RoHS Compliant

LOW POWER NPN SILICON TRANSISTOR

Qualified per MIL-PRF-19500/391

Qualified Levels:
JAN, JANTX, JANTXV, and JANS

DESCRIPTION

This 2N3057A 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.

FEATURES

- JEDEC registered 2N3057 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 JANSD2N3057A.)
- RoHS compliant by design.

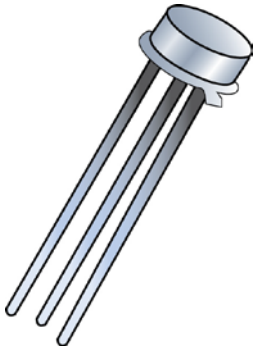
APPLICATIONS / BENEFITS

- Low profile metal TO-46 leaded package.
- Light weight.
- General–purpose switching and amplifier applications.
- Military and 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 Impedance Junction-to-Ambient		$R_{\Theta JA}$	325	°C/W
Thermal Impedance Junction-to-Case		$R_{\Theta JC}$	80	°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)	P_D	0.5	W
	@ T_C = +25 °C (2)		1.8	

Notes:
1. Derate linearly 2.3 mW/°C for $T_A \geq$ +25 °C.
2. Derate linearly 10.3 mW/°C for $T_C \geq$ +25 °C.



TO-46 (TO-206AB) Package

Also available in:

TO-39 (TO-205AD)
(short-leaded)
2N3019S

TO-5 package
(long-leaded)
2N3019

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

UB package
(surface mount)
2N3700UB

MSC – Lawrence
6 Lake Street,
Lawrence, MA 01841
Tel: 1-800-446-1158 or
(978) 620-2600
Fax: (978) 689-0803

MSC – Ireland
Gort Road Business Park,
Ennis, Co. Clare, Ireland
Tel: +353 (0) 65 6840044
Fax: +353 (0) 65 6822298

Website:
www.microsemi.com

MECHANICAL and PACKAGING

- CASE: Low profile nickel cap.
- TERMINALS: Gold over nickel plated kovar leads. 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.
- WEIGHT: Approximately 0.234 grams.
- See Package Dimensions on last page.

PART NOMENCLATURE

JAN **2N3057A**

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

JEDEC type number
(see Electrical Characteristics table)

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)

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

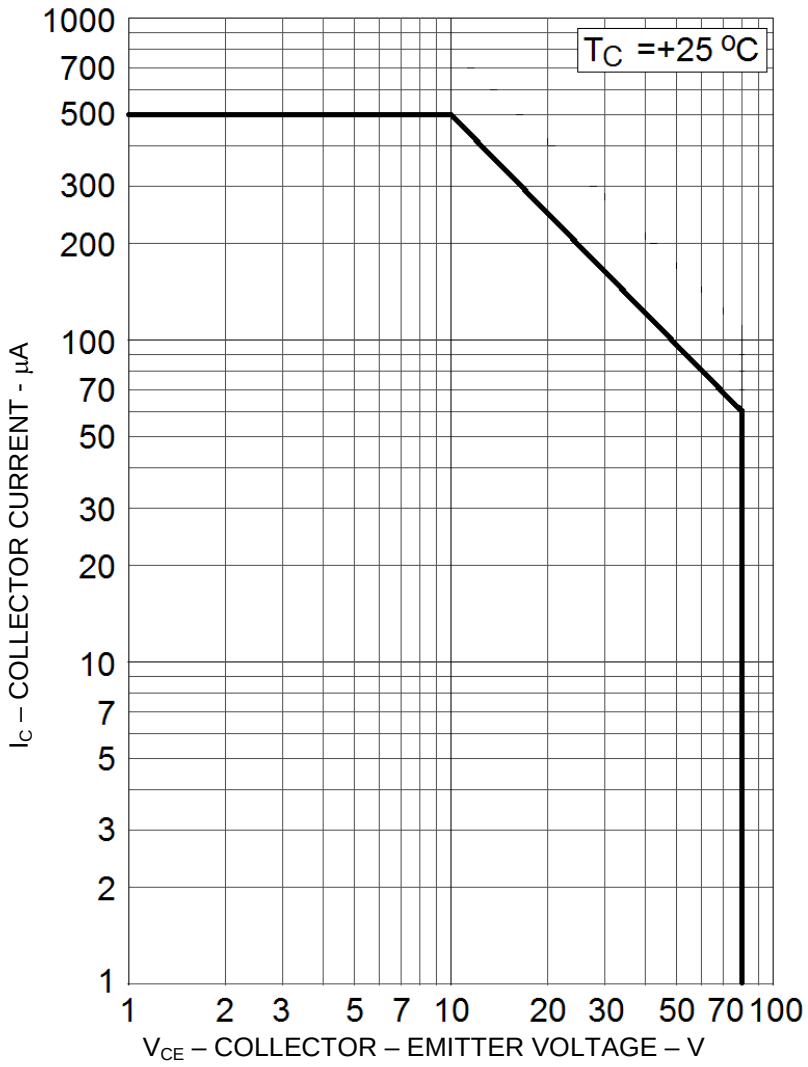
Parameters / Test Conditions	Symbol	Min.	Max.	Unit
Small-Signal Short-Circuit Forward Current Transfer Ratio I_C = 1.0 mA, V_{CE} = 5.0 V, f = 1.0 kHz	h_{fe}	80	400	
Magnitude of Small-Signal Short-Circuit Forward Current Transfer Ratio I_C = 50 mA, V_{CE} = 10 V, f = 20 MHz	$\|h_{fe}\|$	5.0	20	
Output 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

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 = 180 mA
Test 2	V_{CE} = 40 V I_C = 45 mA
Test 3	V_{CE} = 80 V I_C = 22.5 mA

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



Maximum Safe Operating Area

GRAPHS

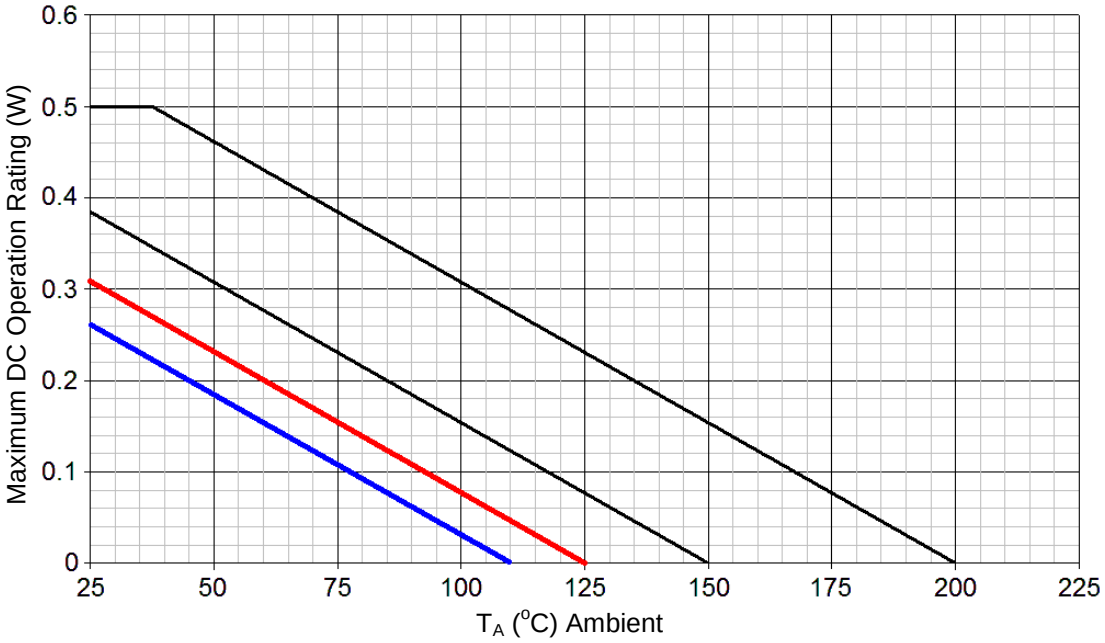


FIGURE 1
Temperature-Power Derating ($R_{\theta JA}$)
Leads = .125 inch (3.175mm)

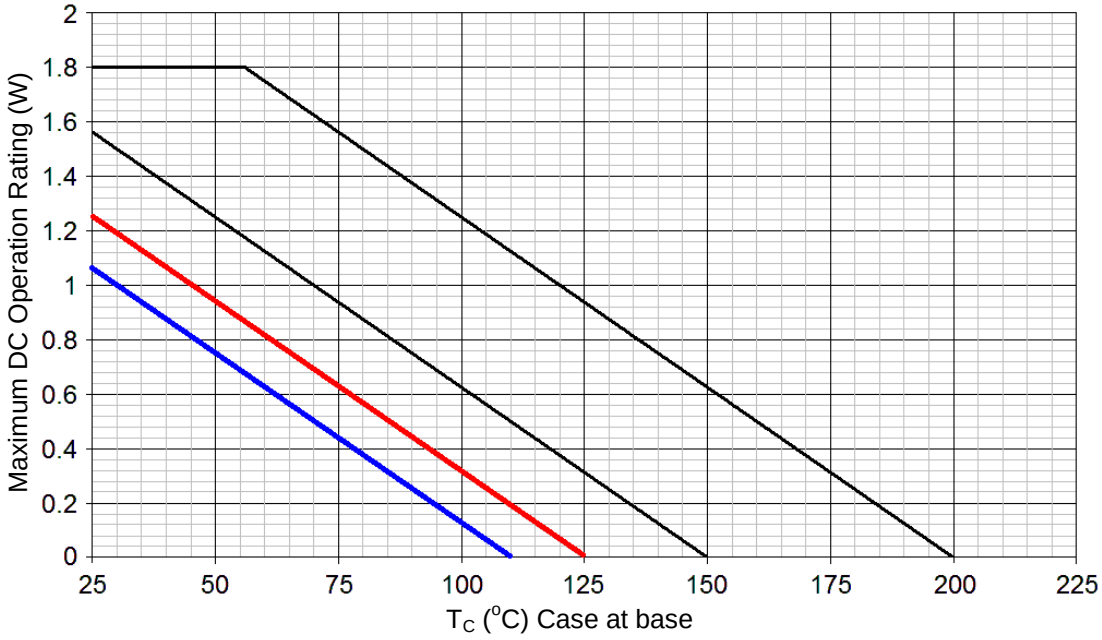


FIGURE 2
Temperature-Power Derating ($R_{\theta JC}$)