RoHS

Available on commercial versions

NPN Power Silicon Transistor

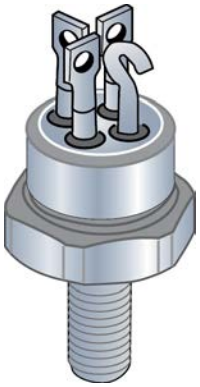
Qualified per MIL-PRF-19500/315

Qualified Levels:
JAN, JANTX, and JANTXV

DESCRIPTION

This NPN silicon transistor is rated at 5 amps and is military qualified up to the JANTXV level. This TO-111 isolated package features a 180 degree lead orientation.

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



TO-111 Package

FEATURES

- JEDEC registered 2N3749
- Low saturation voltage
- Low leakage current
- Fast switching capable - 0.5 μs rise time
- High frequency response
- TO-111 case with isolated terminals
- JAN, JANTX, and JANTXV qualifications are available per MIL-PRF-19500/315
- RoHS compliant versions available (commercial grade only)

APPLICATIONS / BENEFITS

- Class 3B to ESD per MIL-STD-750 Method 1020
- High frequency inverters
- Converters
- Linear amplifiers
- High speed switching regulated power supplies
- RF power supplies

MAXIMUM RATINGS

Parameters/Test Conditions		Symbol	Value	Unit
Junction and Storage Temperature		T_J and T_{STG}	-65 to +200	°C
Thermal Resistance Junction-to-Case		$R_{\Theta JC}$	3.33	°C/W
Collector Current		I_C	5.0	A
Collector-Emitter Voltage		V_{CEO}	80	V
Collector-Base Voltage		V_{CBO}	110	V
Emitter-Base Voltage		V_{EBO}	8.0	V
Total Power Dissipation	@ T_A = +25°C (1)	P_T	2.0	W
	@ T_C = +100°C (2)		30	

Notes: 1. Derate linearly 11.4 mW/°C for T_A > +25°C.
2. Derate linearly 300 mW/°C for T_C > +100°C.

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MECHANICAL and PACKAGING

- CASE: Nickel Plated
- TERMINALS: Solder Dip over Nickel Plating. RoHS compliant Matte/Tin available on commercial grade only.
- MARKING: Manufacturer's ID, Date Code, Part Number, BeO
- POLARITY: See Package Outline Drawing on last page
- WEIGHT: Approximately 5.412 grams
- See Package Dimensions on last page.

PART NOMENCLATURE

JAN **2N3749** **(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.
P_T	Total power dissipation: The sum of the forward and reverse power dissipations.
V_{BE}	Base-emitter voltage: The dc voltage between the base and the emitter.
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_{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_{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

Characteristic	Symbol	Min.	Max.	Unit
OFF CHARACTERISTICS				
Collector-Emitter Breakdown Voltage I_C = 100 mA	$V_{(BR)CEO}$	80		V
Collector-Emitter Breakdown Voltage I_C = 10 µA	$V_{(BR)CBO}$	110		V
Emitter-Base Breakdown to Voltage I_E = 10 µA	$V_{(BR)EBO}$	8.0		V
Collector-Emitter Cutoff Current V_{CE} = 60 V	I_{CEO}		20	µA
Collector-Base Cutoff Current V_{CB} = 80 V	I_{CBO}		0.2	µA
Collector-Emitter Cutoff Current V_{CE} = 110 V, V_{BE} = -0.5	I_{CEX}		1.0	µA
Emitter-Base Cutoff Current V_{EB} = 6.0 V	I_{EBO}		0.2	µA
ON CHARACTERISTICS				
Forward-Current Transfer Ratio I_C = 50 mA, V_{CE} = 5.0 V I_C = 1.0 A, V_{CE} = 2.0 V I_C = 5.0 A, V_{CE} = 5.0 V	h_{FE}	40 40 15	120 120	
Base-Emitter Voltage Non-saturated V_{CE} = 2.0 V, I_C = 1.0 A	V_{BE}		1.2	V
Collector-Emitter Saturation Voltage I_C = 1.0 A, I_B = 0.1 A I_C = 5.0 A, I_B = 0.5 A	$V_{CE(sat)}$		0.25 1.5	V
Base-Emitter Saturation Voltage I_C = 1.0 A, I_B = 0.1 A	$V_{BE(sat)}$		1.2	V
DYNAMIC CHARACTERISTICS				
Magnitude of Common Emitter Small-Signal Short-Circuit Forward Current Transfer Ratio I_C = 1.0 A, V_{CE} = 10.0 V, f = 10 MHz	$\|h_{fe}\|$	3.0	12	
Common Emitter Small-Signal Short-Circuit Forward Current Transfer Ratio I_C = 50 mA, V_{CE} = 5.0 V, f = 1 kHz	h_{fe}	40	140	
Output Capacitance V_{CB} = 10 V, I_E = 0, 100 ≤ f ≤ 1.0 MHz	C_{obo}		150	pF
SWITCHING CHARACTERISTICS				
Pulse delay time	t_d		60	ns
Pulse rise time	t_r		300	ns
Pulse storage time	t_s		1.7	µs
Pulse fall time	t_f		300	ns

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

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

DC Tests

T_C = +100°C, t = 10 seconds

Test 1

V_{CE} = 80 V, I_C = 80 mA

Test 2

V_{CE} = 20 V, I_C = 1.5 A

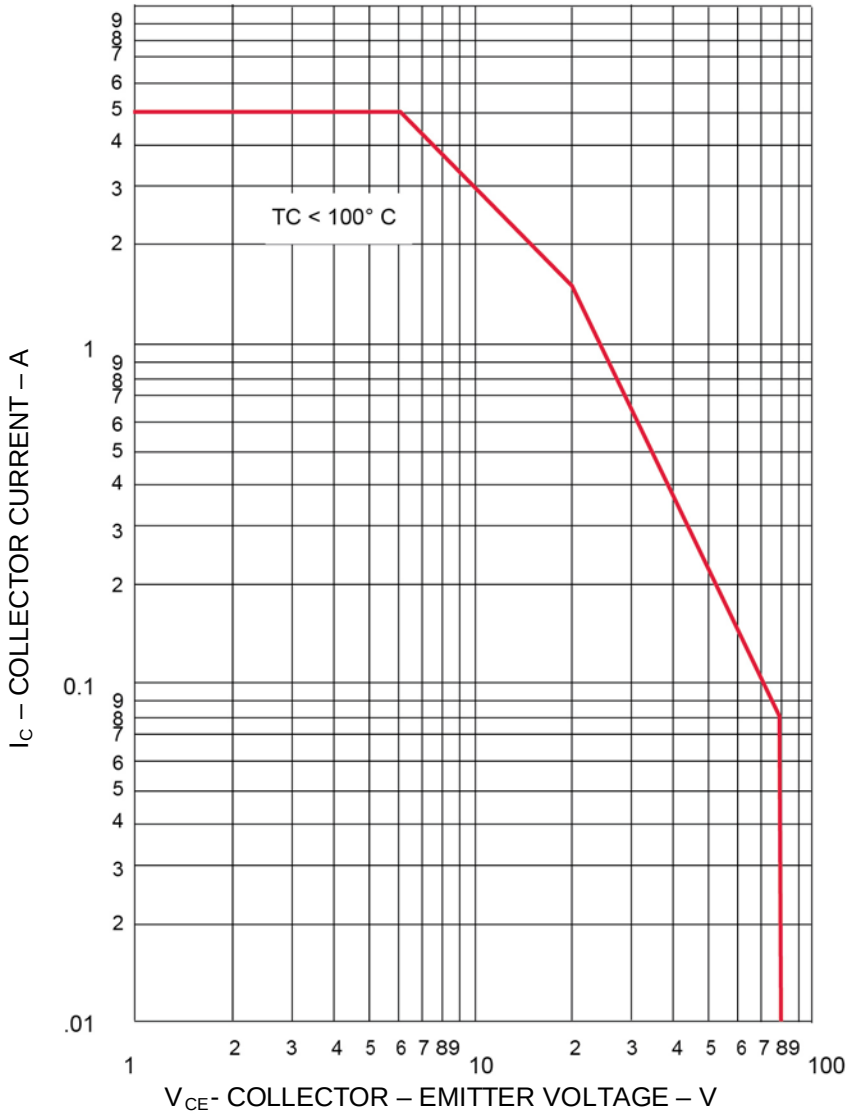

FIGURE 1

Maximum Safe Operating Area

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GRAPHS

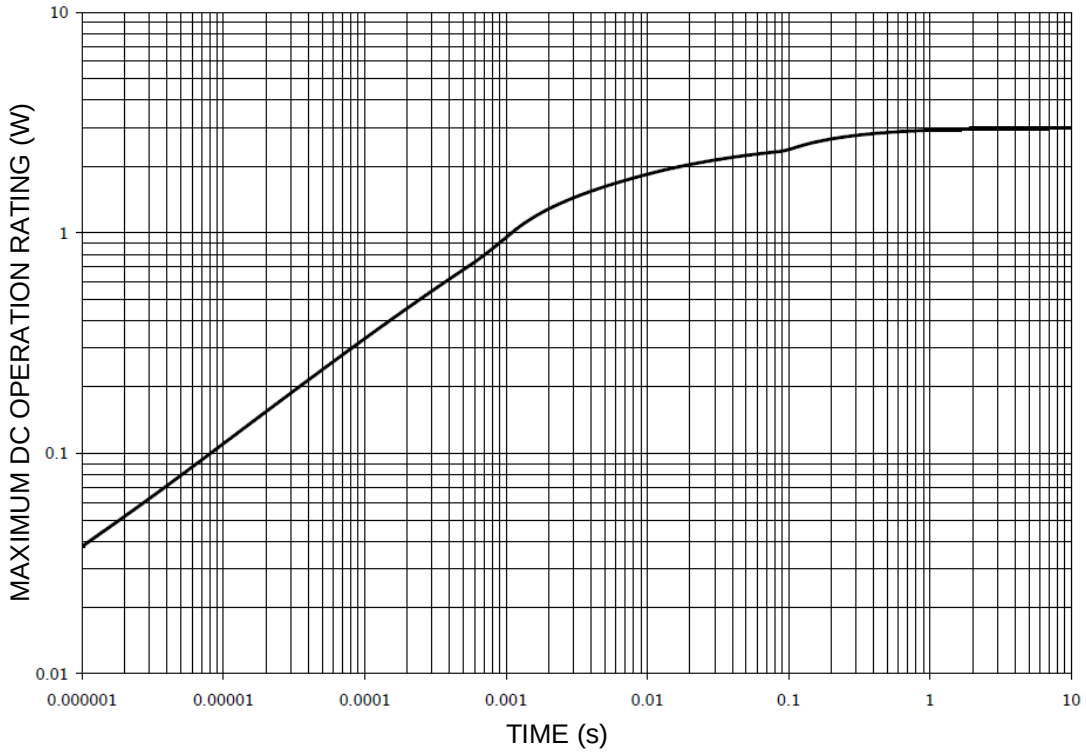

FIGURE 2
Thermal Impedance

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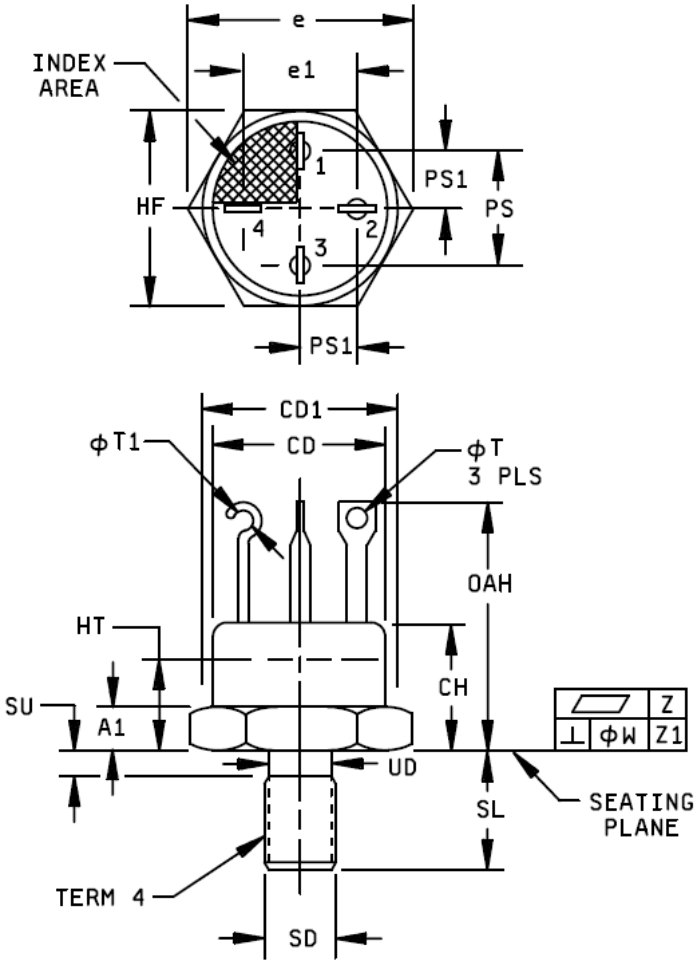
PACKAGE DIMENSIONS



NOTES:

1. Dimensions are in inches.
2. Millimeters are given for information only.
3. Terminal 1 - emitter; terminal 2 - base; terminal 3 - collector; terminal 4 - case.
4. Chamfer or undercut on one, or both, ends of hexagonal portion is optional.
5. The outline contour, with the exception of the hexagon, is optional within cylinder defined by CD1 and HT.
6. Terminal 4 can be flattened and pierced or hook type. A visual index is required when the flattened and pierced tab terminal contour (identical to the adjacent terminals) option is used.
7. Angular orientation of terminals with respect to hexagon is optional.
8. A1 dimension does not include sealing flanges.
9. SU is the length of incomplete or undercut threads.
10. SD is the outer diameter of coated threads. (Reference: Screw thread standards for Federal Standard H28/1 , (FED-STD-H28/1)

Symbol	Dimension				Notes
	Inch		Millimeters		
	Min	Max	Min	Max	
CH	0.0320	0.458	8.13	11.63	
HT	-	0.250	-	6.35	5
CD	0.318	0.380	8.08	9.65	
CD1	0.380	0.437	9.65	11.10	5
HF	0.423	0.438	10.74	11.13	
E	-	0.505	-	12.83	
E1	0.180	0.215	4.57	5.46	7
A1	0.090	0.0150	2.29	3.81	4, 8
OAH	0.570	0.763	14.48	19.38	
SL	0.400	0.0455	10.16	11.56	
SU	-	0.078	-	1.98	9
ϕT	0.040	0.065	1.02	1.65	
ϕT1	0.040	0.070	1.02	1.78	6
SD	0.190-32UNF-2A				10
Z	-	0.02	-	0.05	
Z1	-	0.006	-	0.15	

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