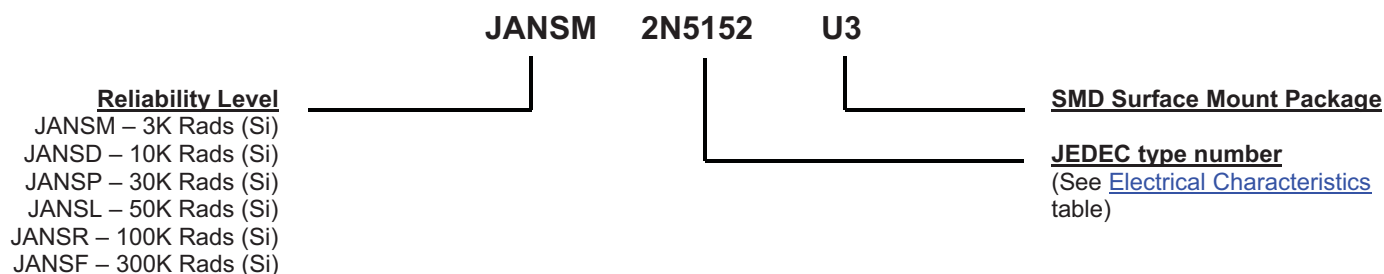


MECHANICAL and PACKAGING

- CASE: Ceramic and gold over nickel plated steel.
- TERMINALS: Gold over nickel plated tungsten/copper.
- MARKING: Part number, date code, A = anode.
- POLARITY: See [schematic](#) on last page.
- WEIGHT: 0.9 grams.
- See [Package Dimensions](#) on last page.

PART NOMENCLATURE

SYMBOLS & DEFINITIONS

Symbol	Definition
C_{obo}	Common-base open-circuit output capacitance.
I_{CEO}	Collector cutoff current, base open.
I_{CEX}	Collector cutoff current, circuit between base and emitter.
I_{EBO}	Emitter cutoff current, collector open.
h_{FE}	Common-emitter static forward current transfer ratio.
V_{CEO}	Collector-emitter voltage, base open.
V_{CBO}	Collector-emitter voltage, emitter open.
V_{EBO}	Emitter-base voltage, collector open.

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

Parameters / Test Conditions	Symbol	Min.	Max.	Unit
Collector-Emitter Breakdown Voltage $I_C = 100\text{ mA}, I_B = 0$	$V_{(BR)CEO}$	80		V
Emitter-Base Cutoff Current $V_{EB} = 4.0\text{ V}, I_C = 0$ $V_{EB} = 5.5\text{ V}, I_C = 0$	I_{EBO}		1.0 1.0	μA mA
Collector-Emitter Cutoff Current $V_{CE} = 60\text{ V}, V_{BE} = 0$ $V_{CE} = 100\text{ V}, V_{BE} = 0$	I_{CES}		1.0 1.0	μA mA
Collector-Emitter Cutoff Current $V_{CE} = 40\text{ V}, I_B = 0$	I_{CEO}		50	μA

ON CHARACTERISTICS

Parameters / Test Conditions	Symbol	Min.	Max.	Unit
Forward-Current Transfer Ratio $I_C = 50\text{ mA}, V_{CE} = 5\text{ V}$ 2N5152U3 2N5154U3 $I_C = 2.5\text{ A}, V_{CE} = 5\text{ V}$ 2N5152U3 2N5154U3 $I_C = 5\text{ A}, V_{CE} = 5\text{ V}$ 2N5152U3 2N5154U3	h_{FE}	20 50 30 70 20 40	-- -- 90 200 -- --	
Collector-Emitter Saturation Voltage $I_C = 2.5\text{ A}, I_B = 250\text{ mA}$ $I_C = 5.0\text{ A}, I_B = 500\text{ mA}$	$V_{CE(sat)}$		0.75 1.5	V
Base-Emitter Voltage Non-Saturation $I_C = 2.5\text{ A}, V_{CE} = 5\text{ V}$	V_{BE}		1.45	V
Base-Emitter Saturation Voltage $I_C = 2.5\text{ A}, I_B = 250\text{ mA}$ $I_C = 5.0\text{ A}, I_B = 500\text{ mA}$	$V_{BE(sat)}$		1.45 2.2	V

DYNAMIC CHARACTERISTICS

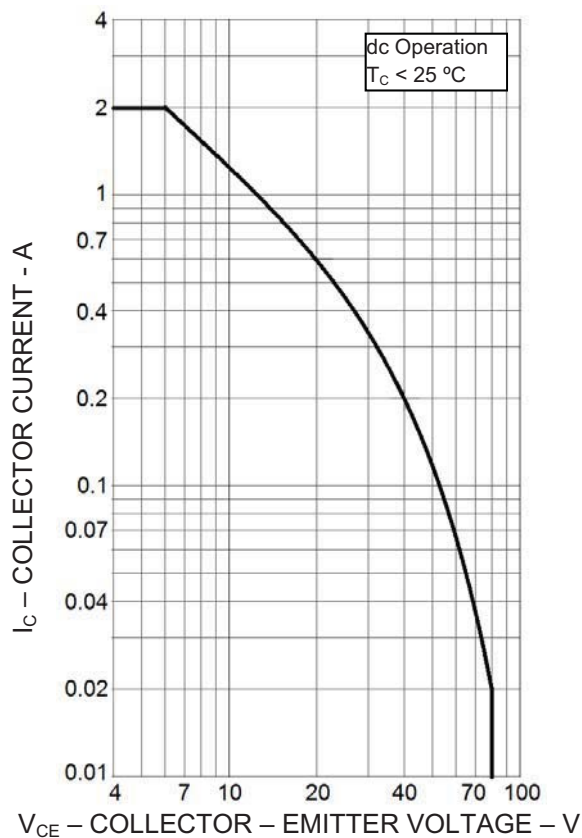
Parameters / Test Conditions	Symbol	Min.	Max.	Unit
Magnitude of Common Emitter Small-Signal Short-Circuit Forward Current Transfer Ratio 2N5152U3 2N5154U3 $I_C = 500\text{ mA}, V_{CE} = 5\text{ V}, f = 10\text{ MHz}$	$ h_{fe} $	6 7		
Small-signal short Circuit Forward-Current Transfer Ratio 2N5152U3 2N5154U3 $I_C = 100\text{ mA}, V_{CE} = 5\text{ V}, f = 1\text{ KHz}$	h_{fe}	20 50		
Output Capacitance $V_{CB} = 10\text{ V}, I_E = 0, f = 1.0\text{ MHz}$	C_{obo}		250	pF

ELECTRICAL CHARACTERISTICS @ $T_A = +25^\circ\text{C}$ unless otherwise noted. (continued)
SWITCHING CHARACTERISTICS

Parameters / Test Conditions	Symbol	Min.	Max.	Unit
Turn-On Time $I_C = 5\text{ A}$, $I_{B1} = 500\text{ mA}$	t_{on}		0.5	μs
Turn-Off Time $R_L = 6\Omega$	t_{off}		1.5	μs
Storage Time $I_{B2} = -500\text{ mA}$	t_s		1.4	μs
Fall Time $V_{BE(OFF)} = 3.7\text{ V}$	t_f		0.5	μs

SAFE OPERATING AREA (See SOA graph below and [MIL-STD-750, method 3053](#))

DC Tests
 $T_C = +25^\circ\text{C}$, $t_p = 1.0\text{ s}$, 1 Cycle

Test 1
 $V_{CE} = 5.0\text{ V}$, $I_C = 2.0\text{ A}$
Test 2
 $V_{CE} = 32\text{ V}$, $I_C = 310\text{ mA}$
Test 3
 $V_{CE} = 80\text{ V}$, $I_C = 12.5\text{ mA}$

Maximum Safe Operating Area

ELECTRICAL CHARACTERISTICS @ $T_A = +25^\circ\text{C}$, unless otherwise noted (continued)
POST RADIATION ELECTRICAL CHARACTERISTICS

Parameters / Test Conditions	Symbol	Min.	Max.	Unit
Collector to Emitter Cutoff Current $V_{CE} = 40\text{ V}$	I_{CEO}		100	μA
Emitter to Base Cutoff Current $V_{EB} = 4\text{ V}$	I_{EBO}		2.0	μA
Breakdown Voltage, Collector to Emitter $I_C = 100\text{ mA}$	$V_{(BR)CEO}$	80		V
Collector to Emitter Cutoff Current $V_{CE} = 60\text{ V}$	I_{CES}		2.0	μA
Emitter to Base Cutoff Current $V_{EB} = 5.5\text{ V}$	I_{EBO}		2.0	mA
Forward-Current Transfer Ratio ⁽¹⁾ $I_C = 50\text{ mA}$, $V_{CE} = 5\text{ V}$ 2N5152U3 2N5154U3 $I_C = 2.5\text{ A}$, $V_{CE} = 5\text{ V}$ 2N5152U3 2N5154U3 $I_C = 5\text{ A}$ pulsed, $V_{CE} = 5\text{ V}$ 2N5152U3 2N5154U3	$[h_{FE}]$	[10] [25] [15] [35] [10] [20]	90 200	
Base to Emitter voltage (non-saturated) $V_{CE} = 5\text{ V}$, $I_C = 2.5\text{ A}$, pulsed	V_{BE}		1.45	V
Collector-Emitter Saturation Voltage $I_C = 2.5\text{ mA}$, $I_B = 250\text{ mA}$, pulsed $I_C = 500\text{ mA}$, $I_B = 500\text{ mA}$, pulsed	$V_{CE(sat)}$		0.86 1.73	V
Base-Emitter Saturation Voltage $I_C = 2.5\text{ A}$, $I_B = 250\text{ mA}$, pulsed $I_C = 5\text{ A}$, $I_B = 500\text{ mA}$, pulsed	$V_{BE(sat)}$		1.67 2.53	V

- (1) See method 1019 of MIL-STD-750 for how to determine $[h_{FE}]$ by first calculating the delta ($1/h_{FE}$) from the pre- and post-radiation h_{FE} . Notice the $[h_{FE}]$ is not the same as h_{FE} and cannot be measured directly. The $[h_{FE}]$ value can never exceed the pre-radiation minimum h_{FE} that it is based upon.

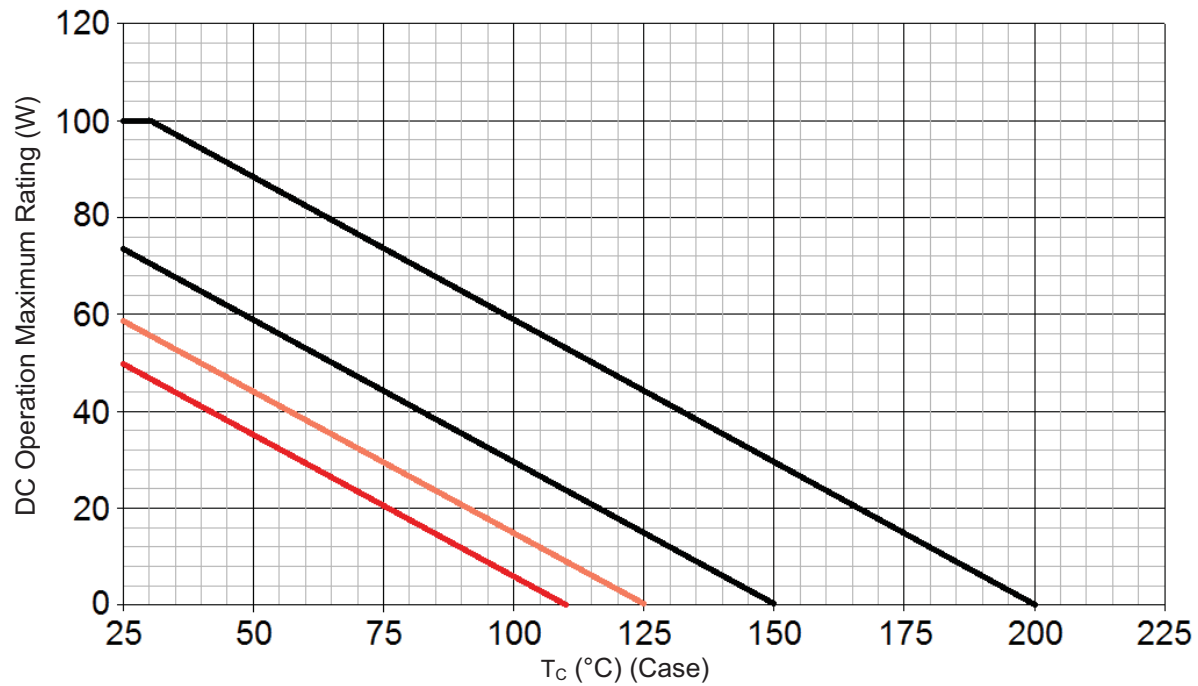
GRAPHS


FIGURE 1
Temperature-Power Derating Curve

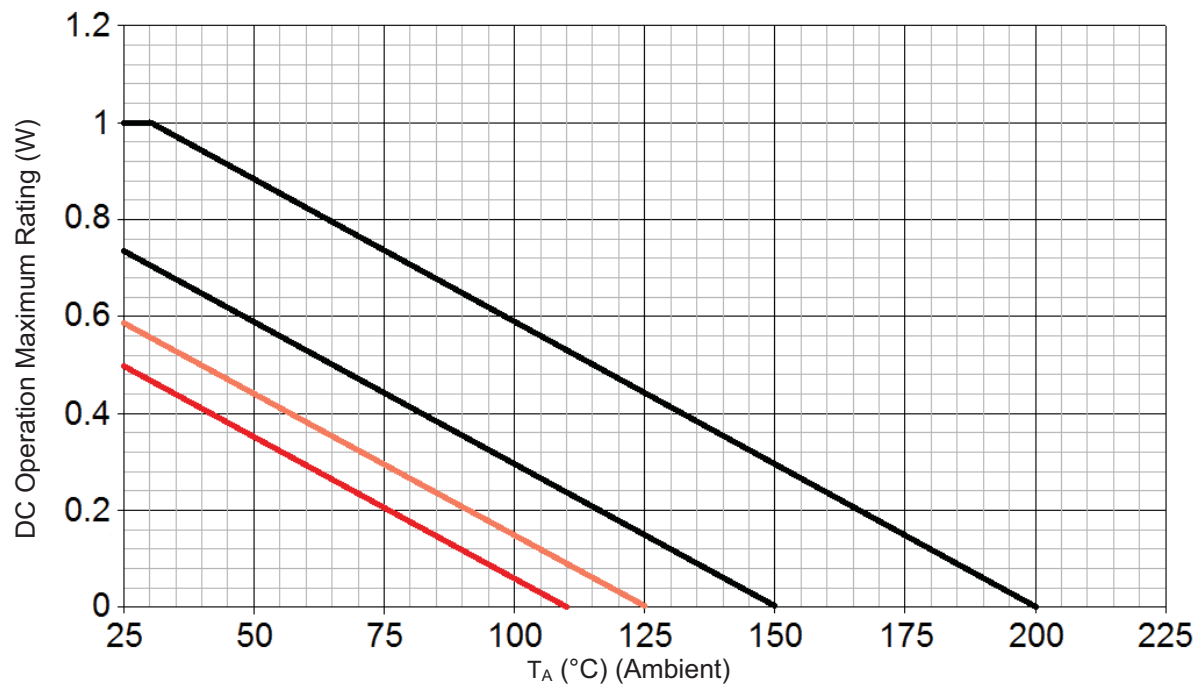


FIGURE 2
Temperature-Power Derating Curve

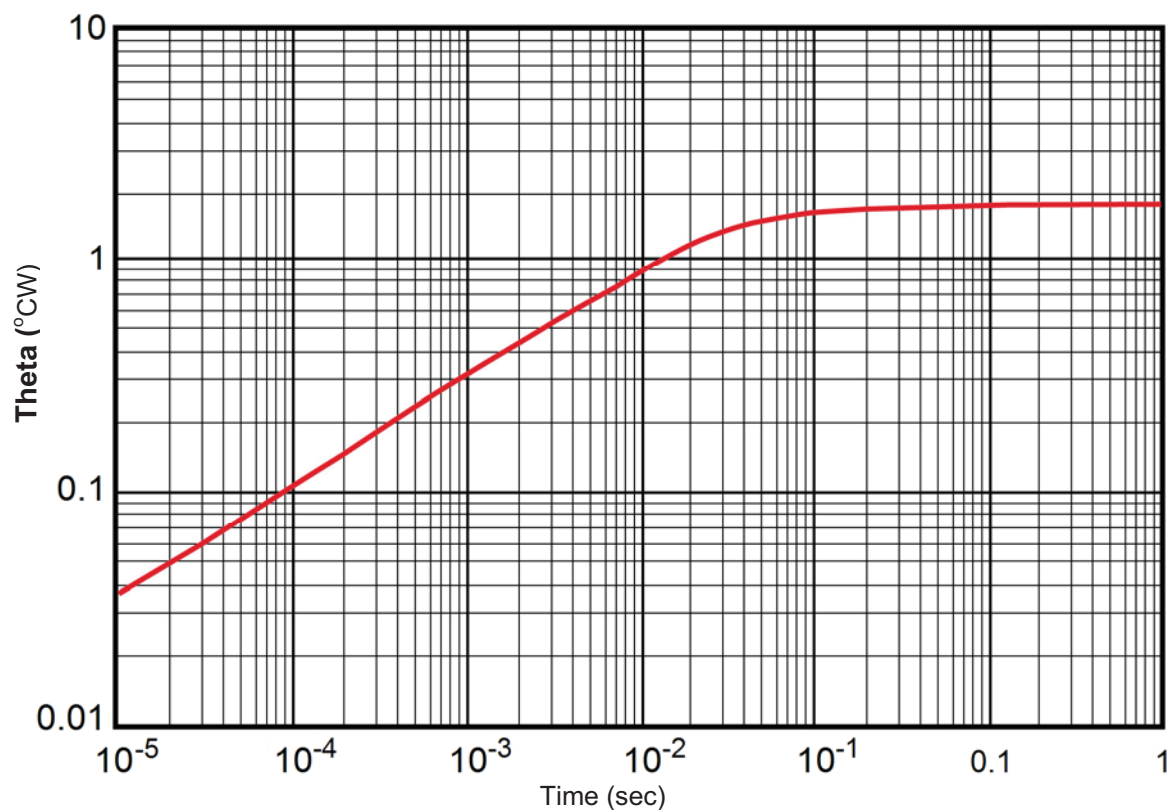
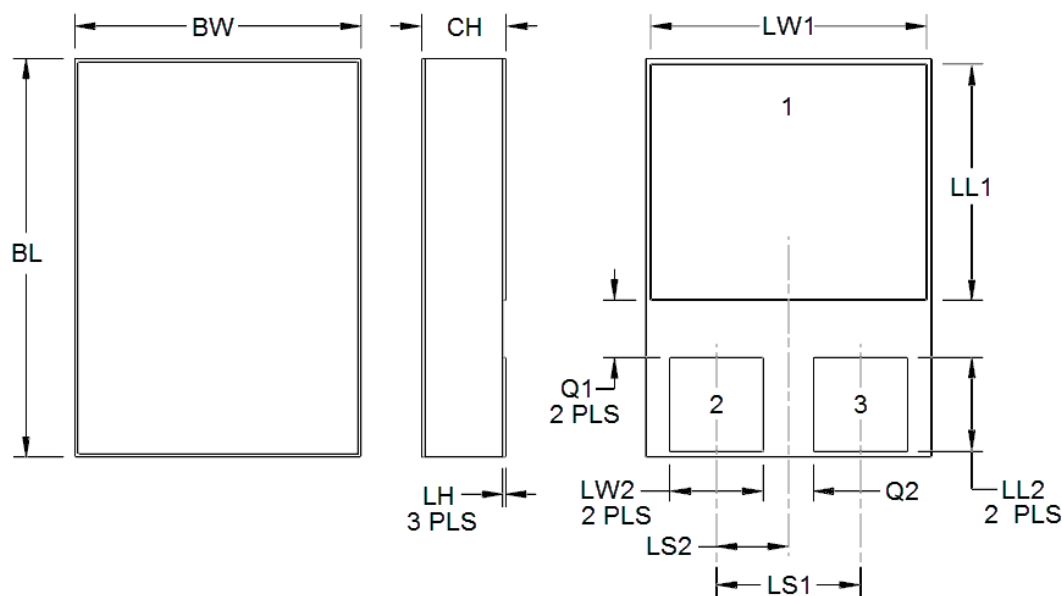
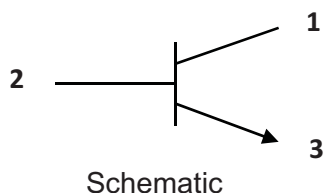
GRAPHS (continued)


FIGURE 3
Maximum Thermal Impedance ($R_{\theta JC}$)

PACKAGE DIMENSIONS

NOTES:

1. Dimensions are in inches.
2. Millimeters are given for general information only.
3. In accordance with ASME Y14.5M, diameters are equivalent to Φ x symbology.



Symbol	DIMENSIONS			
	INCH		MILLIMETERS	
	Min	Max	Min	Max
BL	.395	.405	10.03	10.29
BW	.291	.301	7.39	7.65
CH	.112	.124	2.84	3.15
LH	.010	.020	0.25	0.51
LL1	.220	.230	5.59	5.84
LL2	.115	.125	2.92	3.18
LS1	.150 BSC		3.81 BSC	
LS2	.075 BSC		1.91 BSC	
LW1	.281	.291	7.14	7.39
LW2	.090	.100	2.29	2.54
Q1	.030		0.76	
Q2	.030		0.76	
Term 1	Collector			
Term 2	Base			
Term 3	Emitter			