Available on commercial versions

PNP Darlington High Power Silicon Transistor

Qualified per MIL-PRF-19500/623

Qualified Levels:
JAN, JANTX, and JANTXV

DESCRIPTION

This high power PNP transistor is rated at 12 amps and is military qualified up to the JANTXV level for high reliability applications. This TO-254AA low-profile design offers flexible mounting options.

TO-254AA Package

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

FEATURES

- JEDEC registered 2N7371.
- JAN, JANTX, and JANTXV qualifications are available per MIL-PRF-19500/623.
  (See part nomenclature for all available options.)
- RoHS compliant versions available (commercial grade only).

APPLICATIONS / BENEFITS

- High power operation.
- Flexible, low-profile TO-254AA package

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

Parameters/Test Conditions	Symbol	Value	Unit
Junction and Storage Temperature	T_J and T_{STG}	-65 to +200	°C
Thermal Resistance Junction-to-Case	$R_{\Theta JC}$	1.5	°C/W
Collector-Base Voltage	V_{CBO}	-100	V
Collector-Emitter Voltage	V_{CEO}	-100	V
Emitter-Base Voltage	V_{EBO}	-5.0	V
Total Power Dissipation (see Figure 1)	P_T	100	W
Base Current	I_B	-0.2	A
Collector Current	I_C	-12	A

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MECHANICAL and PACKAGING

- CASE: Nickel plated CRS steel
- TERMINALS: Ceramic feed-though, hot solder dip, Ni plated Alloy 52, copper core. RoHS compliant pure tin dip is available for commercial versions only.
- MARKING: Part number, date code, and polarity symbol
- POLARITY: See Schematic on last page
- WEIGHT: Approximately 6.5 grams
- See Package Dimensions on last page.

PART NOMENCLATURE

JAN 2N7371 (e3)

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

JEDEC type number

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.

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

Characteristics	Symbol	Min.	Max.	Unit
OFF CHARACTERISTICS				
Collector-Emitter Breakdown Voltage I_C = -100 mA	$V_{(BR)CEO}$	-100		V
Collector-Emitter Cutoff Current V_{CE} = -50 V	I_{CEO}		-1.0	mA
Collector-Emitter Cutoff Current V_{CE} = -100 V, V_{BE} = 1.5 V V_{CE} = -100 V, V_{BE} = 1.5 V, T_A = +150 ºC	I_{CEX}		-20 -1.0	µA mA
Emitter-Base Cutoff Current V_{EB} = -5.0 V	I_{EBO}		-2.0	mA
ON CHARACTERISTICS				
Forward-Current Transfer Ratio I_C = -6.0 A, V_{CE} = -3.0 V I_C = -12.0 A, V_{CE} = -3.0 V I_C = -6.0 A, V_{CE} = -3.0 V, T_A = +150 ºC	h_{FE}	1,000 150 300	18,000	
Collector-Emitter Saturation Voltage I_C = -12 A, I_B = -120 mA	$V_{CE(sat)}$		-3.0	V
Base-Emitter Saturation Voltage I_C = -12 A, I_B = -120 mA	$V_{BE(sat)}$		-4.0	V
DYNAMIC CHARACTERISTICS				
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	

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ELECTRICAL CHARACTERISTICS @ T_C = 25 °C unless otherwise noted. (continued)

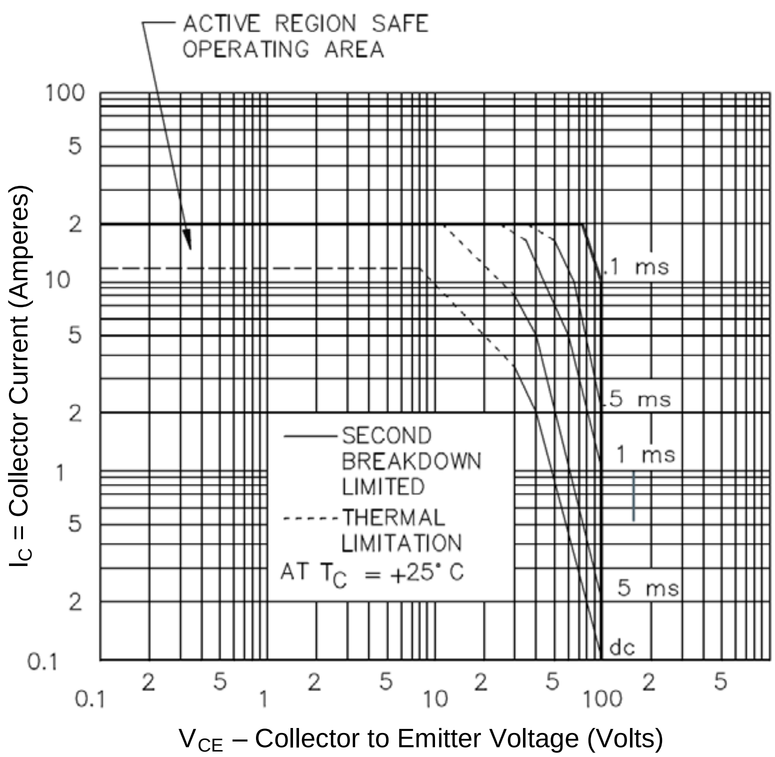
SWITCHING CHARACTERISTICS

Turn-On Time V_{CC} = -30 V, I_C = -12 A; I_{B1} = -120 mA	t_{on}		2.0	µs
Turn-Off Time V_{CC} = -30 V, I_C = -12 A; I_{B1}= I_{B2} = -120 mA	t_{off}		10	µs

SAFE OPERATING AREA (See figure below and MIL-STD-750,Test Method 3053)

DC Tests T_C = +25 °C, t ≥ 1 second, 1 Cycle **Test 1** V_{CE} = -8.3 V, I_C = -12 A **Test 2** V_{CE} = -30 V, I_C = -3.3 A **Test 3** V_{CE} = -90 V, I_C = -150 mA

* Pulse test: Pulse width 300 µsec, duty cycle ≤ 2%.



Safe Operating Area

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GRAPHS

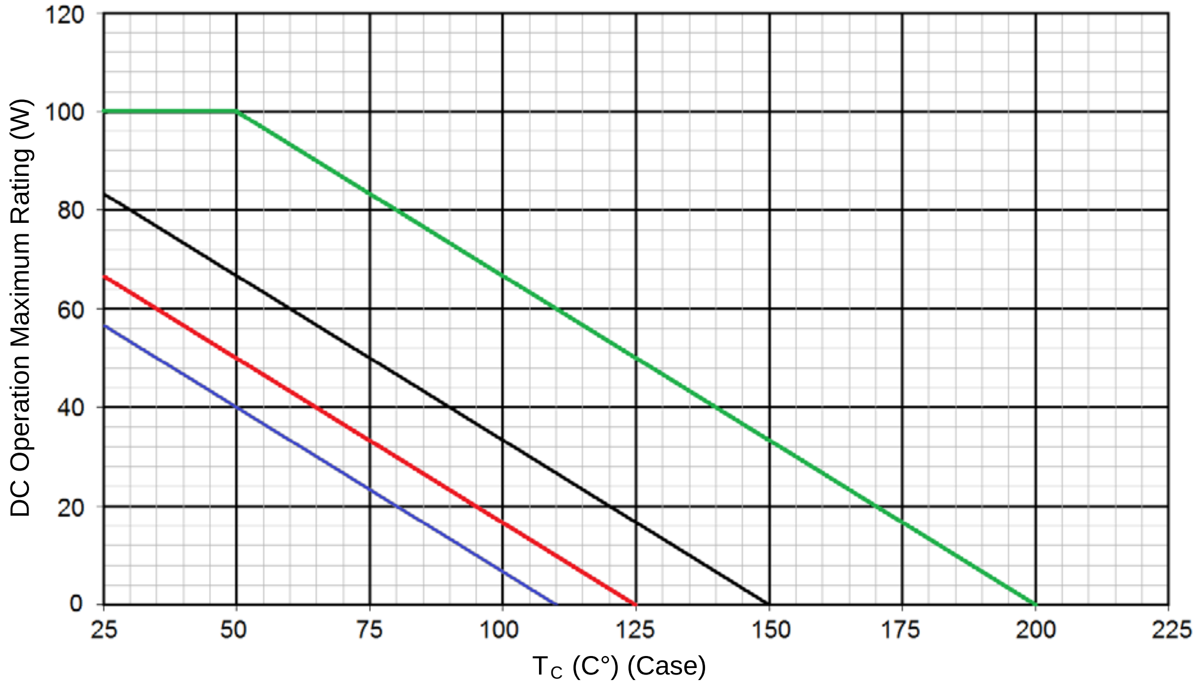

FIGURE 1
Temperature-Power Derating Graph

NOTES:

1. All devices are capable of operating at ≤ T_J specified on this curve. Any parallel line to this curve will intersect the appropriate power for the desired maximum T_J allowed.
2. Derate design curve constrained by the maximum junction temperature (T_J ≤ +200°C) and power rating specified. (See Maximum Ratings.)
3. Derate design curve chosen at T_J ≤ +150°C, where the maximum temperature of electrical test is performed.
4. Derate design curves chosen at T_J ≤ +125°C, and +110°C to show power rating where most users want to limit T_J in their application.

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GRAPHS (continued)

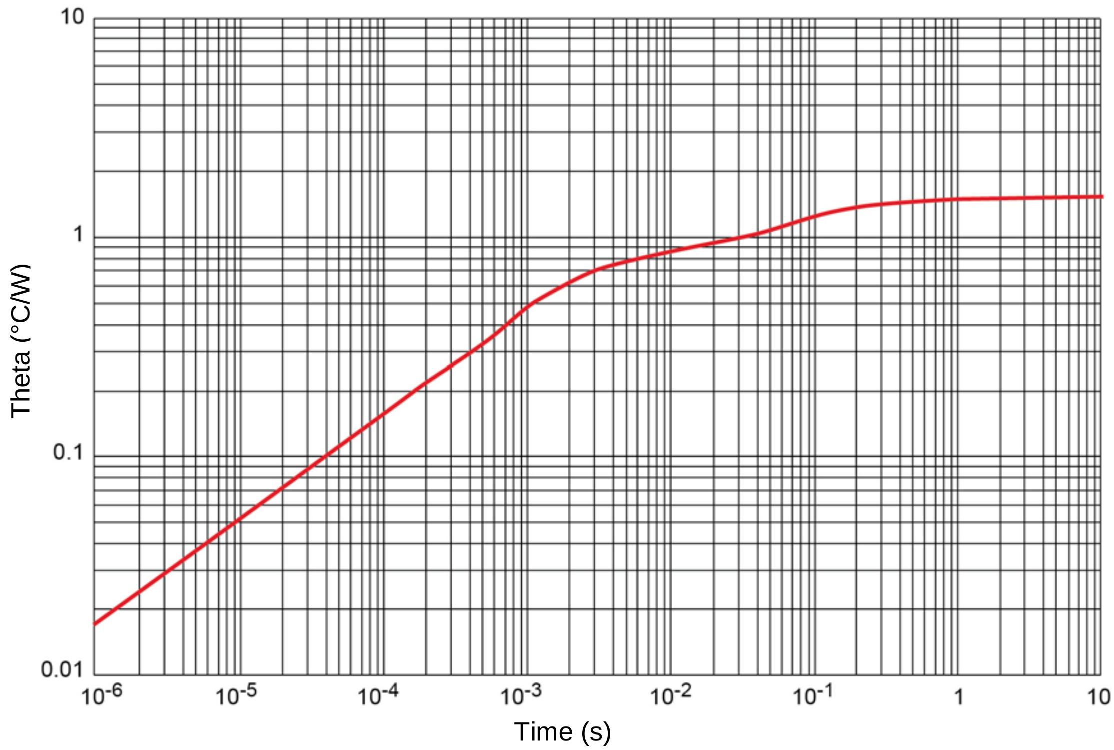

FIGURE 2
Thermal Impedance Graph

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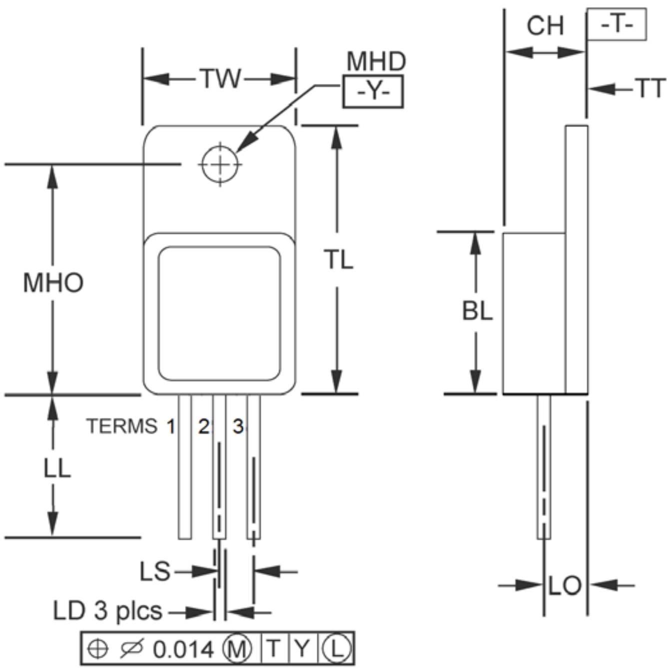
PACKAGE DIMENSIONS

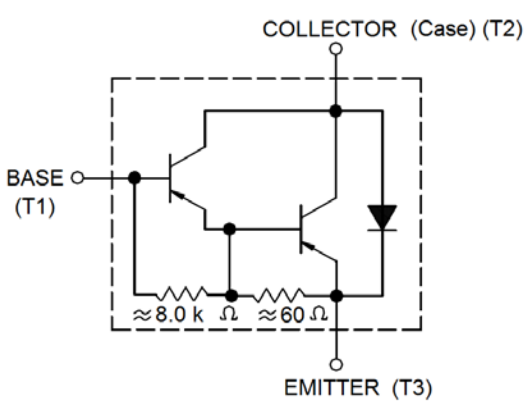


Ltr	Dimensions			
	Inch		Millimeters	
	Min	Max	Min	Max
BL	0.535	0.545	13.59	13.84
CH	0.249	0.260	6.32	6.60
LD	0.035	0.045	0.89	1.14
LL	0.510	0.570	12.95	14.48
LO	0.150 BSC		3.81 BSC	
LS	0.150 BSC		3.81 BSC	
MHD	0.139	0.149	3.53	3.78
MHO	0.665	0.685	16.89	17.40
TL	0.790	0.800	20.07	20.32
TT	0.040	0.050	1.02	1.27
TW	0.535	0.545	13.59	13.84
Term 1	Base			
Term 2	Collector			
Term 3	Emitter			

NOTES:

1. Dimensions are in inches. Millimeters are given for information only.
2. All terminals are isolated from case.
3. Protrusion of ceramic eyelets included in dimension LL.
4. In accordance with ASME Y14.5M, diameters are equivalent to Φx symbology.

SCHEMATIC



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