

# NST489AMT1

## High Current Surface Mount NPN Silicon Low $V_{CE(sat)}$ Switching Transistor for Load Management in Portable Applications

### Features

- Pb-Free Package is Available

### MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ )

Rating	Symbol	Max	Unit
Collector-Emitter Voltage	$V_{CEO}$	30	V
Collector-Base Voltage	$V_{CBO}$	50	V
Emitter-Base Voltage	$V_{EBO}$	5.0	V
Collector Current – Continuous	$I_C$	2.0	A
Collector Current – Peak	$I_{CM}$	3.0	A

### THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Total Device Dissipation $T_A = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$ (Note 1)	535 4.3	mW mW/ $^\circ\text{C}$
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$ (Note 1)	234	$^\circ\text{C}/\text{W}$
Total Device Dissipation $T_A = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$ (Note 2)	1.180 9.4	W mW/ $^\circ\text{C}$
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$ (Note 2)	106	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction-to-Lead #1	$R_{\theta JL}$ (Note 1) $R_{\theta JL}$ (Note 2)	110 50	$^\circ\text{C}/\text{W}$ $^\circ\text{C}/\text{W}$
Total Device Dissipation (Single Pulse < 10 s)	$P_{D\text{single}}$ (Notes 2 and 3)	1.75	W
Junction and Storage Temperature Range	$T_J, T_{stg}$	-55 to +150	$^\circ\text{C}$

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

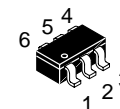
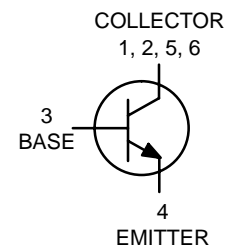
- FR-4 with 1 oz and  $3.9\text{ mm}^2$  of copper area.
- FR-4 with 1 oz and  $645\text{ mm}^2$  of copper area.
- Refer to Figure 8.



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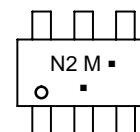
<http://onsemi.com>

30 VOLTS, 3.0 AMPS  
NPN TRANSISTOR



TSOP-6  
CASE 318G  
STYLE 6

### DEVICE MARKING



- N2 = Specific Device Code
- M = Date Code\*
- = Pb-Free Package

(Note: Microdot may be in either location)

\*Date Code orientation may vary depending upon manufacturing location.

### ORDERING INFORMATION

Device	Package	Shipping†
NST489AMT1	TSSOP-6	3000/Tape & Reel
NST489AMT1G	TSSOP-6 (Pb-Free)	3000/Tape & Reel

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

# NST489AMT1

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

Characteristic	Symbol	Min	Typ	Max	Unit	
<b>OFF CHARACTERISTICS</b>						
Collector–Emitter Breakdown Voltage ( $I_C = 10\text{ mA}$ , $I_B = 0$ )	$V_{(BR)CEO}$	30	–	–	V	
Collector–Base Breakdown Voltage ( $I_C = 0.1\text{ mA}$ , $I_E = 0$ )	$V_{(BR)CBO}$	50	–	–	V	
Emitter–Base Breakdown Voltage ( $I_E = 0.1\text{ mA}$ , $I_C = 0$ )	$V_{(BR)EBO}$	5.0	–	–	V	
Collector Cutoff Current ( $V_{CB} = 30\text{ V}$ , $I_E = 0$ )	$I_{CBO}$	–	–	0.1	$\mu\text{A}$	
Collector–Emitter Cutoff Current ( $V_{CES} = 30\text{ V}$ )	$I_{CES}$	–	–	0.1	$\mu\text{A}$	
Emitter Cutoff Current ( $V_{EB} = 4.0\text{ V}$ )	$I_{EBO}$	–	–	0.1	$\mu\text{A}$	
<b>ON CHARACTERISTICS</b>						
DC Current Gain (Note 4)	$h_{FE}$	( $I_C = 1.0\text{ mA}$ , $V_{CE} = 5.0\text{ V}$ ) ( $I_C = 0.5\text{ A}$ , $V_{CE} = 5.0\text{ V}$ ) ( $I_C = 1.0\text{ A}$ , $V_{CE} = 5.0\text{ V}$ )	300 300 200	– 500 –	– 900 –	
Collector–Emitter Saturation Voltage (Note 4)	$V_{CE(sat)}$	( $I_C = 1.0\text{ A}$ , $I_B = 100\text{ mA}$ ) ( $I_C = 0.5\text{ A}$ , $I_B = 50\text{ mA}$ ) ( $I_C = 0.1\text{ A}$ , $I_B = 1.0\text{ mA}$ )	– – –	0.10 0.06 0.05	0.200 0.125 0.075	V
Base–Emitter Saturation Voltage (Note 4) ( $I_C = 1.0\text{ A}$ , $I_B = 0.1\text{ A}$ )	$V_{BE(sat)}$		–	–	1.1	V
Base–Emitter Turn–on Voltage (Note 4) ( $I_C = 1.0\text{ A}$ , $V_{CE} = 2.0\text{ V}$ )	$V_{BE(on)}$		–	–	1.1	V
Cutoff Frequency ( $I_C = 100\text{ mA}$ , $V_{CE} = 5.0\text{ V}$ , $f = 100\text{ MHz}$ )	$f_T$		200	300	–	MHz
Output Capacitance ( $f = 1.0\text{ MHz}$ )	$C_{obo}$		–	–	15	pF

4. Pulsed Condition: Pulse Width  $\leq 300\ \mu\text{sec}$ , Duty Cycle  $\leq 2\%$ .

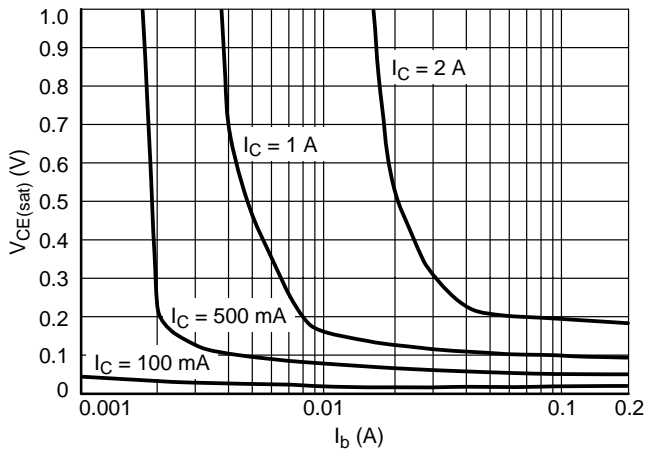


Figure 1.  $V_{CE(sat)}$  versus  $I_b$

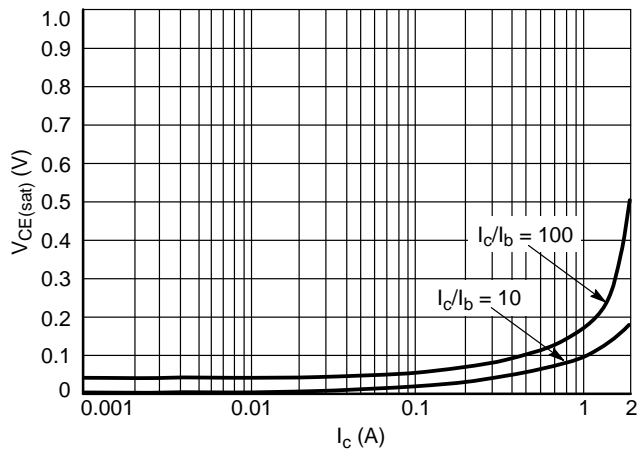


Figure 2.  $V_{CE(sat)}$  versus  $I_C$

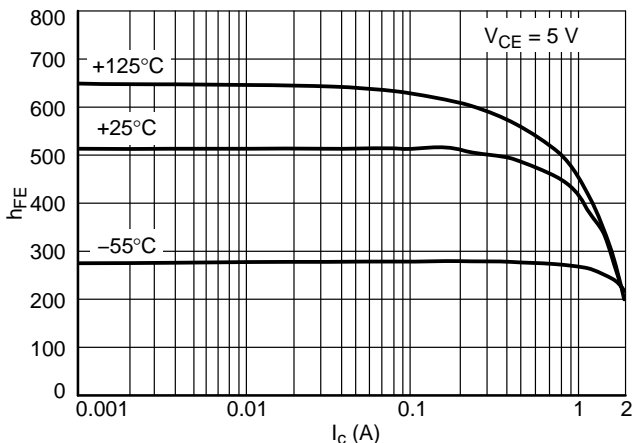


Figure 3.  $h_{FE}$  versus  $I_C$

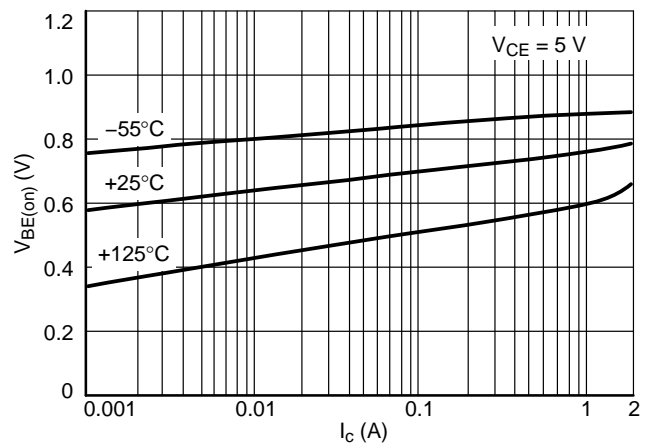


Figure 4.  $V_{BE(on)}$  versus  $I_C$

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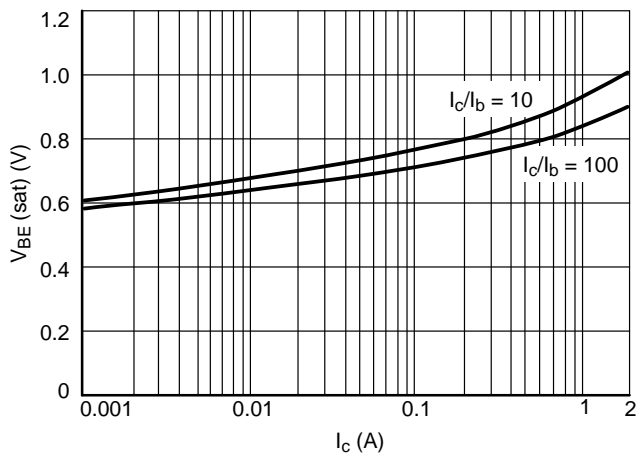


Figure 5.  $V_{BE(sat)}$  versus  $I_C$

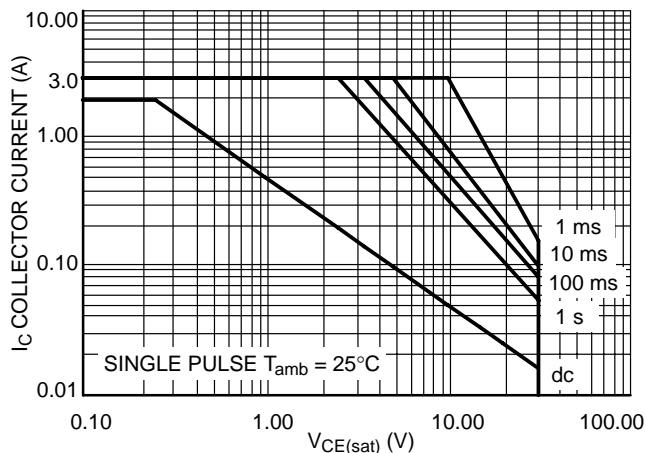


Figure 6. Safe Operating Area

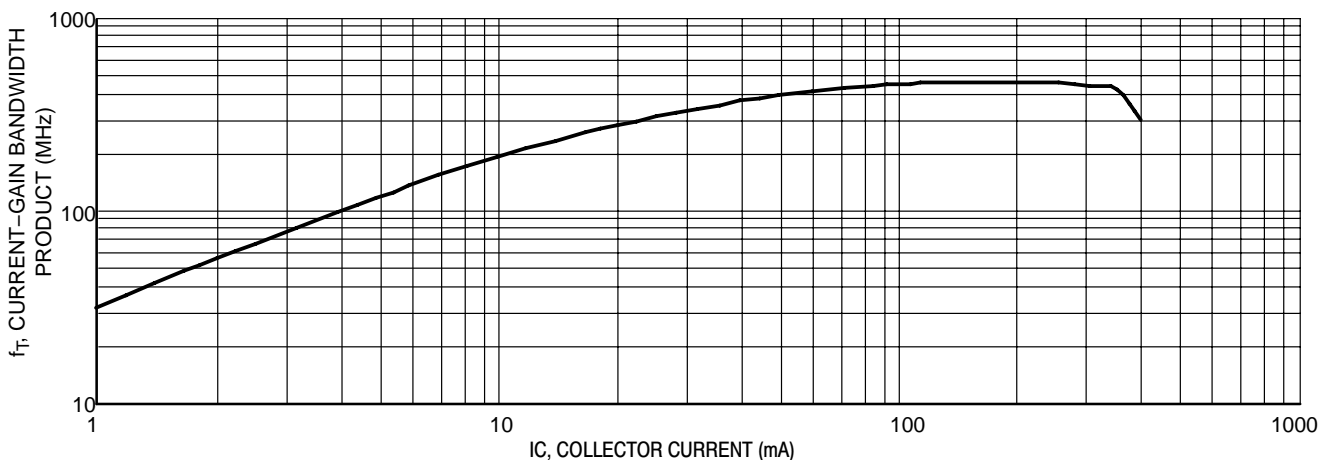


Figure 7.  $f_T$  (MHz) versus  $I_C$  (mA)  $V_{CE} = 5.0$  V

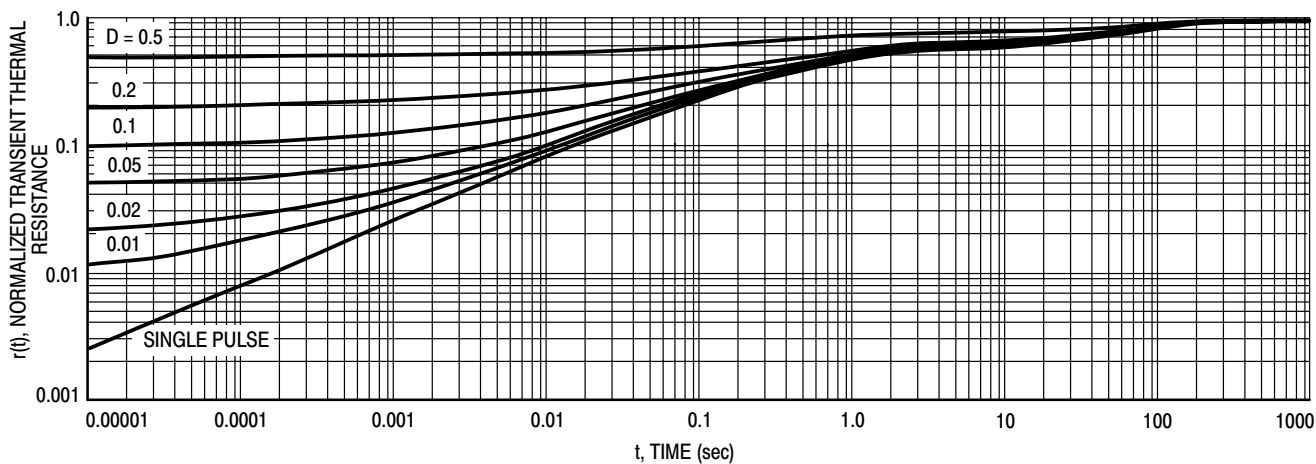
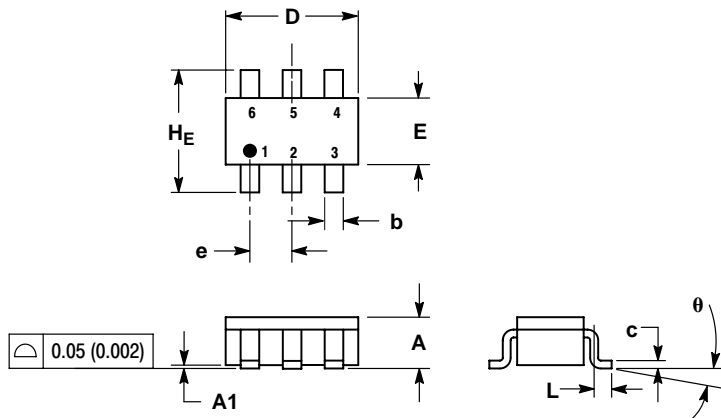


Figure 8. Normalized Thermal Response

# NST489AMT1

## PACKAGE DIMENSIONS

TSOP-6  
CASE 318G-02  
ISSUE S



### NOTES:

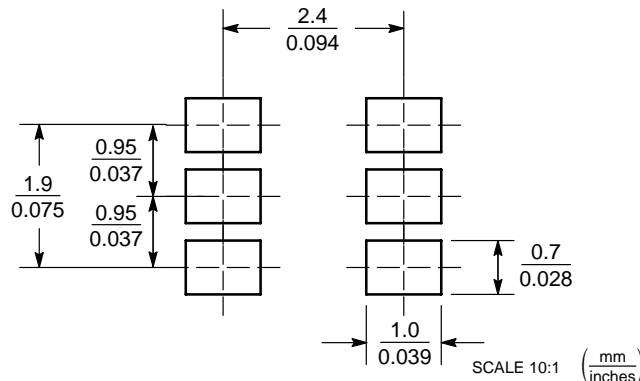
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
4. DIMENSIONS A AND B DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS.

DIM	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.90	1.00	1.10	0.035	0.039	0.043
A1	0.01	0.06	0.10	0.001	0.002	0.004
b	0.25	0.38	0.50	0.010	0.014	0.020
c	0.10	0.18	0.26	0.004	0.007	0.010
D	2.90	3.00	3.10	0.114	0.118	0.122
E	1.30	1.50	1.70	0.051	0.059	0.067
e	0.85	0.95	1.05	0.034	0.037	0.041
L	0.20	0.40	0.60	0.008	0.016	0.024
HE	2.50	2.75	3.00	0.099	0.108	0.118
θ	0°	-	10°	0°	-	10°

### STYLE 6:

1. COLLECTOR
2. COLLECTOR
3. BASE
4. EMITTER
5. COLLECTOR
6. COLLECTOR

### SOLDERING FOOTPRINT\*



\*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

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