2N6058 & 2N6059

NPN Darlington Power Silicon Transistors

Rev. V3

Features

- Available in JAN, JANTX, JANTXV per MIL-PRF-19500/502
- TO-3 (TO-204AA) Package
- Designed for Use in High Gain Amplifier and Switching Applications

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

Parameter	Test Conditions	Symbol	Units	Min.	Max.
Collector - Emitter Breakdown Voltage	I_C = 100 mA dc, 2N6058 I_C = 100 mA dc, 2N6059	$V_{(BR)CEO}$	V dc	80 100	—
Collector - Emitter Cutoff Current	V_{CE} = 40 V dc, 2N6058 V_{CE} = 50 V dc, 2N6059	I_{CEO}	mA dc	—	1.0 1.0
Collector - Emitter Cutoff Current	V_{CE} = 80 V dc; V_{BE} = 1.5 V dc, 2N6058 V_{CE} = 100 V dc; V_{BE} = 1.5 V dc, 2N6059	I_{CEX1}	µA dc	—	10 10
Collector - Base Cutoff Current	V_{EB} = 5 Vdc	I_{EBO}	mA dc	—	2.0
Forward Current Transfer Ratio	I_C = 1 A dc; V_{CE} = 3 V dc I_C = 6 A dc; V_{CE} = 3 V dc I_C = 12 A dc; V_{CE} = 3 V dc	h_{FE}	-	1,000 1,000 150	18,000
Collector - Emitter Saturation Voltage	I_C = 12 A dc; I_B = 120 mA dc I_C = 6 A dc; I_B = 24 mA dc	$V_{CE(sat)1}$ $V_{CE(sat)2}$	Vdc	—	3.0 2.0
Base - Emitter Voltage	I_C = 12 A dc; I_B = 120 mA dc	$V_{BE(SAT)}$	Vdc	—	4.0
Base - Emitter Voltage	I_C = 6 A dc; V_{CE} = 3 Vdc	V_{BE}	Vdc	—	2.8
Collector - Emitter Cutoff Current	T_A = +150°C V_{CE} = 80 V dc; V_{BE} = 1.5 V dc, 2N6058 V_{CE} = 100 V dc; V_{BE} = 1.5 V dc, 2N6059	I_{CEX2}	mA dc	—	5.0 5.0
Collector - Emitter Saturation Voltage	T_A = +150°C I_C = 6 A dc; I_B = 24 mA dc	$V_{CE(sat)3}$	V dc	—	2.0
Forward - Current Transfer Ratio	T_A = -55°C V_{CE} = 3 V dc; I_C = 6 A dc	h_{FE4}		1,000	
Dynamic Characteristics					
Magnitude of Common Small-Signal Short-Circuit Forward Current Transfer Ratio	I_C = 5 A dc; V_{CE} = 3 Vdc; f = 1.0 MHz	$\lvert h_{fe} \rvert$	-	10	250
Small-Signal Short-Circuit Forward Current Transfer Ratio	I_C = 5 A dc; V_{CE} = 3 Vdc; f = 1 kHz	h_{fe}	-	1,000	—
Output Capacitance	V_{CB} = 10 V dc; I_E = 0; 100 kHz ≤ f ≤ 1 MHz	C_{obo}	pF	—	300
Switching Characteristics					
Turn-On Time	V_{CC} = 30 Vdc; I_C = 5 A dc; I_B = 20 mA dc	t_{on}	µs	—	2.0
Turn-Off Time	V_{CC} = 30 Vdc; I_C = 5 A dc; I_{B1} = I_{B2} = 20 mA dc	t_{off}	µs	—	10

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

Ratings	Symbol	Value
Collector - Emitter Voltage 2N6058 2N6059	V_{CEO}	 80 V dc 100 V dc
Collector - Base Voltage 2N6058 2N6059	V_{CBO}	 80 V dc 100 V dc
Emitter - Base Voltage	V_{EBO}	5 V dc
Collector Current	I_C	12 A dc
Base Current	I_B	0.2 A dc
Total Power Dissipation @ T_C = +25°C[1] @ T_C = +100°C	P_T	 150 W 75 W
Operating & Storage Temperature Range	T_J, T_{STG}	-55°C to +175°C

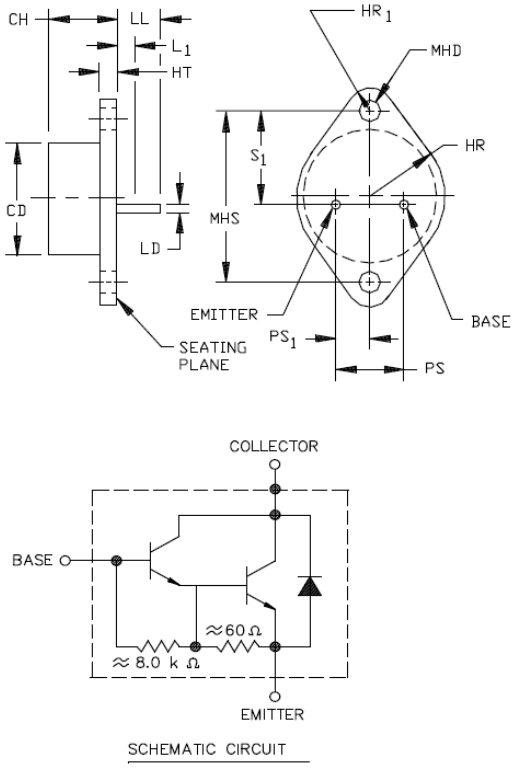
(1) Derate linearly @ 1.00 W/°C above T_C > +25°C.

Thermal Characteristics

Characteristics	Symbol	Max. Value
Thermal Resistance, Junction to Case	$R_{\theta JC}$	1°C/W

Safe Operating Area	
DC Tests:	T_C = +25°C, +10°C, -0°C, I Cycle, t ≥ 1s; 1 cycle
Test 1:	V_{CE} = 12.5 Vdc, I_C = 12 Adc
Test 2:	V_{CE} = 30 Vdc, I_C = 5 Adc
Test 3:	V_{CE} = 70 Vdc, I_C = 200 mAdc, 2N6058
	V_{CE} = 90 Vdc, I_C = 155 mAdc, 2N6059

Outline Drawing (TO-3)



Symbol	Dimensions				Notes
	Inches		Millimeters		
	Min	Max	Min	Max	
CD		.875		22.23	
CH	.250	.328	6.35	8.33	
HR	.495	.525	12.57	13.34	
HR_1	.131	.188	3.33	4.78	3
HT	.060	.135	1.52	3.43	
LD	.038	.043	0.97	1.09	4 , 5
LL	.312	.500	7.92	12.7	4
L_1		.050		1.27	4 , 5
MHD	.151	.161	3.84	4.09	6
MHS	1.177	1.197	29.90	30.40	
PS	.420	.440	10.67	11.18	7, 8
PS_1	.205	.225	5.21	5.72	7, 4, 8
S_1	.655	.675	16.64	17.15	7

FIGURE 1. Physical dimensions and schematic circuit (TO-204AA, similar to TO-3).

NOTES:

1. Dimensions are in inches. Millimeters are given for general information only.
2. Body contour is optional within zone defined by dimension CD.
3. At both ends.
4. Both terminals.
5. Dimension LD applies between dimension L_1 and LL. Lead diameter shall not exceed twice dimension LD within dimension L_1. Diameter is uncontrolled in dimension L_1.
6. Two holes.
7. These dimensions shall be measured 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.
8. 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.
9. The collector shall be electrically connected to the case.
10. In accordance with ASME Y14.5M, diameters are equivalent to ϕ symbology.

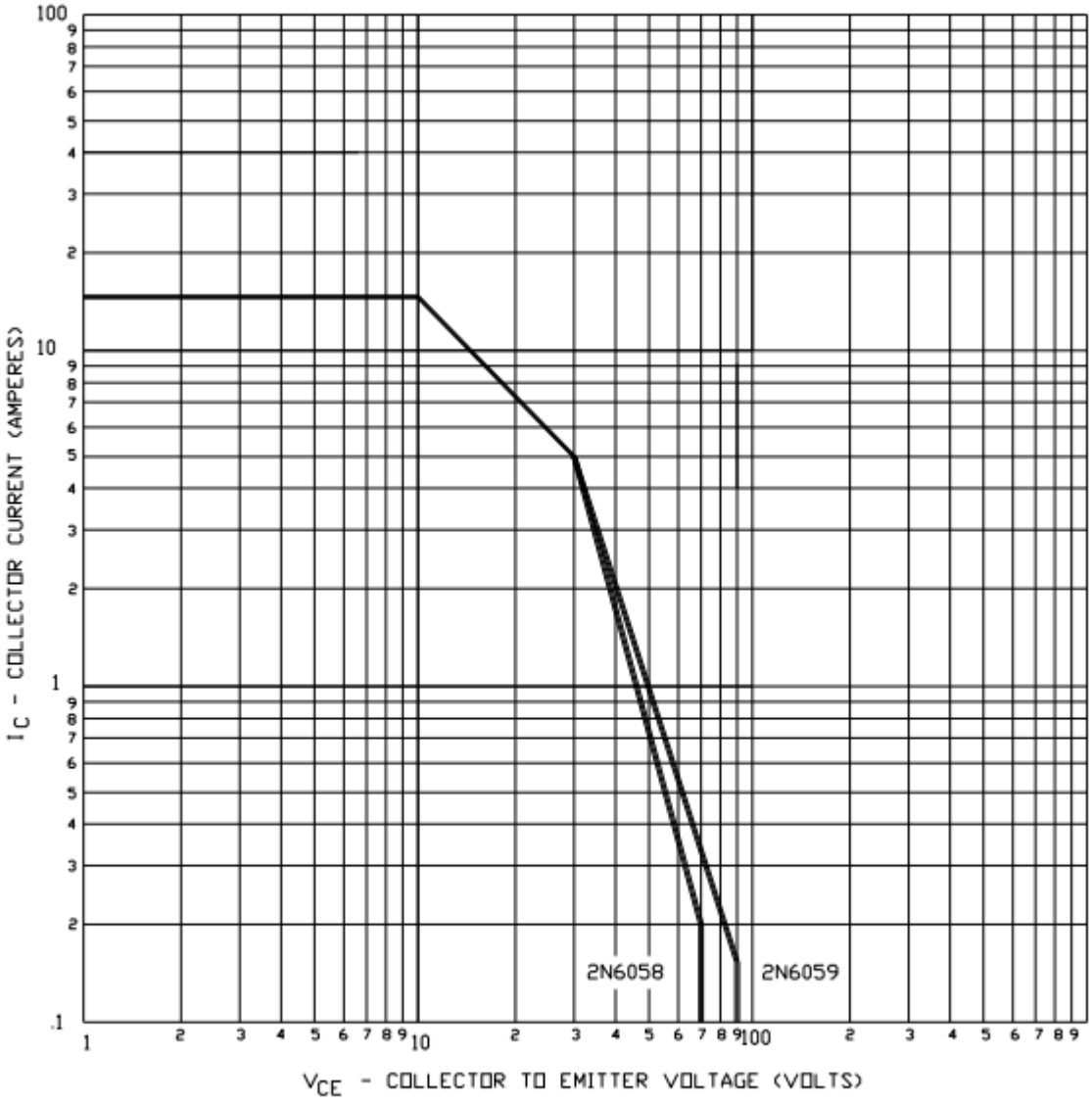


FIGURE 3. Maximum safe operating area graph (continuous dc).

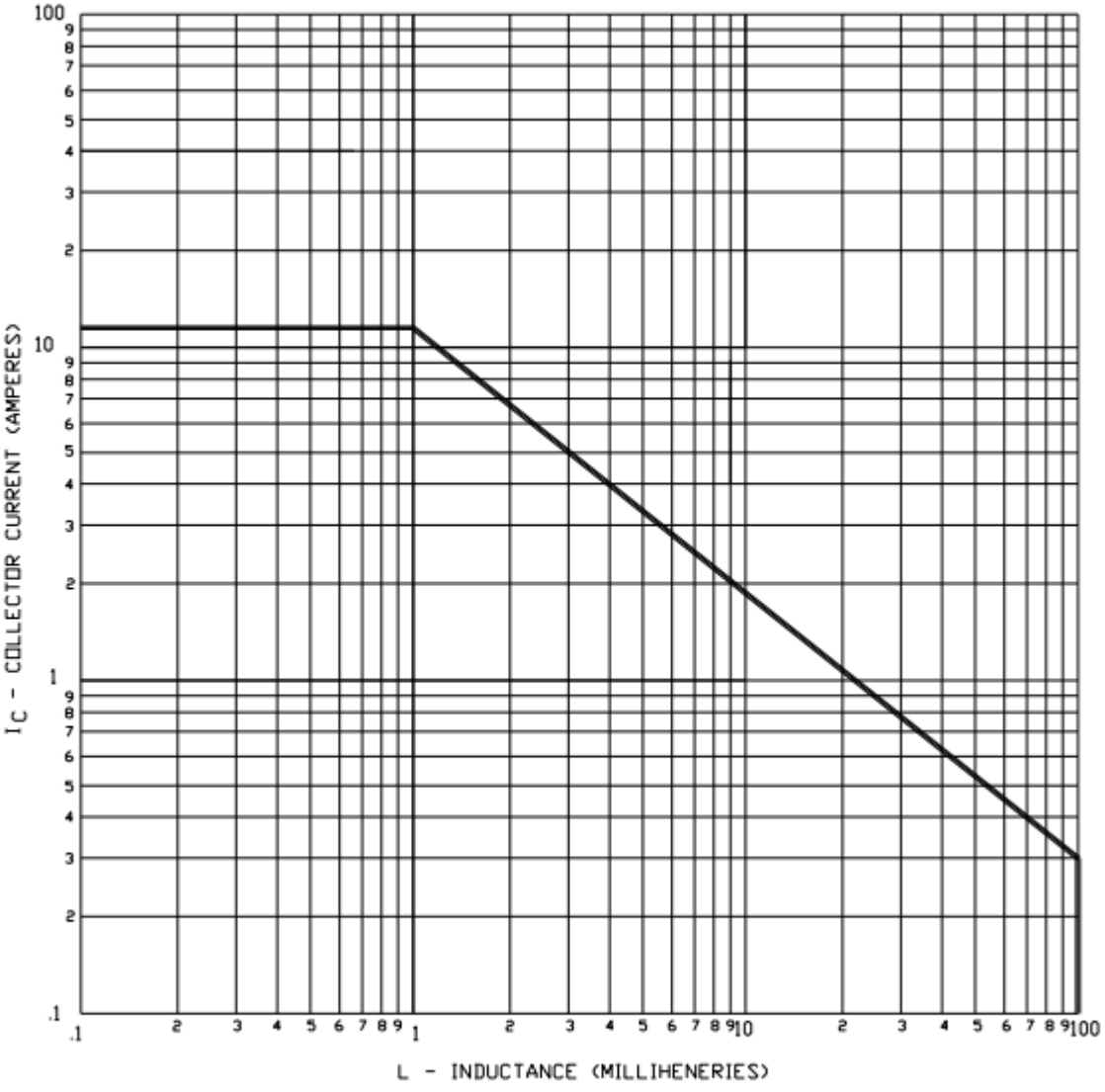


FIGURE 4. Safe operating area for switching between saturation and cutoff (unclamped inductive load).