RoHS

Available on commercial versions

NPN/PNP SILICON COMPLEMENTARY SMALL SIGNAL DUAL TRANSISTOR

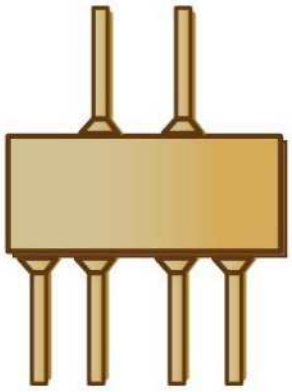
Qualified per MIL-PRF-19500/421

Qualified Levels:
JAN, JANTX, and JANTXV

DESCRIPTION

This 2N3838 device in a 6-pin Flatpack package is military qualified up to a JANTXV level for high-reliability applications. Microsemi also offers numerous other products to meet higher and lower power voltage regulation applications.

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



6-Pin Flatpack Package

FEATURES

- JAN, JANTX, and JANTXV qualifications also available per MIL-PRF-19500/421.
- RoHS compliant versions available (commercial grade only).

APPLICATIONS / BENEFITS

- Two complementary small signal silicon transistors in a single package design.
- Lightweight.

Also available in:

TO-78 package
(leaded)
2N4854

6-Pin U package
(surface mount)
2N4854U

MAXIMUM RATINGS

Parameters/Test Conditions	Symbol	Value per		Unit
		Each Transistor	Total Package	
Thermal Resistance Junction-to-Case	$R_{\Theta JC}$	250	125	ºC/W
Thermal Resistance Junction-to-Ambient	$R_{\Theta JA}$	350	290	ºC/W
Total Power Dissipation @ T_A = +25 ºC (1)	P_T	0.25	0.35	W
Total Power Dissipation @ T_C = +25 ºC (2)	P_T	0.7	1.4	W
Junction and Storage Temperature	T_J and T_{STG}	-65 to +200		ºC
Collector-Base Voltage, Emitter Open	V_{CBO}	60		V
Emitter-Base Voltage, Collector Open	V_{EBO}	5		V
Collector-Emitter Voltage, Base Open	V_{CEO}	40		V
Collector Current, dc	I_C	600		mA
Lead to Case Voltage		+/- 120		V
Solder Temperature @ 10 s	T_{SP}	260		°C

Notes: 1. For T_A > +25 °C, derate linearly 1.43 mW/°C one transistor, 2.00 mW/°C both transistors.
2. For T_C > +25 °C, derate linearly 4.0 mW/°C one transistor, 8.0 mW/°C both transistors.

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MECHANICAL and PACKAGING

- CASE: Hermetic ceramic (white), Au over Ni plated kovar cover.
- TERMINALS: Au over Ni plated copper.
- MARKING: Manufacturer's ID, part number, date code, Pin 1 Identifier.
- POLARITY: See Case Outline.
- See Package Dimensions on last page.

PART NOMENCLATURE



SYMBOLS & DEFINITIONS

Symbol	Definition
I_B	Base Current, dc.
I_C	Collector Current, dc.
I_E	Emitter Current, dc.
I_O	Average Rectified Output Current: The Output Current averaged over a full cycle with a 50 Hz or 60 Hz sine-wave input and a 180 degree conduction angle.
V_{CB}	Collector-Base Voltage (dc).
V_{CE}	Collector-Emitter Voltage, dc.
V_{EB}	Emitter-Base Voltage (dc).

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ELECTRICAL CHARACTERISTICS @ T_A= 25 ºC unless otherwise noted.

Characteristics	Symbol	Min.	Max.	Unit
OFF CHARACTERISTICS				
Collector-Emitter Breakdown Current I_C = 10 mA (pulsed)	$V_{(BR)CEO}$	40		V
Collector-Base Cutoff Current V_{EB} = 5 V	$I_{CBO(1)}$		10	µA
Collector-Base Cutoff Current V_{CB} = 50 V	$I_{CBO(2)}$		50	nA
Emitter-Base Cutoff Current V_{EB} = 5.0 V V_{EB} = 3.0 V	 $I_{EBO(1)}$ $I_{EBO(2)}$		 10 10	 µA nA
ON CHARACTERISTICS				
Forward-Current Transfer Ratio I_C = 150 mA, V_{CE} = 1 V I_C = 100 µA, V_{CE} = 10 V I_C = 1.0 mA, V_{CE} = 10 V I_C = 10 mA, V_{CE} = 10 V I_C = 150 mA, V_{CE} = 10 V I_C = 300 mA, V_{CE} = 10 V	h_{FE}	 50 35 50 75 100 35	 300 	
Collector-Emitter Saturation Voltage I_C = 150 mA, I_B = 15 mA	$V_{CE(sat)}$		0.40	V
Base-Emitter Saturation Voltage I_C = 150 mA, I_B = 15 mA	$V_{BE(sat)}$	0.80	1.25	V
DYNAMIC CHARACTERISTICS				
Forward Current Transfer Ratio I_C = 1.0 mA, V_{CE} = 10 V, f = 1.0 kHz	h_{fe}	60	300	
Forward Current Transfer Ratio, Magnitude I_C = 20 mA, V_{CE} = 10 V, f = 100 MHz	$\|h_{fe}\|$	2.0	10	
Small-Signal Common Emitter Input Impedance I_C = 1.0 mA, V_{CE} = 10 V, f = 1.0 kHz	h_{ie}	1.5	9.0	kΩ
Small-Signal Common Emitter Output Admittance I_C = 1.0 mA, V_{CE} = 10 V, f = 1.0 kHz	h_{oe}		50	µhmo
Open Circuit Output Capacitance V_{CB} = 10 V, I_E = 0, 100 kHz ≤ f ≤ 1.0 MHz	C_{obo}		8.0	pF
Noise Figure I_C = 100 µA, V_{CE} = 10 V, f = 1.0 kHz, R_G =1.0 kΩ	NF		8.0	dB
SWITCHING CHARACTERISTICS				
Turn-On Time (Saturated) (Reference MIL-PRF-19500/421, figure 7)	t_{on}		45	ns
Turn-Off Time (Saturated) (Reference MIL-PRF-19500/421, figure 8)	t_{off}		300	ns
Pulse Response (Non-Saturated) (Reference MIL-PRF-19500/421, figure 9)	$t_{on} + t_{off}$		18	ns
Collector-Emitter Non-Latching Voltage	V_{CEO}	40		V

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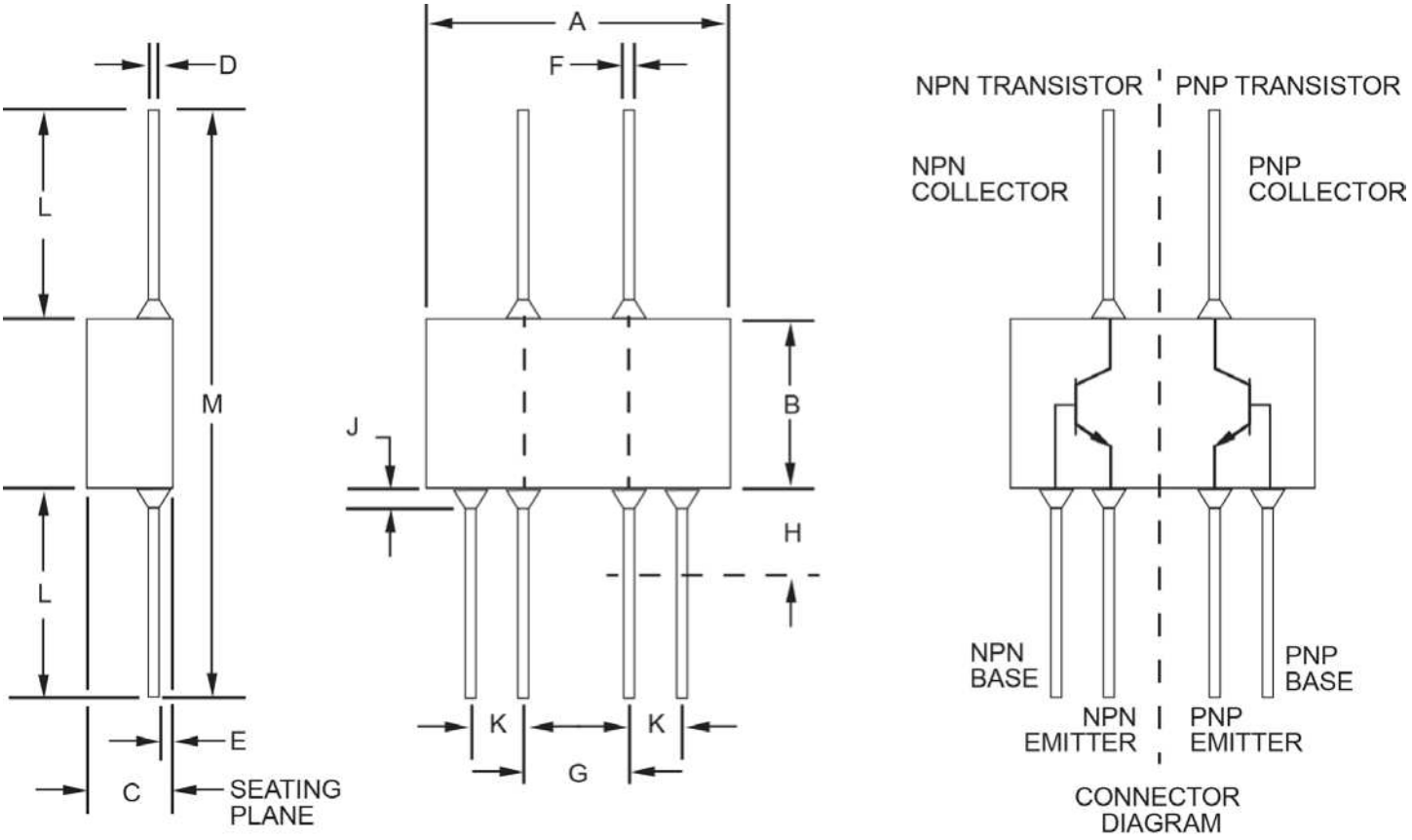
PACKAGE DIMENSIONS



Ltr	Dimensions				Notes
	Inch		Millimeters		
	Min	Max	Min	Max	
A	.240	.290	6.10	7.37	
B	.115	.160	2.92	4.06	
C	.030	.080	0.76	2.03	
D	.003	.006	0.08	0.15	4
E	.005	.035	0.13	0.89	
F	.010	.019	0.25	0.48	4, 6

Ltr	Dimension				Notes
	Inch		Millimeters		
	Min	Max	Min	Max	
G	.100 TP		2.54 TP		6,7
H	-	.050	-	1.27	
J	-	.015	-	0.38	5
K	.050 TP		1.27 TP		6,7
L	.070	.250	1.78	6.35	3,4
M	.260	.650	6.60	16.51	

NOTES:

1. Dimensions are in inches.
2. Millimeters are given for general information only.
3. Maximum limit of this dimension does not apply to device supplied in a carrier.
4. All six leads.
5. Lead dimensions are uncontrolled in this zone.
6. Dimensions "F", "G", and "K" to be measured in zone "H".
7. Leads within .005 inch (0.13 mm) total of true position (TP) at "H" with maximum material condition.
8. In accordance with ASME Y14.5M, diameters are equivalent to Φx symbology.

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