RoHS Compliant

LOW POWER NPN SILICON TRANSISTOR

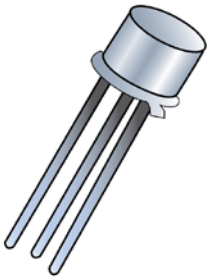
Qualified per MIL-PRF-19500/391

Qualified Levels:
JAN, JANTX, JANTXV, and JANS

DESCRIPTION

This 2N3019S NPN leaded silicon transistor device is military qualified for high-reliability applications. Microsemi also offers numerous other transistor products to meet higher and lower power ratings with various switching speed requirements in both through-hole and surface-mount packages.

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



TO-39 (TO-205AD) Package

Also available in:

TO-5 package
(long-leaded)
2N3019

TO-46 (TO-206AB)
(leaded)
2N3057A

TO-18 (TO-206AA)
(leaded)
2N3700

UB package
(leaded)
2N3700UB

FEATURES

- JEDEC registered 2N3019 number.
- JAN, JANTX, JANTXV and JANS qualifications are available per MIL-PRF-19500/391.
- Rad hard levels are also available per MIL-PRF-19500/391.
  (For RHA datasheet see JANSD2N3019S.)
- RoHS compliant by design.

APPLICATIONS / BENEFITS

- Short leaded TO-39 package.
- Lightweight.
- Low power.
- Military and other high-reliability applications.

MAXIMUM RATINGS @ T_A = +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-Ambient		$R_{\Theta JA}$	195	°C/W
Thermal Resistance Junction-to-Case		$R_{\Theta JC}$	30	°C/W
Collector-Emitter Voltage		V_{CEO}	80	V
Collector-Base Voltage		V_{CBO}	140	V
Emitter-Base Voltage		V_{EBO}	7.0	V
Collector Current		I_C	1.0	A
Total Power Dissipation:	@ T_A = +25 °C (1) @ T_C = +25 °C (2)	P_D	0.8 5.0	W

Notes:
1. Derate linearly 4.6 mW/°C for $T_A \geq$ +25 °C.
2. Derate linearly 28.6 mW/°C for $T_C \geq$ +25 °C.

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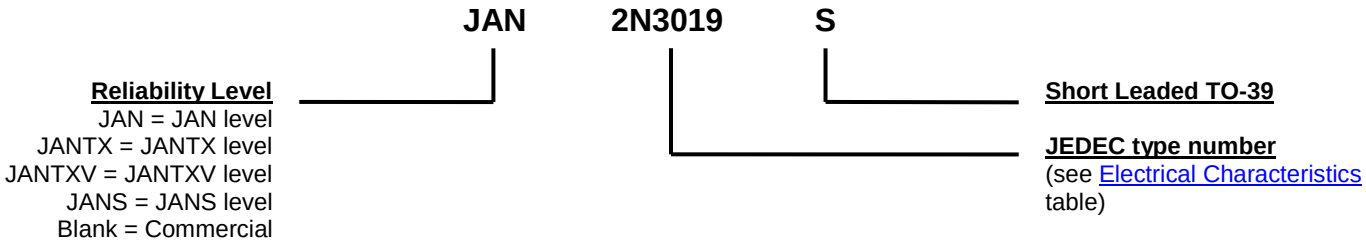
MECHANICAL and PACKAGING

- CASE: Hermetically sealed, kovar base, nickel cap.
- TERMINALS: Gold plate, solder dip (Sn63/Pb37) available upon request. NOTE: Solder dip will eliminate RoHS compliance.
- MARKING: Part number, date code, manufacturer's ID and serial number.
- POLARITY: NPN.
- WEIGHT: Approximately 1.064 grams.
- See Package Dimensions on last page.

PART NOMENCLATURE



SYMBOLS & DEFINITIONS

Symbol	Definition
f	Frequency
I_B	Base current (dc)
I_E	Emitter current (dc)
T_A	Ambient temperature
T_C	Case temperature
V_{CB}	Collector to base voltage (dc)
V_{CE}	Collector to emitter voltage (dc)
V_{EB}	Emitter to base voltage (dc)

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

Parameters / Test Conditions	Symbol	Min.	Max.	Unit
OFF CHARACTERISTICS				
Collector-Emitter Breakdown Current I_C = 30 mA	$V_{(BR)CEO}$	80		V
Collector-Base Cutoff Current V_{CB} = 140 V	I_{CBO}		10	µA
Emitter-Base Cutoff Current V_{EB} = 7 V	I_{EBO1}		10	µA
Collector-Emitter Cutoff Current V_{CE} = 90 V	I_{CES}		10	ηA
Emitter-Base Cutoff Current V_{EB} = 5.0 V	I_{EBO2}		10	ηA
ON CHARACTERISTICS				
Forward-Current Transfer Ratio I_C = 150 mA, V_{CE} = 10 V I_C = 0.1 mA, V_{CE} = 10 V I_C = 10 mA, V_{CE} = 10 V I_C = 500 mA, V_{CE} = 10 V I_C = 1.0 A, V_{CE} = 10 V	h_{FE}	 100 50 90 50 15	 300 300 300 	
Collector-Emitter Saturation Voltage I_C = 150 mA, I_B = 15 mA I_C = 500 mA, I_B = 50 mA	$V_{CE(sat)}$		 0.2 0.5	V
Base-Emitter Saturation Voltage I_C = 150 mA, I_B = 15 mA	$V_{BE(sat)}$		1.1	V

DYNAMIC CHARACTERISTICS

Parameters / Test Conditions	Symbol	Min.	Max.	Unit
Small-Signal Short-Circuit Forward Current Transfer Ratio I_C = 1.0 mA, V_{CE} = 5.0 V, f = 1.0 kHz	h_{fe}	80	400	
Magnitude of Small-Signal Short-Circuit Forward Current Transfer Ratio I_C = 50 mA, V_{CE} = 10 V, f = 20 MHz	$\|h_{fe}\|$	5.0	20	
Output Capacitance V_{CB} = 10 V, I_E = 0, 100 kHz ≤ f ≤ 1.0 MHz	C_{obo}		12	pF
Input Capacitance V_{EB} = 0.5 V, I_C = 0, 100 kHz ≤ f ≤ 1.0 MHz	C_{ibo}		60	pF

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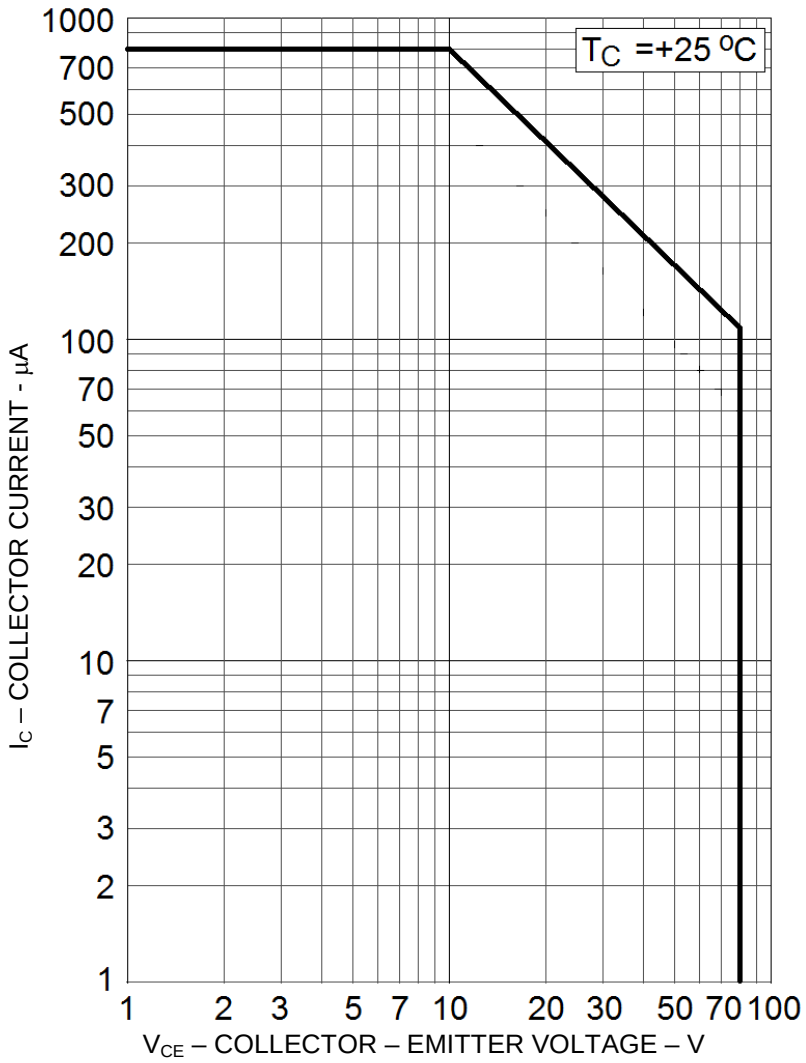
ELECTRICAL CHARACTERISTICS @ T_A = +25 °C, unless otherwise noted (continued)

SAFE OPERATION AREA (See SOA graph below and MIL-STD-750, method 3053)

DC Tests	
T_C = 25 °C, 1 cycle, t = 10 ms	
Test 1	V_{CE} = 10 V I_C = 500 mA
Test 2	V_{CE} = 40 V I_C = 125 mA
Test 3	V_{CE} = 80 V I_C = 60 mA

(1) Pulse Test: Pulse Width = 300 µs, duty cycle ≤ 2.0%.



Maximum Safe Operating Area

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GRAPHS

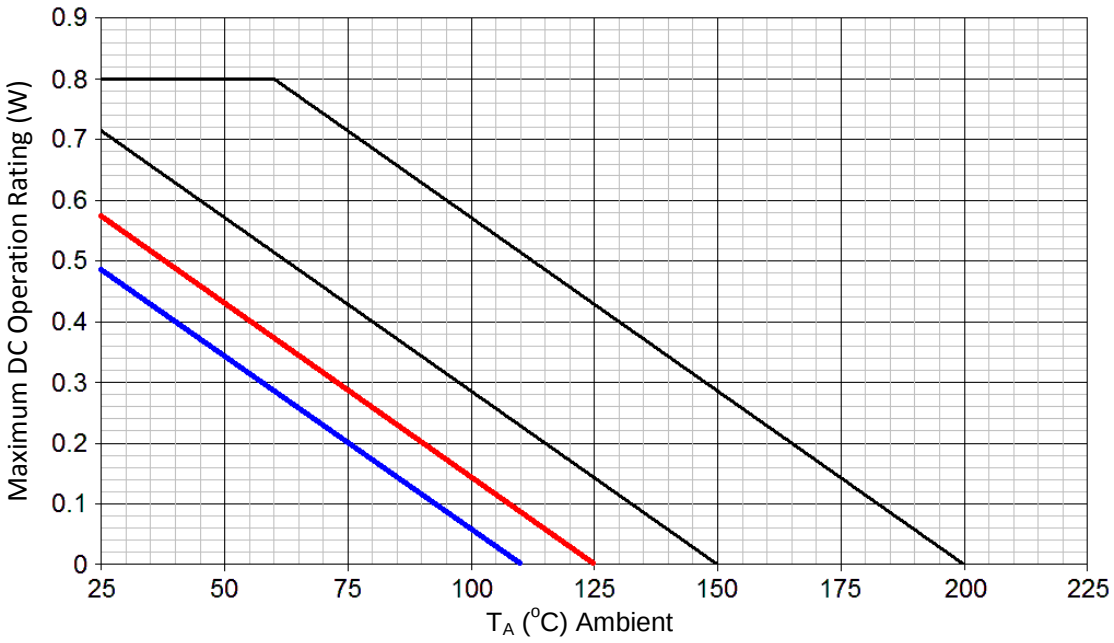

FIGURE 1
Temperature – Power Derating ($R_{\Theta JA}$)

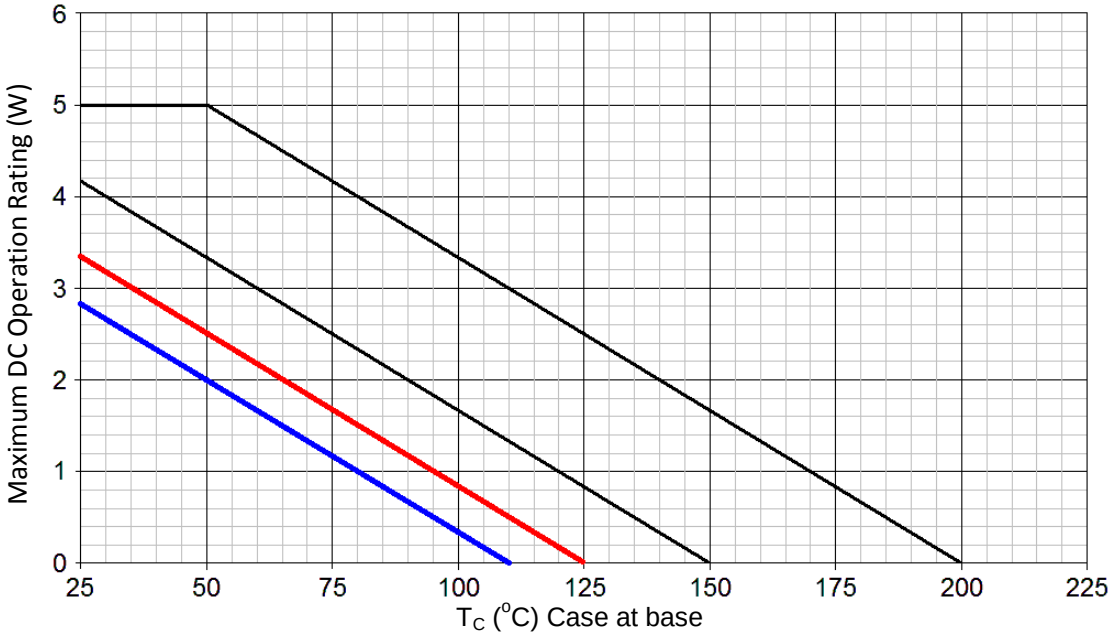

FIGURE 2
Temperature – Power Derating ($R_{\Theta JC}$)

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