RoHS
Available on commercial versions

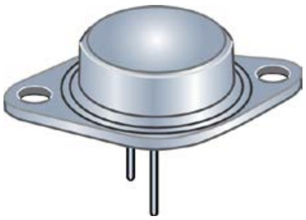
NPN Darlington Power Silicon Transistor

Qualified per MIL-PRF-19500/502

Qualified Levels:
JAN, JANTX, and JANTXV

DESCRIPTION

This high speed NPN transistor is rated at 12 amps and is military qualified up to a JANTXV level. This TO-204AA isolated package features a 180 degree lead orientation.



TO-204AA (TO-3) Package

Important: For the latest information, visit our website http://www.microsemi.com.

FEATURES

- JEDEC registered 2N6058 and 2N6059
- JAN, JANTX, and JANTXV qualifications are available per MIL-PRF-19500/502
- RoHS compliant versions available (commercial grade only)

APPLICATIONS / BENEFITS

- Military, space and other high reliability applications
- High frequency response
- TO-204AA case with isolated terminals

MAXIMUM RATINGS @ T_C = +25 °C unless otherwise noted

Parameters/Test Conditions		Symbol	Value	Unit
Junction and Storage Temperature		T_J and T_{STG}	-55 to +175	°C
Thermal Resistance Junction-to-Case		$R_{\Theta JC}$	1.0	°C/W
Collector Current		I_C	12	A
Collector-Emitter Voltage	2N6058 2N6059	V_{CEO}	80 100	V
Collector-Base Voltage	2N6058 2N6059	V_{CBO}	80 100	V
Emitter-Base Voltage		V_{EBO}	5	V
Total Power Dissipation	@ T_C = +25 °C (1) @ T_C = +100 °C	P_T	150 75	W

Notes: 1. Derate linearly 1.0 W/°C above T_C > +25 °C.

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MECHANICAL and PACKAGING

- CASE: Industry standard TO-204AD (TO-3), hermetically sealed, 0.040 inch diameter pins.
- FINISH: Solder dipped tin-lead over nickel plated alloy 52 or RoHS compliant matte-tin plating. Solderable per MIL-STD-750 method 2026.
- POLARITY: NPN (see schematic)
- MOUNTING HARDWARE: Consult factory for optional insulator and sheet metal screws
- WEIGHT: Approximately 15 grams
- See package dimensions on last page.

PART NOMENCLATURE

JAN 2N6058 (e3)

Reliability Level
JAN = JAN Level
JANTX = JANTX Level
JANTXV = JANTXV Level
Blank = Commercial

JEDEC type number
(see Electrical Characteristics table)

RoHS Compliance
e3 = RoHS Compliant (available on commercial grade only)
Blank = non-RoHS Compliant

SYMBOLS & DEFINITIONS

Symbol	Definition
I_B	Base current: The value of the dc current into the base terminal.
I_C	Collector current: The value of the dc current into the collector terminal.
I_E	Emitter current: The value of the dc current into the emitter terminal.
T_C	Case temperature: The temperature measured at a specified location on the case of a device.
V_{CB}	Collector-base voltage: The dc voltage between the collector and the base.
V_{CBO}	Collector-base voltage, base open: The voltage between the collector and base terminals when the emitter terminal is open-circuited.
V_{CC}	Collector-supply voltage: The supply voltage applied to a circuit connected to the collector.
V_{CE}	Collector-emitter voltage: The dc voltage between the collector and the emitter.
V_{CEO}	Collector-emitter voltage, base open: The voltage between the collector and the emitter terminals when the base terminal is open-circuited.
V_{EB}	Emitter-base voltage: The dc voltage between the emitter and the base.
V_{EBO}	Emitter-base voltage, collector open: The voltage between the emitter and base terminals with the collector terminal open-circuited.

ELECTRICAL CHARACTERISTICS @ T_A = +25 °C unless otherwise noted

Characteristics		Symbol	Min.	Max.	Unit
OFF CHARACTERISTICS					
Collector-Emitter Breakdown Voltage I_C = 100 mA	2N6058 2N6059	$V_{(BR)CEO}$	80 100		V
Collector-Emitter Cutoff Current V_{CE} = 40 V V_{CE} = 50 V	2N6058 2N6059	I_{CEO}		1.0 1.0	mA
Collector-Emitter Cutoff Current V_{CE} = 80 V, V_{EB} = 1.5 V V_{CE} = 150 V, V_{EB} = 1.5 V	2N6058 2N6059	I_{CEX}		10 10	µA
Emitter-Base Cutoff Current V_{EB} = 5.0 V		I_{EBO}		2.0	mA
ON CHARACTERISTICS					
Forward-Current Transfer Ratio I_C = 1.0 A, V_{CE} = 3.0 V I_C = 6.0 A, V_{CE} = 3.0 V I_C = 12 A, V_{CE} = 3.0 V		h_{FE}	1,000 1,000 150	18,000	
Collector-Emitter Saturation Voltage I_C = 12 A, I_B = 120 mA I_C = 6.0 A, I_B = 24 mA		$V_{CE(sat)}$		3.0 2.0	V
Base-Emitter Saturation Voltage I_C = 12 A, I_B = 120 mA		$V_{BE(sat)}$		4.0	V
Base-Emitter Voltage Non-saturated V_{CE} = 3.0 V, I_C = 6 A		V_{BE}		2.8	V
DYNAMIC CHARACTERISTICS					
Common Emitter Small-Signal Short-Circuit Forward Current Transfer Ratio I_C = 5 A, V_{CE} = 3.0 V, f = 1 kHz		h_{fe}	1,000		
Magnitude of Common Emitter Small-Signal Short-Circuit Forward Current Transfer Ratio I_C = 5 A, V_{CE} = 3.0 V, f = 1 MHz		$\|h_{fe}\|$	10	250	
Output Capacitance V_{CB} = 10 V, I_E = 0, f = 100 kHz ≤ f ≤ 1 MHz		C_{obo}		300	pF

ELECTRICAL CHARACTERISTICS @ T_C = 25 ^oC unless otherwise noted. (continued)

SWITCHING CHARACTERISTICS

Turn-On Time V_{CC} = 30 V, I_C = 5 A; I_{B1}= 20 mA	t_{on}		2.0	µs
Turn-Off Time V_{CC} = 30 V, I_C = 5 A; I_{B1}= 20 mA	t_{off}		10	µs

SAFE OPERATING AREA (See figures 1 and 2 and MIL-STD-750,Test Method 3053)

DC Tests

T_C = +25 °C, +10 ºC, -0 ºC, t ≥ 1 second, 1 Cycle

Test 1

V_{CE} = 12.5 V, I_C = 12 A

Test 2

V_{CE} = 30 V, I_C = 5 A

Test 3

V_{CE} = 70 V, I_C = 200 mA (2N6058)

V_{CE} = 90 V, I_C = 155 mA (2N6059)

SAFE OPERATING AREA

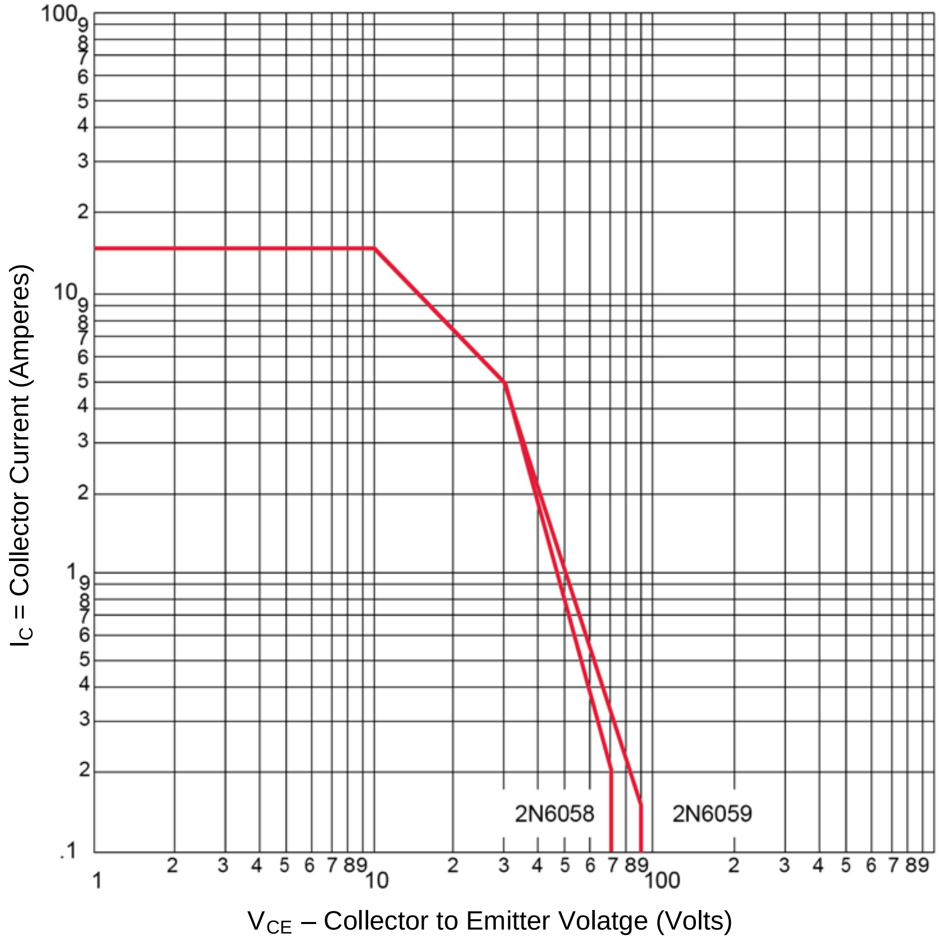


FIGURE 1

Maximum Safe Operating Area

(continuous dc)

SAFE OPERATING AREA (continued)

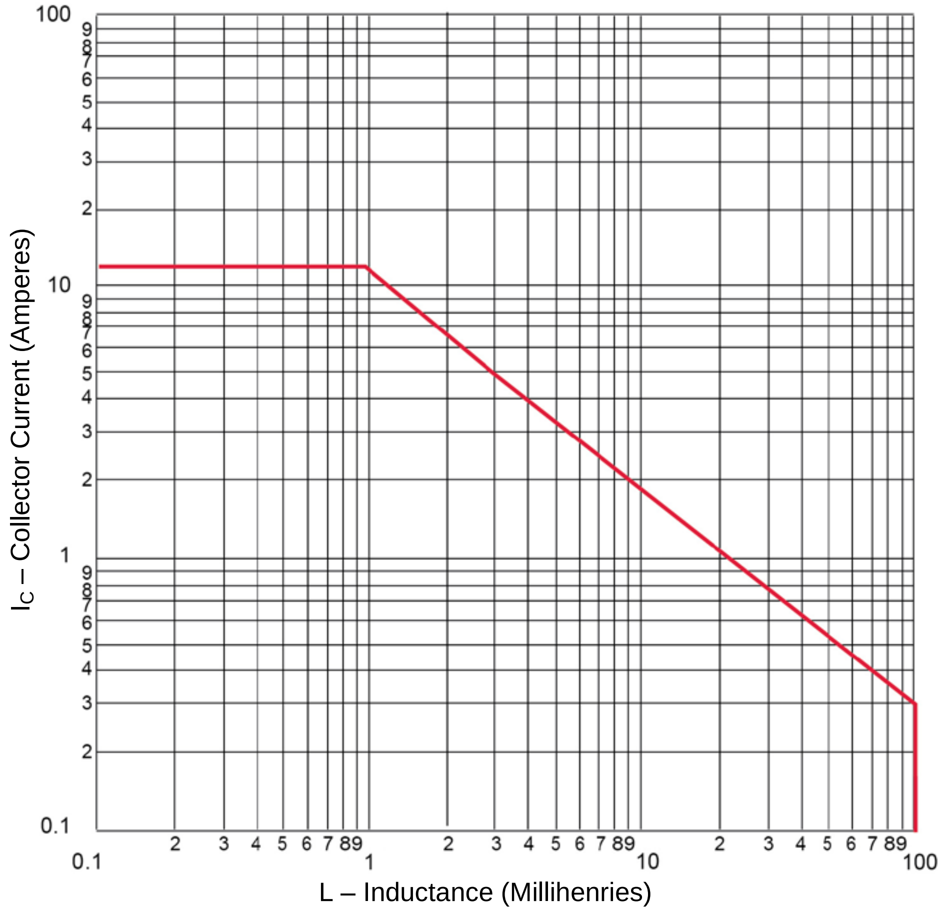
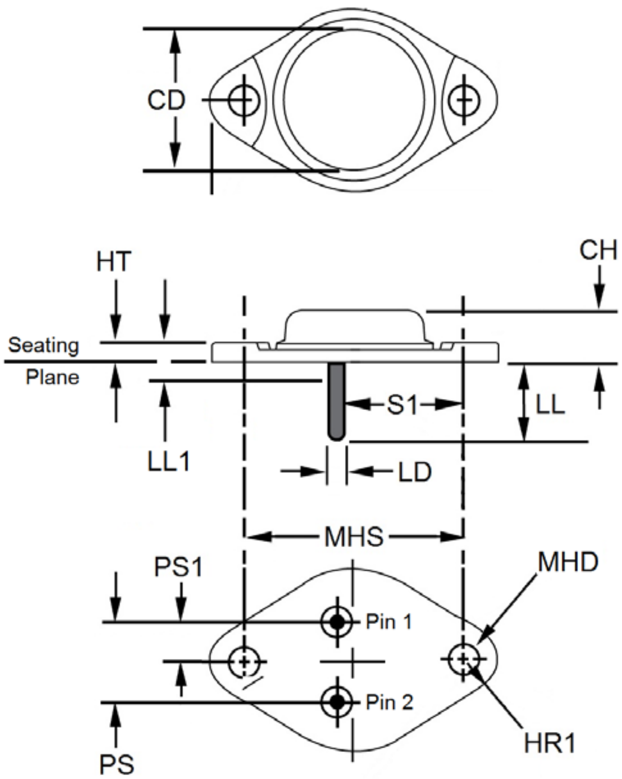


FIGURE 2
Safe Operating Area For Switching Between Saturation And Cutoff
(unclamped inductive load)

PACKAGE DIMENSIONS



Ltr	Dimensions				Notes
	Inches		Millimeters		
	Min	Max	Min	Max	
CD	-	0.875	-	22.23	
CH	0.250	0.328	6.35	8.33	
HR	0.495	0.525	12.57	13.34	
HR1	0.131	0.188	3.33	4.78	3
HT	0.060	0.135	1.52	3.43	
LD	0.038	0.043	0.97	1.09	4, 5
LL	0.312	0.500	7.92	12.70	4
LL1	-	0.050	-	1.27	4, 5
MHD	0.151	0.161	3.84	4.09	6
MHS	1.177	1.197	29.90	30.40	
PS	0.420	0.440	10.67	11.18	7, 8
PS1	0.205	0.225	5.21	5.72	7, 4, 8
S1	0.655	0.675	16.64	17.15	7
T1	Emitter				
T2	Base				
Case	Collector				

NOTES:

1. Dimensions are in inches. Millimeters are given for 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 L1 and LL. Lead diameter shall not exceed twice dimension LD within dimension L1. Diameter is uncontrolled in dimension L1.
6. Two holes
7. These dimensions shall be measured at points 0.050 inch (1.27 mm) to 0.055 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 0.001 inch (0.03 mm) concave to 0.004 inch (0.10 mm) convex inside a 0.930 inch (23.62 mm) diameter circle on the center of the header and flat within 0.001 inch (0.03 mm) concave to 0.006 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 Φx symbology.

See schematic on next page

SCHEMATIC