I_{EBO}	mA dc	—	5.0
Collector - Emitter Cutoff Current	V_{CE} = 40 V dc, 2N6383 V_{CE} = 60 V dc, 2N6384 V_{CE} = 80 V dc, 2N6385	I_{CEO}	mA dc	—	1.0
Collector - Emitter Cutoff Current	V_{CE} = 40 V dc, V_{BE} = -1.5 Vdc, 2N6383 V_{CE} = 60 V dc, V_{BE} = -1.5 Vdc, 2N6384 V_{CE} = 80 V dc, V_{BE} = -1.5 Vdc, 2N6385	I_{CEX1}	µA dc	—	100
Forward Current Transfer Ratio	V_{CE} = 3 V dc, I_C = 5.0 A dc V_{CE} = 3 V dc, I_C = 10 A dc	h_{FE1} h_{FE2}	-	1,000 100	20,000
Saturation Voltage and Resistance	I_C = 5.0 A dc, I_B = 10 mA dc I_C = 10 A dc, I_B = 0.1 A dc	$V_{CE(SAT)1}$ $V_{CE(SAT)2}$	V dc	—	2.0 3.0
Base - Emitter Voltage (Unsaturated)	V_{CE} = 3.0 V dc, I_C = 5.0 A dc V_{CE} = 3.0 V dc, I_C = 10 A dc	$V_{BE(on)1}$ $V_{BE(on)2}$	V dc	—	2.8 4.5
Collector-Emitter Cutoff Current	T_A = +150°C V_{CE} = 40 V dc, V_{BE} = -1.5 Vdc, 2N6383 V_{CE} = 60 V dc, V_{BE} = -1.5 Vdc, 2N6384 V_{CE} = 80 V dc, V_{BE} = -1.5 Vdc, 2N6385	I_{CEX2}	mA dc	—	3.0
Forward - Current Transfer Ratio	T_A = -55°C V_{CE} = 3.0 V dc, I_C = 5.0 A dc	h_{FE3}		200	

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Electrical Characteristics (T_A = +25°C unless otherwise noted)

Parameter	Test Conditions	Symbol	Units	Min.	Max.
Magnitude of Small-Signal Short-Circuit Forward-Current Transfer Ratio	I_C = 1 A dc, V_{CE} = 5 V dc, f = 1 MHz	$\lvert h_{fe} \rvert$	-	20	300
Open-Circuit Output Capacitance	V_{CB} = 10 V dc, I_E = 0, 100 kHz ≤ f ≤ 1 MHz	C_{obo}	pF	—	200
Turn-On Time	V_{CC} = 30 V dc; I_C = 5 A dc, I_{B1} = 20 mA dc	t_{on}	µs	—	2.5
Turn-Off Time	V_{CC} = 30 V dc; I_C = 5 A dc, I_{B1} = -I_{B2} = 20 mA dc	t_{off}	µs	—	10

Absolute Maximum Ratings (T_A = +25°C unless otherwise noted)

Ratings	Symbol	2N6383	2N6384	2N6385	Units
Collector - Emitter Voltage	V_{CEO}	40	60	80	V dc
Collector - Base Voltage	V_{CBO}	40	60	80	V dc
Emitter - Base Voltage	V_{EBO}	5			V dc
Collector Current	I_C	10			A dc
Base Current	I_B	0.25			A dc
Total Power Dissipation @ T_A = +25°C (1) @ T_C = +25°C (2)	P_T	6 100			W
Operating & Storage Temperature Range	T_J, T_{STG}	-55 to +175			°C

(1) Derate linearly @ 34.2 mW / °C above T_A > 25°C.
(2) Derate linearly @ 571 mW / °C above T_C > 25°C.

Thermal Characteristics

Characteristics	Symbol	Max. Value
Thermal Resistance, Junction to Case	$R_{\theta JC}$	1.75°C/W

Safe Operating Area	
DC Tests:	T_C = +25 °C, I Cycle, t = 1.0 s
Test 1:	V_{CE} = 10 Vdc, I_C = 10 A dc, All Types
Test 2:	V_{CE} = 30 Vdc, I_C = 3.33 A dc, All Types
Test 3:	V_{CE} = 40 Vdc, I_C = 1.5 A dc, 2N6383
	V_{CE} = 60 Vdc, I_C = 0.4 A dc, 2N6384
	V_{CE} = 80 Vdc, I_C = 0.16 A dc, 2N6385

Outline Drawing (TO-3)

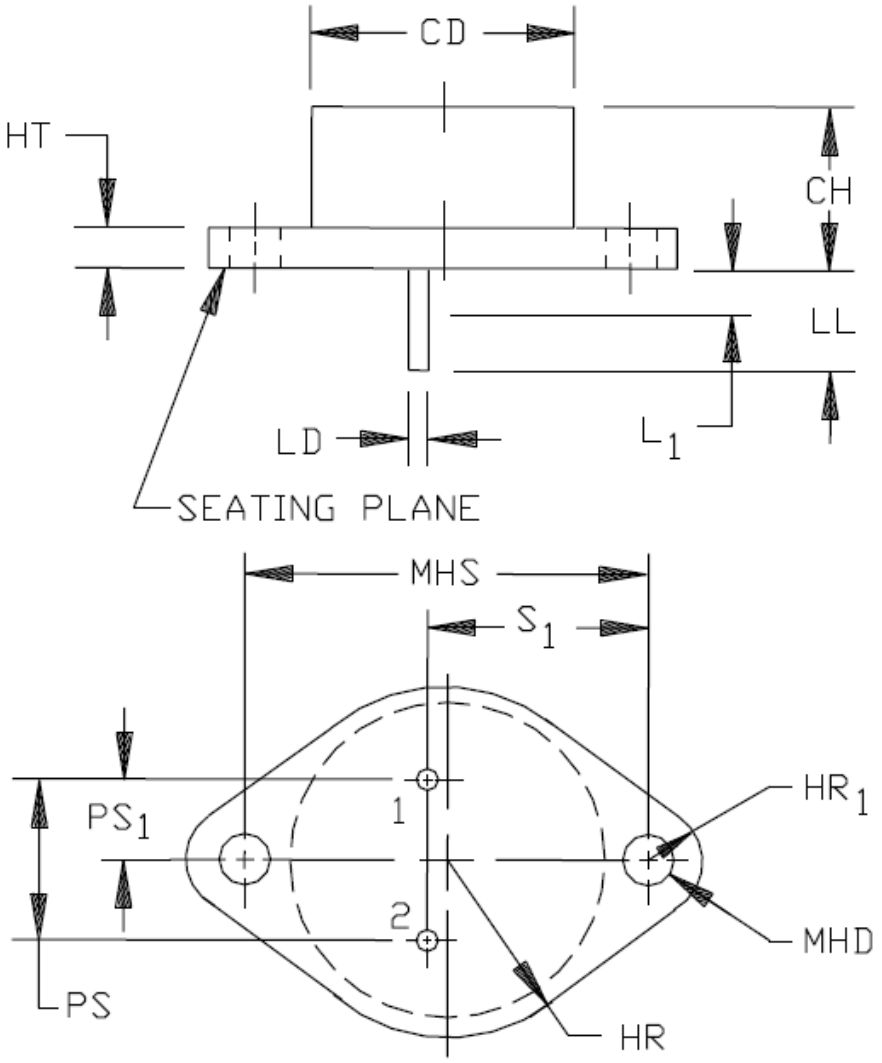

FIGURE 1. Physical dimensions (TO-204AA, formerly TO-3)

Outline Drawing (TO-3)

Symbol	Dimensions				Notes
	Inches		Millimeters		
	Min	Max	Min	Max	
CD		.875		22.23	5
CH	.250	.450	6.35	11.43	
HR	.495	.525	12.57	13.34	6
HR_1	.131	.188	3.33	4.78	6
HT	.050	.135	1.27	3.43	
LD	.038	.043	0.97	1.09	7, 8, 9
LL	.312	.500	7.92	12.7	
L_1		.050		1.27	
MHD	.151	.161	3.84	4.09	10
MHS	1.177	1.197	29.90	30.40	
PS	.420	.440	10.67	11.18	8
PS_1	.205	.225	5.21	5.72	7, 8
S_1	.655	.675	16.64	17.15	7, 8

NOTES:

1. Dimensions are in inches. Millimeters are given for general information only.
2. Terminal 1 is the emitter and terminal 2 is the base. The collector shall be electrically connected to the case.
3. The seating plane of the header shall be flat within .001 inch (0.03 mm) concave to .004 inch (0.10 mm) convex inside a .930 inch (23.62 mm) diameter circle on the center of the header and flat within .001 inch (0.03 mm) concave to .006 inch (0.15 mm) convex overall.
4. Mounting holes (MHD) shall be deburred on the seating plane side.
5. Body contour is optional within zone defined by dimension CD.
6. Applies to all sides (HR) or both ends (HR_1).
7. Applies to both terminals.
8. Measurement for this dimension shall be taken at points .050 inch (1.27 mm) to .055 inch (1.40 mm) below the seating plane. When gauge is not used, measurement shall be made at seating plane.
9. Lead diameter shall not exceed twice dimension LD within dimension L_1.
10. Applies to both holes.
11. In accordance with ASME Y14.5M, diameters are equivalent to ϕx symbology.

FIGURE 1. Physical dimensions (TO-204AA, formerly TO-3) - Continued.

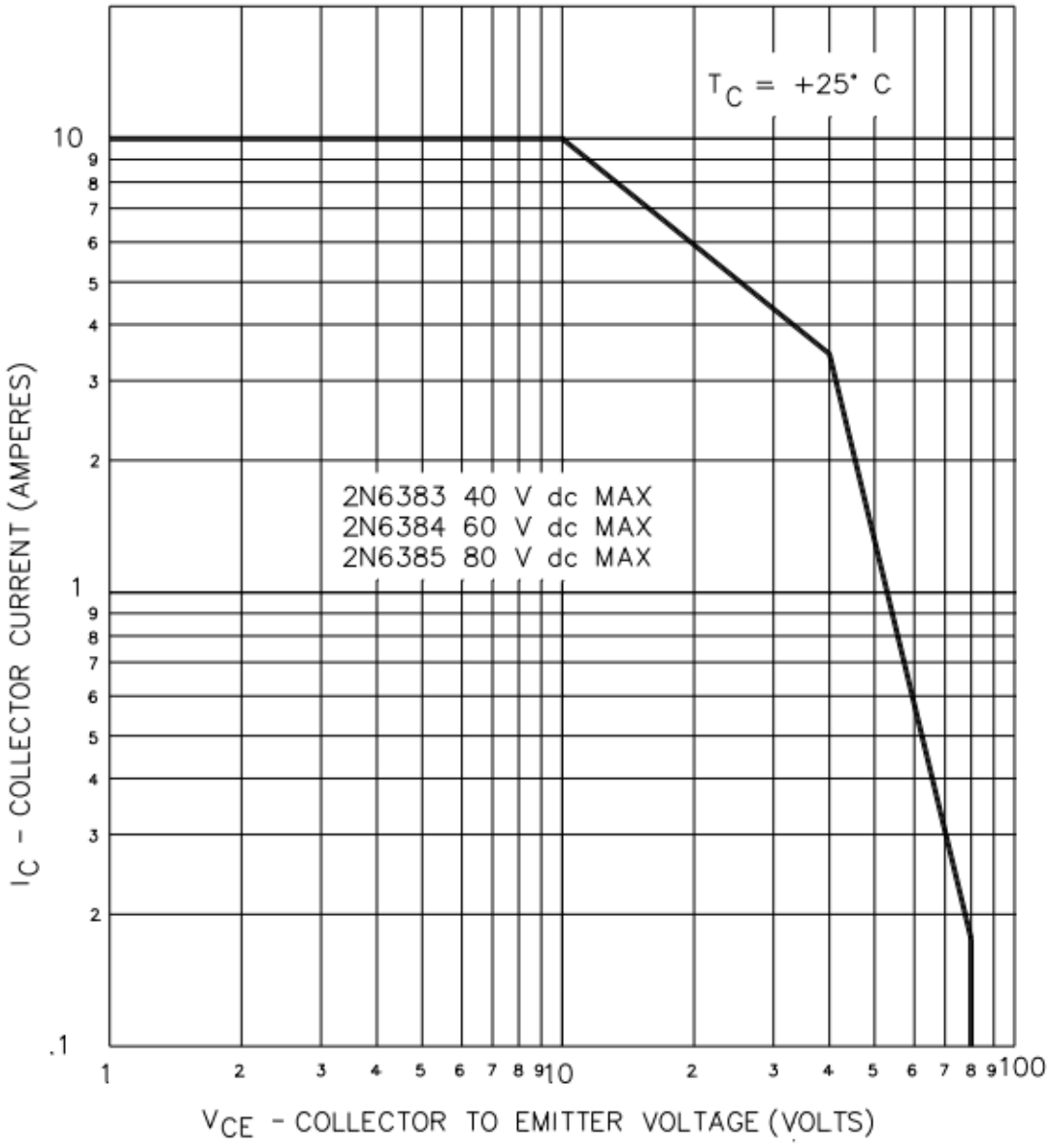

FIGURE 3. Maximum safe operating graph (continuous dc).

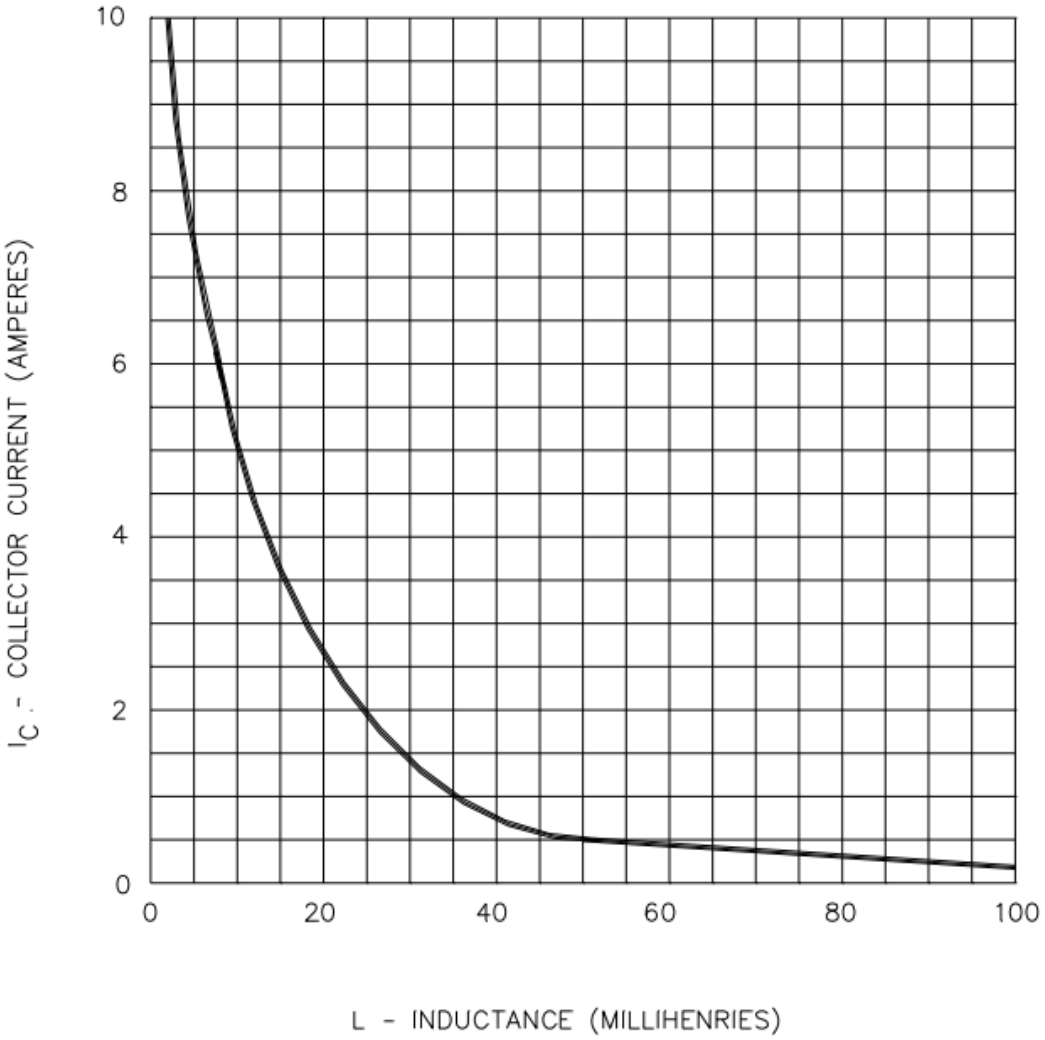

FIGURE 4. Safe operating area for switching between saturation and cutoff (unclamped inductive load).