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## NPN/PNP Silicon Complementary Small Signal Dual Transistor Qualified per MIL-PRF-19500/421

*Qualified Levels:  
JAN, JANTX, and  
JANTXV*

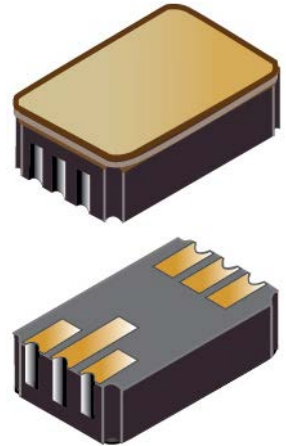
### DESCRIPTION

This 2N4854U device in a low profile 6-pin U 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>.

### FEATURES

- Surface mount equivalent of JEDEC registered 2N4854
- JAN, JANTX, and JANTXV qualifications also available per MIL-PRF-19500/421
- RoHS compliant versions available (commercial grade only)




**6-Pin "U" Package**

### APPLICATIONS / BENEFITS

- Low-profile and compact package design
- Lightweight

Also available in:

 **TO-78 package**  
[2N4854](#)

 **6-Pin Flatpack package**  
[2N3838](#)

### MAXIMUM RATINGS

Parameters/Test Conditions	Symbol	Value per		Unit
		Each Transistor	Total Package	
Thermal Resistance Surface Mount Junction-to-Solder Point	R <sub>θJSP</sub>	110	90	°C/W
Thermal Resistance Junction-to-Ambient <sup>(3)</sup>	R <sub>θJA</sub>	350	290	°C/W
Total Power Dissipation @ T <sub>A</sub> = +25 °C <sup>(1)</sup>	P <sub>T</sub>	0.30	0.60	W
Total Power Dissipation @ T <sub>C</sub> = +25 °C <sup>(2)</sup>	P <sub>T</sub>	1.0	2.0	W
Junction and Storage Temperature	T <sub>J</sub> and T <sub>STG</sub>	-65 to +200		°C
Collector-Base Voltage, Emitter Open	V <sub>CB0</sub>	60		V
Emitter-Base Voltage, Collector Open	V <sub>EB0</sub>	5		V
Collector-Emitter Voltage, Base Open	V <sub>CE0</sub>	40		V
Collector Current, dc	I <sub>C</sub>	600		mA
Lead to Case Voltage		+/- 120		V
Solder Temperature @ 10 s		260		°C

- Notes:**
1. For T<sub>A</sub> > +25°C, derate linearly 1.71 mW/°C one transistor, 3.43 mW/°C both transistors.
  2. For T<sub>C</sub> > +25°C, derate linearly 5.71 mW/°C one transistor, 11.43 mW/°C both transistors.
  3. Ambient equates to PCB FR4 mounting (R<sub>θJPCB</sub>) in Figure 2 and MIL-PRF-19500/421.

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**MECHANICAL and PACKAGING**

- CASE: Hermetically sealed ceramic (black), Au over Ni plated kovar lid
- TERMINALS: Au over Ni plated metallization
- MARKING: Manufacturer's ID, part number, date code
- POLARITY: See case outline.
- WEIGHT: 0.158 grams
- See [Package Dimensions](#) on last page.

**PART NOMENCLATURE**

**JAN 2N4854 U (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

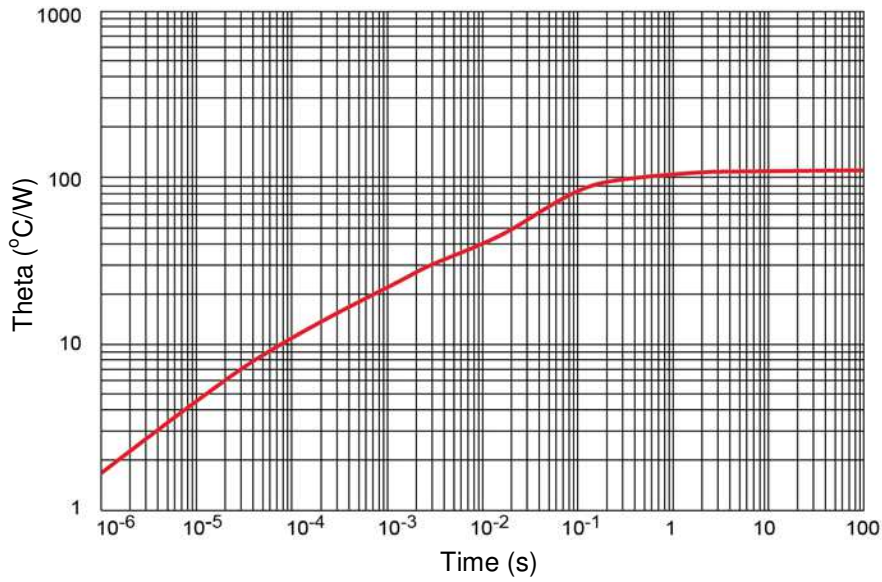
**Surface Mount package**
**SYMBOLS & DEFINITIONS**

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.
$V_{CB}$	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.
$V_{CE}$	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.

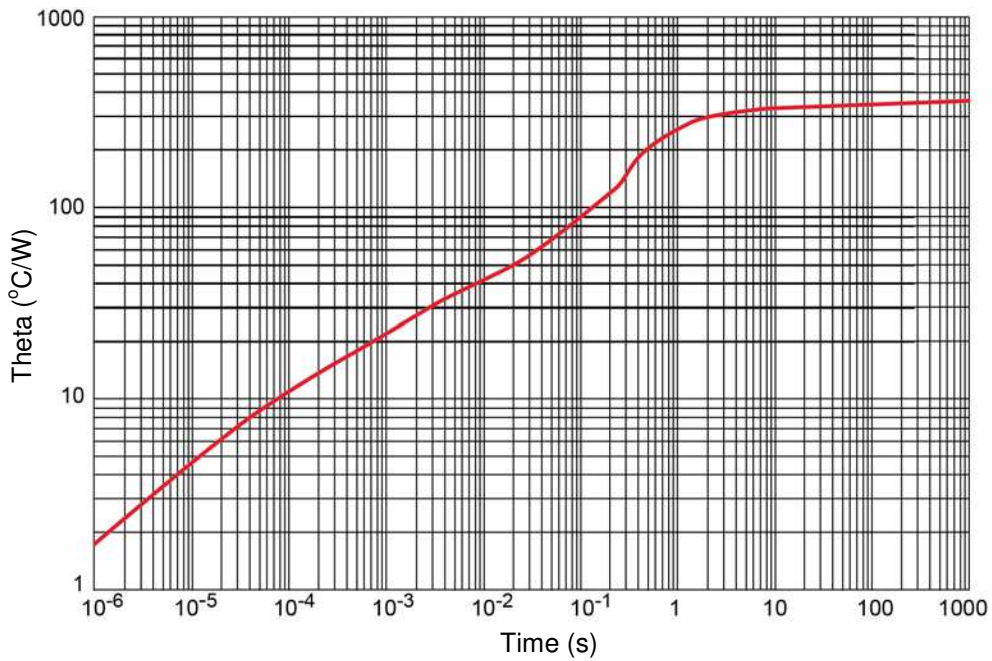
**ELECTRICAL CHARACTERISTICS @  $T_A = 25\text{ }^\circ\text{C}$  unless otherwise noted**

Characteristics	Symbol	Min.	Max.	Unit
<b>OFF CHARACTERISTICS</b>				
Collector-Emitter Breakdown Current $I_C = 10\text{ mA}$ (pulsed)	$V_{(BR)CEO}$	40		V
Collector-Base Cutoff Current $V_{CB} = 60\text{ V}$	$I_{CBO(1)}$		10	$\mu\text{A}$
Collector-Base Cutoff Current $V_{CB} = 50\text{ V}$	$I_{CBO(2)}$		10	nA
Emitter-Base Cutoff Current $V_{EB} = 5.0\text{ V}$ $V_{EB} = 3.0\text{ V}$	$I_{EBO(1)}$ $I_{EBO(2)}$		10 10	$\mu\text{A}$ nA
<b>ON CHARACTERISTICS</b>				
Forward-Current Transfer Ratio $I_C = 150\text{ mA}$ , $V_{CE} = 1\text{ V}$ $I_C = 100\text{ }\mu\text{A}$ , $V_{CE} = 10\text{ V}$ $I_C = 1.0\text{ mA}$ , $V_{CE} = 10\text{ V}$ $I_C = 10\text{ mA}$ , $V_{CE} = 10\text{ V}$ $I_C = 150\text{ mA}$ , $V_{CE} = 10\text{ V}$ $I_C = 300\text{ mA}$ , $V_{CE} = 10\text{ V}$	$h_{FE}$	50 35 50 75 100 35	300	
Collector-Emitter Saturation Voltage $I_C = 150\text{ mA}$ , $I_B = 15\text{ mA}$	$V_{CE(sat)}$		0.40	V
Base-Emitter Saturation Voltage $I_C = 150\text{ mA}$ , $I_B = 15\text{ mA}$	$V_{BE(sat)}$	0.80	1.25	V
<b>DYNAMIC CHARACTERISTICS</b>				
Forward Current Transfer Ratio $I_C = 1.0\text{ mA}$ , $V_{CE} = 10\text{ V}$ , $f = 1.0\text{ kHz}$	$h_{fe}$	60	300	
Forward Current Transfer Ratio, Magnitude $I_C = 20\text{ mA}$ , $V_{CE} = 10\text{ V}$ , $f = 100\text{ MHz}$	$ h_{fe} $	2.0	10	
Small-Signal Common Emitter Input Impedance $I_C = 1.0\text{ mA}$ , $V_{CE} = 10\text{ V}$ , $f = 1.0\text{ kHz}$	$h_{ie}$	1.5	9.0	$\text{k}\Omega$
Small-Signal Common Emitter Output Admittance $I_C = 1.0\text{ mA}$ , $V_{CE} = 10\text{ V}$ , $f = 1.0\text{ kHz}$	$h_{oe}$		50	$\mu\text{hm}\Omega$
Open Circuit Output Capacitance $V_{CB} = 10\text{ V}$ , $I_E = 0$ , $100\text{ kHz} \leq f \leq 1.0\text{ MHz}$	$C_{obo}$		8.0	pF
Noise Figure $I_C = 100\text{ }\mu\text{A}$ , $V_{CE} = 10\text{ V}$ , $f = 1.0\text{ kHz}$ , $R_G = 1.0\text{ k}\Omega$	NF		8.0	dB
<b>SWITCHING CHARACTERISTICS</b>				
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

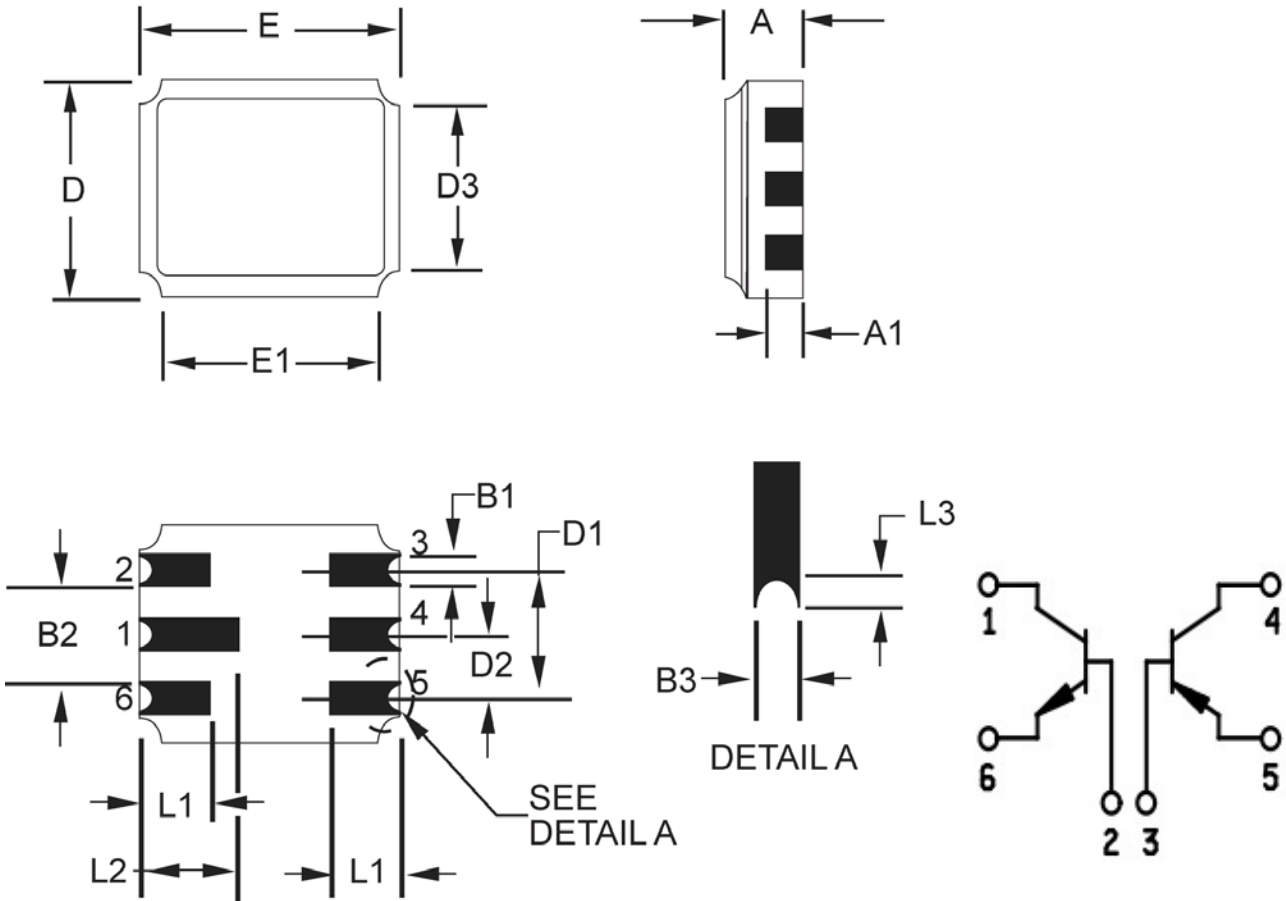
GRAPHS



**FIGURE 1**  
Thermal impedance graph ( $R_{\theta JS}$ )



**FIGURE 2**  
Thermal impedance graph ( $R_{\theta PCB}$ )

**PACKAGE DIMENSIONS**


Ltr	Dimension				Notes
	Inch		Millimeters		
	Min	Max	Min	Max	
A	.058	.100	1.47	2.54	
A1	.026	.039	0.66	0.99	
B1	.022	.028	0.56	0.71	
B2	.072 Ref.		1.83 Ref.		
B3	.006	.022	0.15	0.56	
D	.165	.175	4.19	4.45	
D1	.095	.105	2.41	2.67	

Ltr	Dimensions				Notes
	Inch		Millimeters		
	Min	Max	Min	Max	
D2	.045	.055	1.14	1.40	
D3		.175		4.45	
E	.240	.250	6.10	6.35	
E1		.250		6.35	
L1	.060	.070	1.52	1.78	
L2	.082	.098	2.08	2.49	
L3	.003	.007	0.08	0.18	

**NOTES:**

1. Dimensions are in inches.
2. Millimeters are given for general information only.
3. The co-planarity deviation of all terminal contact points, as defined by the device seating plane, shall not exceed .006 inch (0.15 mm) for solder dipped leadless chip carriers.