NSB1706DMW5T1

Dual Bias Resistor Transistor

NPN Silicon Surface Mount Transistors with Monolithic Bias Resistor Network

The BRT (Bias Resistor Transistor) contains a single transistor with a monolithic bias network consisting of two resistors; a series base resistor and a base–emitter resistor. These digital transistors are designed to replace a single device and its external resistor bias network. The BRT eliminates these individual components by integrating them into a single device. In the NSB1706DMW5T1, two BRT devices are housed in the SC–88A package which is ideal for low power surface mount applications where board space is at a premium.

Features

- Simplifies Circuit Design
- Reduces Board Space
- Reduces Component Count
- Pb-Free Package is Available

MAXIMUM RATINGS

 $(T_A = 25^{\circ}C \text{ unless otherwise noted, common for } Q_1 \text{ and } Q_2)$

Rating	Symbol	Value	Unit
Collector-Base Voltage	V _{CBO}	50	Vdc
Collector-Emitter Voltage	V _{CEO}	50	Vdc
Collector Current	I _C	100	mAdc

THERMAL CHARACTERISTICS

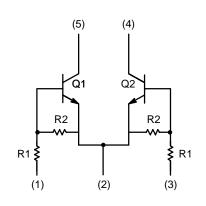
Characteristic (One Junction Heated)	Symbol	Max	Unit
Total Device Dissipation T _A = 25°C Derate above 25°C	P _D	187 (Note 1) 256 (Note 2) 1.5 (Note 1) 2.0 (Note 2)	mW mW/°C
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	670 (Note 1) 490 (Note 2)	°C/W
Characteristic (Both Junctions Heated)	Symbol	Max	Unit
Total Device Dissipation T _A = 25°C Derate above 25°C	P _D	250 (Note 1) 385 (Note 2) 2.0 (Note 1) 3.0 (Note 2)	mW mW/°C
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	493 (Note 1) 325 (Note 2)	°C/W
Thermal Resistance, Junction-to-Lead	$R_{\theta JL}$	188 (Note 1) 208 (Note 2)	°C/W
Junction and Storage Temperature	T _J , T _{stg}	-55 to +150	°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.



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SC-88A CASE 419A STYLE 1

MARKING DIAGRAM



U6 = Device Marking M = Date Code

= Pb–Free Package

(Note: Microdot may be in either location)

ORDERING INFORMATION

Device	Package	Shipping [†]
NSB1706DMW5T1	SC-88A	3000/Tape & Reel
NSB1706DMW5T1G	SC-88A (Pb-Free)	

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

^{1.} FR-4 @ Minimum Pad.

^{2.} FR-4 @ 1.0 x 1.0 inch Pad.

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ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted, common for Q_1 and Q_2)

Characteristic	Symbol	Min	Тур	Max	Unit
OFF CHARACTERISTICS	<u>.</u>				
Collector-Base Cutoff Current $(V_{CB} = 50 \text{ V}, I_{E} = 0)$	I _{CBO}	-	_	100	nAdc
Collector-Emitter Cutoff Current (V _{CE} = 50 V, I _B = 0)	I _{CEO}	-	_	500	nAdc
Emitter-Base Cutoff Current $(V_{EB} = 6.0 \text{ V}, I_{C} = 0)$	I _{EBO}	-	_	0.18	mAdc
Collector-Base Breakdown Voltage ($I_C = 10 \mu A, I_E = 0$)	V _(BR) CBO	50	-	_	Vdc
Collector-Emitter Breakdown Voltage (Note 3) (I _C = 2.0 mA, I _B = 0)	V _(BR) CEO	50	-	_	Vdc
ON CHARACTERISTICS (Note 3)				_	
DC Current Gain (V _{CE} = 10 V, I _C = 5.0 mA)	h _{FE}	80	200	_	
Collector-Emitter Saturation Voltage (I _C = 10 mA, I _B = 1 mA)	V _{CE(sat)}	-	-	0.25	Vdc
Output Voltage (on) (V _{CC} = 5.0 V, V _B = 2.5 V, R _L = 1.0 k Ω)	V _{OL}	_	-	0.2	Vdc
Output Voltage (off) (V _{CC} = 5.0 V, V _B = 0.25 V, R _L = 1.0 k Ω)	V _{OH}	4.9	_	_	Vdc
Input Resistor	R1	3.3	4.7	6.1	kΩ
Resistor Ratio	R1/R2	0.055	0.1	0.185	

^{3.} Pulse Test: Pulse Width < 300 μ s, Duty Cycle < 2.0%.

NOTE: New resistor combinations. Updated curves to follow in subsequent data sheets.

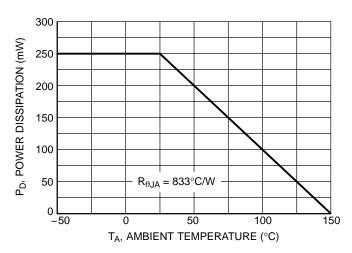
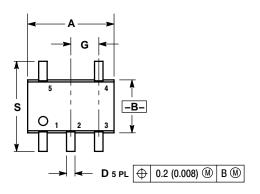


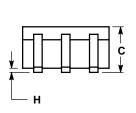
Figure 1. Derating Curve

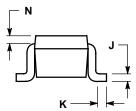
NSB1706DMW5T1

PACKAGE DIMENSIONS

SC-88A, SOT-353, SC-70 CASE 419A-02 ISSUE J







NOTES

- 1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
 CONTROLLING DIMENSION: INCH.
- 419A-01 OBSOLETE. NEW STANDARD 419A-02
- DIMENSIONS A AND B DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS.

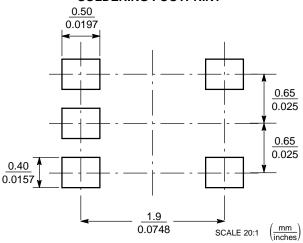
	INCHES		MILLIN	IETERS
DIM	MIN	MAX	MIN	MAX
Α	0.071	0.087	1.80	2.20
В	0.045	0.053	1.15	1.35
С	0.031	0.043	0.80	1.10
D	0.004	0.012	0.10	0.30
G	0.026 BSC		0.65 BSC	
Н		0.004		0.10
7	0.004	0.010	0.10	0.25
K	0.004	0.012	0.10	0.30
N	0.008 REF		0.20 REF	
S	0.079	0.087	2.00	2.20

STYLE 1:

- PIN 1. BASE
 - 2. EMITTER 3. BASE

 - 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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