



TECHNICAL DATA

NPN/PNP SILICON COMPLEMENTARY SMALL SIGNAL DUAL TRANSISTOR

Qualified per MIL-PRF-19500/421

Devices

2N3838

2N4854
2N4854U

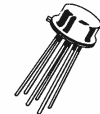
Qualified Level

JAN
JANTX
JANTXV

MAXIMUM RATINGS

Ratings	Sym	2N3838 ⁽²⁾		2N4854, U		Unit
Collector-Emitter Voltage	V_{CEO}	40		40		Vdc
Collector-Base Voltage	V_{CBO}	60		60		Vdc
Emitter-Base Voltage	V_{EBO}	5.0		5.0		Vdc
Collector Current	I_C	600		600		mAdc
		One Trans	Total Device	One Trans	Total Device	
Total Power Dissipation @ $T_A = +25^{\circ}\text{C}$ @ $T_C = +25^{\circ}\text{C}^{(1)}$	P_T	0.25 ⁽²⁾ 0.7 ⁽⁴⁾	0.35 1.4	0.30 ⁽³⁾ 1.0 ⁽⁵⁾	0.60 2.0	W W
Operating & Storage Junction Temp. Range	T_J	200				$^{\circ}\text{C}$
Operating & Storage Junction Temp. Range	T_{stg}	-55 to +200				$^{\circ}\text{C}$
Lead to Case Voltage		± 120				Vdc

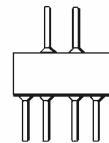
- T_C rating do not apply to Surface Mount devices (2N4854U)
- For $T_A > +25^{\circ}\text{C}$ Derate linearly 1.43 mW/ $^{\circ}\text{C}$ (one transistor) 2.00 mW/ $^{\circ}\text{C}$ (both transistors)
- For $T_A > +25^{\circ}\text{C}$ Derate linearly 1.71 mW/ $^{\circ}\text{C}$ (one transistor) 3.43 mW/ $^{\circ}\text{C}$ (both transistors)
- For $T_C > +25^{\circ}\text{C}$ Derate linearly 4.0 mW/ $^{\circ}\text{C}$ (one transistor) 8.0 mW/ $^{\circ}\text{C}$ (both transistors)
- For $T_C > +25^{\circ}\text{C}$ Derate linearly 5.71 mW/ $^{\circ}\text{C}$ (one transistor) 11.43 mW/ $^{\circ}\text{C}$ (both transistors)



TO-78*
2N4854



6 Pin Surface Mount*
2N4854U



6 Lead Flatpack*
2N3838

*See MILPRF19500/421
for package dimensions.

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

Characteristics	Symbol	Min.	Max.	Unit
OFF CHARACTERISTICS				
Collector-Emitter Breakdown Current $I_C = 10 \text{ mAdc}$	$V_{(BR)CEO}$	40		Dc
Collector-Base Cutoff Current $V_{CB} = 60 \text{ Vdc}$	$I_{CBO(1)}$		10	μAdc
Collector-Base Cutoff Current $V_{CB} = 50 \text{ Vdc}$	$I_{CBO(2)}$		50 10	ηAdc
Emitter-Base Cutoff Current $V_{EB} = 5.0 \text{ Vdc}$ $V_{EB} = 3.0 \text{ Vdc}$	I_{EBO}		10 10	μAdc ηAdc

ELECTRICAL CHARACTERISTICS (con't)

Characteristics	Symbol	Min.	Max.	Unit
-----------------	--------	------	------	------

ON CHARACTERISTICS

Forward-Current Transfer Ratio $I_C = 150 \text{ mAdc}, V_{CE} = 1 \text{ Vdc}$ $I_C = 100 \text{ } \mu\text{Adc}, V_{CE} = 10 \text{ Vdc}$ $I_C = 1.0 \text{ mAdc}, V_{CE} = 10 \text{ Vdc}$ $I_C = 10 \text{ mAdc}, V_{CE} = 10 \text{ Vdc}$ $I_C = 150 \text{ mAdc}, V_{CE} = 10 \text{ Vdc}$ $I_C = 300 \text{ mAdc}, V_{CE} = 10 \text{ Vdc}$	h_{FE}	50 35 50 75 100 35	300	
Collector-Emitter Saturation Voltage $I_C = 150 \text{ mAdc}, I_B = 15 \text{ mAdc}$	$V_{CE(sat)}$		0.40	Vdc
Base-Emitter Saturation Voltage $I_C = 150 \text{ mAdc}, I_B = 15 \text{ mAdc}$	$V_{BE(sat)}$	0.80	1.25	Vdc

DYNAMIC CHARACTERISTICS

Forward Current Transfer Ratio $I_C = 1.0 \text{ mAdc}, V_{CE} = 10 \text{ Vdc}, f = 1.0 \text{ kHz}$	h_{fe}	60	300	
Forward Current Transfer Ratio, Magnitude $I_C = 20 \text{ mAdc}, V_{CE} = 10 \text{ Vdc}, f = 100 \text{ MHz}$	$ h_{fe} $	2.0	10	
Small-Signal Common Emitter Input Impedance $I_C = 1.0 \text{ mAdc}, V_{CE} = 10 \text{ Vdc}, f = 1.0 \text{ kHz}$	h_{je}	1.5	9.0	k Ω
Small-Signal Common Emitter Output Admittance $I_C = 1.0 \text{ mAdc}, V_{CE} = 10 \text{ Vdc}, f = 1.0 \text{ kHz}$	h_{oe}		50	μhmo
Output Capacitance $V_{CB} = 10 \text{ Vdc}, I_E = 0, 100 \text{ kHz} \leq f \leq 1.0 \text{ MHz}$	C_{obo}		8.0	pF
Noise Figure $I_C = 100 \text{ } \mu\text{Adc}, V_{CE} = 10 \text{ Vdc}, f = 1.0 \text{ kHz}, R_G = 1.0 \text{ k}\Omega$	NF		8.0	dB

SWITCHING CHARACTERISTICS

Turn-On Time (See Figure 4 of MIL-PRF-19500/421)	t_{on}		45	ηs
Turn-Off Time (See Figure 5 of MIL-PRF-19500/421)	t_{off}		300	ηs
Pulse Response (See Figure 6 of MIL-PRF-19500/421)	$t_{on} + t_{off}$		18	ηs
Collector-Emitter Non-Latching Voltage (See Figure 7 of MIL-PRF-19500/421)	V_{CEO}	40		Vdc