



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

*Qualified Levels:
JAN, JANTX, and
JANTXV*

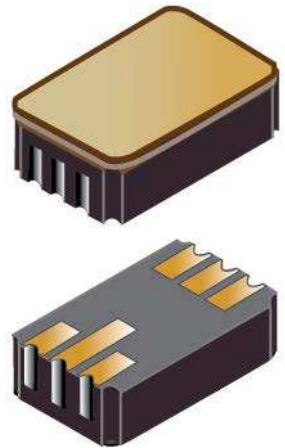
DESCRIPTION

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 _{θJSP}	110	90	°C/W
Thermal Resistance Junction-to-Ambient ⁽³⁾	R _{θJA}	350	290	°C/W
Total Power Dissipation @ T _A = +25 °C ⁽¹⁾	P _T	0.30	0.60	W
Total Power Dissipation @ T _C = +25 °C ⁽²⁾	P _T	1.0	2.0	W
Junction and Storage Temperature	T _J and T _{STG}	-65 to +200		°C
Collector-Base Voltage, Emitter Open	V _{CB0}	60		V
Emitter-Base Voltage, Collector Open	V _{EB0}	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		260		°C

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

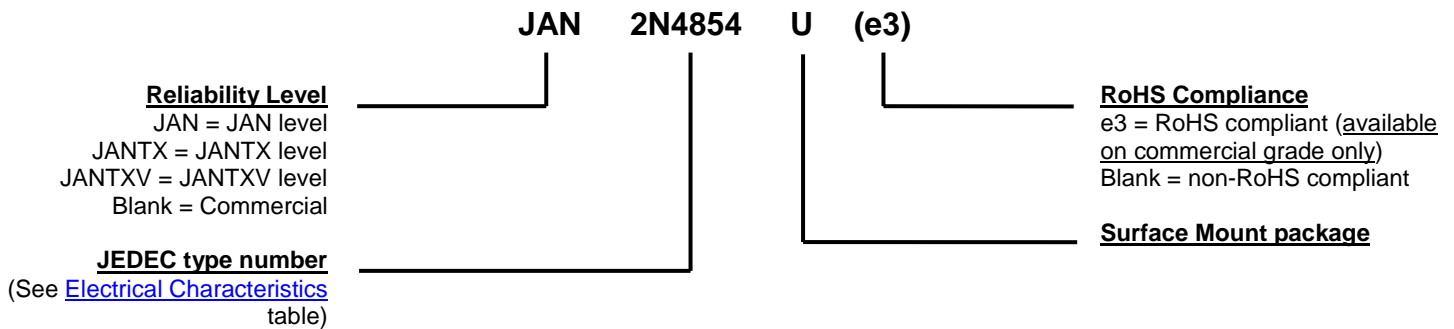
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MECHANICAL and PACKAGING

- 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

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
OFF CHARACTERISTICS				
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	μA
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	μA nA
ON CHARACTERISTICS				
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
DYNAMIC CHARACTERISTICS				
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	μhmo
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
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

GRAPHS

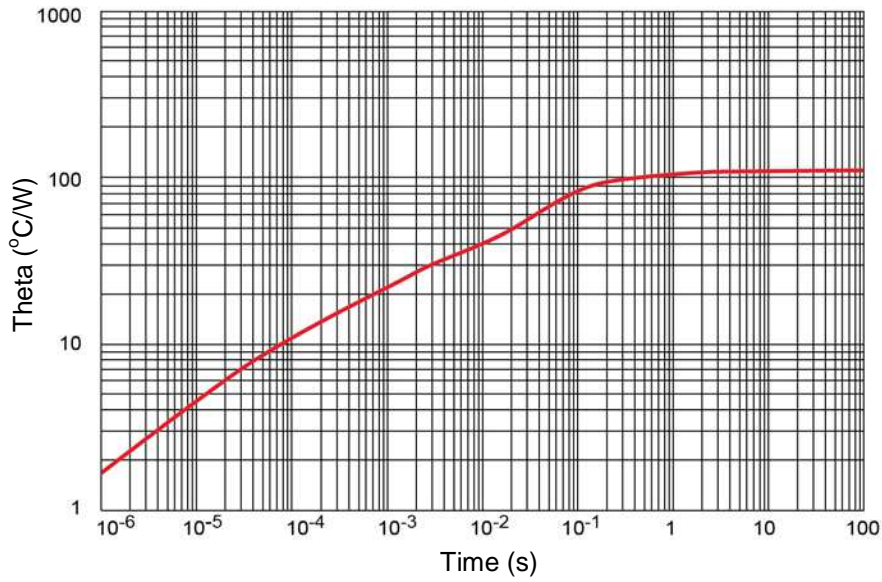


FIGURE 1
Thermal impedance graph ($R_{\theta JSP}$)

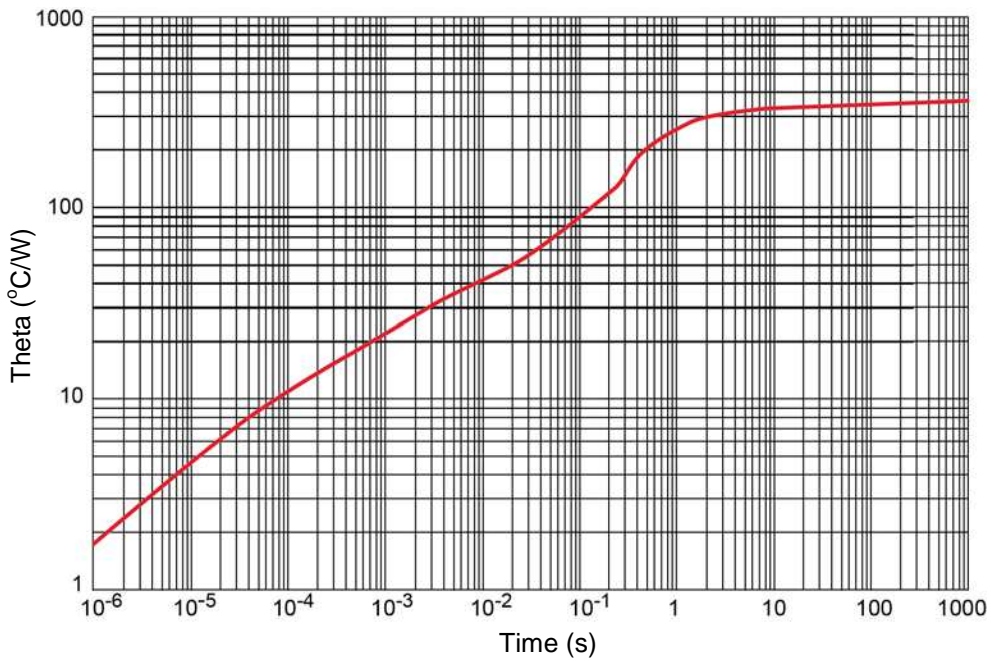
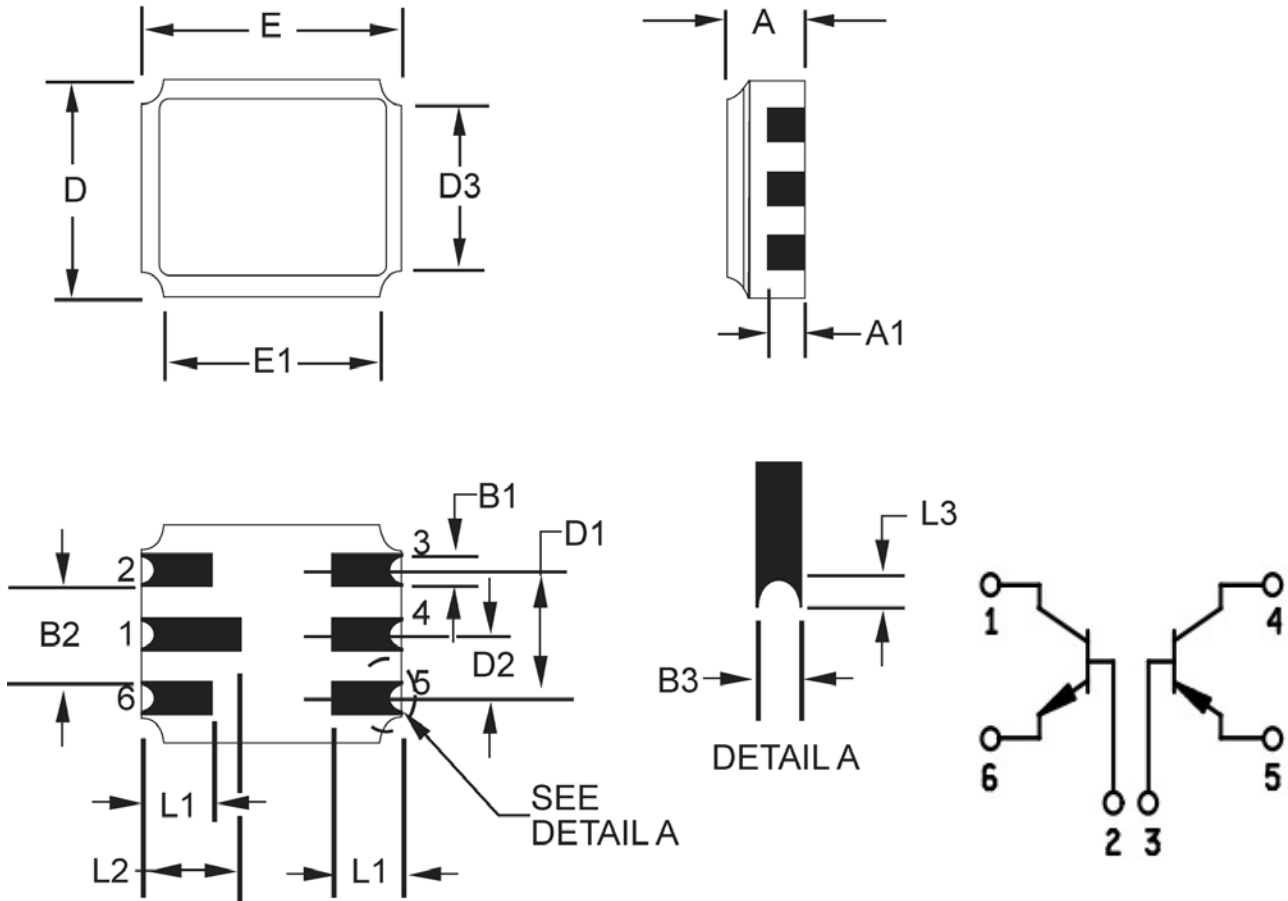


FIGURE 2
Thermal impedance graph ($R_{\theta JPCB}$)

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.