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NSM46211DW6T1G

Dual NPN Transistors

General Purpose NPN Transistor and NPN Transistor with Monolithic Bias Network

NSM46211DW6T1G contains a single NPN transistor with a single NPN bias resistor transistor with a monolithic bias network; a series base resistor and a base-emitter resistor. This device is designed to replace multiple transistors and resistors on customer boards by integrating these components into a single device.

NSM46211DW6T1G is housed in a SC-88/SOT-363 package which is ideal for low power surface mount applications in space constrained applications.

Features

- Simplifies Circuit Design
- Reduces Board Space
- Reduces Component Count
- Q1: NPN
- Q2: NPN BRT, R1 = R2 = 10 k (typical)
- This is a Pb-Free Device

Applications

- Logic Switching
- Amplification
- Driver Circuits
- Interface Circuits

MAXIMUM RATINGS (T_A = 25°C unless otherwise noted, common for Q_1 and Q_2, - minus sign for Q_1 (PNP) omitted)

Rating - Q1 (NPN)	Symbol	Value	Unit
Collector-Base Voltage	$V_{(BR)CBO}$	80	Vdc
Collector-Emitter Voltage	$V_{(BR)CEO}$	65	Vdc
Emitter-Base Voltage	$V_{(BR)EBO}$	6.0	Vdc
Collector Current - Continuous	I_C	100	mAdc
Rating - Q2 (NPN BRT)	**Symbol**	**Value**	**Unit**
Collector-Base Voltage	V_{CBO}	50	Vdc
Collector-Emitter Voltage	V_{CEO}	50	Vdc
Collector Current	I_C	100	mAdc

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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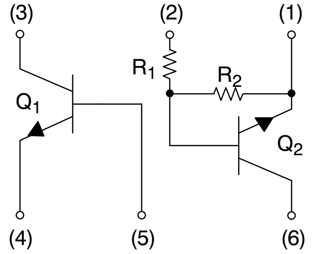
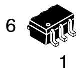
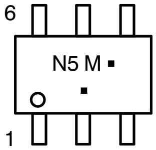




SC-88/SOT-363
CASE 419B
STYLE 1

MARKING DIAGRAM



N5 = Device Code
M = Date Code*
▪ = Pb-Free Package
(Note: Microdot may be in either location)

*Date Code orientation and/or position may vary depending upon manufacturing location.

ORDERING INFORMATION

Device	Package	Shipping†
NSM46211DW6T1G	SC-88 (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 Specification Brochure, BRD8011/D.

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THERMAL CHARACTERISTICS

Characteristic (One Junction Heated)	Symbol	Max	Unit
Total Device Dissipation T_A = 25°C Derate above 25°C	P_D	 180 (Note 1) 1.44 (Note 1)	 mW mW/°C
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	692 (Note 1)	°C/W
Characteristic (Both Junctions Heated)	**Symbol**	**Max**	**Unit**
Total Device Dissipation, T_A = 25°C Derate above 25°C	P_D	 230 1.83	 mW mW/°C
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	544	°C/W
Junction and Storage Temperature	T_J, T_{stg}	−55 to +150	°C

1. FR−4 @ Minimum Pad of 1.45 mm^2, 1 oz Cu.

ELECTRICAL CHARACTERISTICS − Q1 (NPN) (T_A = 25°C unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Collector − Emitter Breakdown Voltage (I_C = 10 mA)	$V_{(BR)CEO}$	65	−	−	V
Collector − Emitter Breakdown Voltage (I_C = 10 μA, V_{EB} = 0)	$V_{(BR)CES}$	80	−	−	V
Collector − Base Breakdown Voltage (I_C = 10 μA)	$V_{(BR)CBO}$	80	−	−	V
Emitter − Base Breakdown Voltage (I_E = 10 μA)	$V_{(BR)EBO}$	6.0	−	−	V
Collector Cutoff Current (V_{CB} = 30 V) (V_{CB} = 30 V, T_A = 150°C)	I_{CBO}	− −	− −	15 5.0	nA μA
ON CHARACTERISTICS					
DC Current Gain (I_C = 10 μA, V_{CE} = 5.0 V) (I_C = 2.0 mA, V_{CE} = 5.0 V)	h_{FE}	 − 200	 150 290	 − 450	−
Collector − Emitter Saturation Voltage (I_C = 10 mA, I_B = 0.5 mA) (I_C = 100 mA, I_B = 5.0 mA)	$V_{CE(sat)}$	− −	− −	0.25 0.6	V
Base − Emitter Saturation Voltage (I_C = 10 mA, I_B = 0.5 mA) (I_C = 100 mA, I_B = 5.0 mA)	$V_{BE(sat)}$	− −	0.7 0.9	− −	V
Base − Emitter Voltage (I_C = 2.0 mA, V_{CE} = 5.0 V) (I_C = 10 mA, V_{CE} = 5.0 V)	$V_{BE(on)}$	580 −	660 −	700 770	mV

ELECTRICAL CHARACTERISTICS – Q2 (NPN BRT) (T_A = 25°C unless otherwise noted)

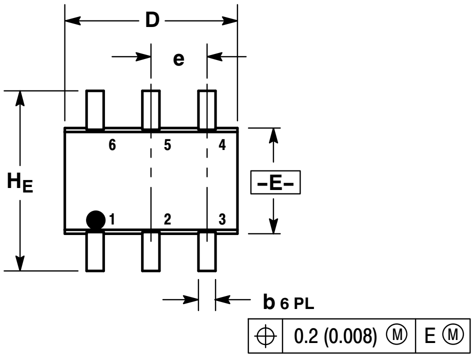
Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Collector-Base Cutoff Current (V_{CB} = 50 V, I_E = 0)	I_{CBO}	–	–	100	nAdc
Collector-Emitter Cutoff Current (V_{CE} = 50 V, I_B = 0)	I_{CEO}	–	–	500	nAdc
Emitter-Base Cutoff Current (V_{EB} = 6.0 V, I_C = 0)	I_{EBO}	–	–	0.5	mAdc
Collector-Base Breakdown Voltage (I_C = 10 μA, I_E = 0)	$V_{(BR)CBO}$	50	–	–	Vdc
Collector-Emitter Breakdown Voltage (Note 2) (I_C = 2.0 mA, I_B = 0)	$V_{(BR)CEO}$	50	–	–	Vdc
ON CHARACTERISTICS (Note 2)					
DC Current Gain (V_{CE} = 10 V, I_C = 5.0 mA)	h_{FE}	35	60	–	
Collector-Emitter Saturation Voltage (I_C = 10 mA, I_B = 0.3 mA)	$V_{CE(sat)}$	–	–	0.25	Vdc
Output Voltage (on) (V_{CC} = 5.0 V, V_B = 2.5 V, R_L = 1.0 kΩ)	V_{OL}	–	–	0.2	Vdc
Output Voltage (off) (V_{CC} = 5.0 V, V_B = 0.5 V, R_L = 1.0 kΩ)	V_{OH}	4.9	–	–	Vdc
Input Resistor	R_1	7.0	10	13	kΩ
Resistor Ratio	R_1/R_2	0.8	1.0	1.2	

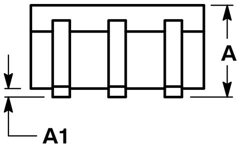
2. Pulse Test: Pulse Width < 300 μs, Duty Cycle < 2.0%

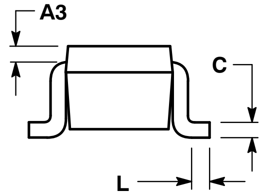
PACKAGE DIMENSIONS

SC−88 (SOT−363)

CASE 419B−02
ISSUE W





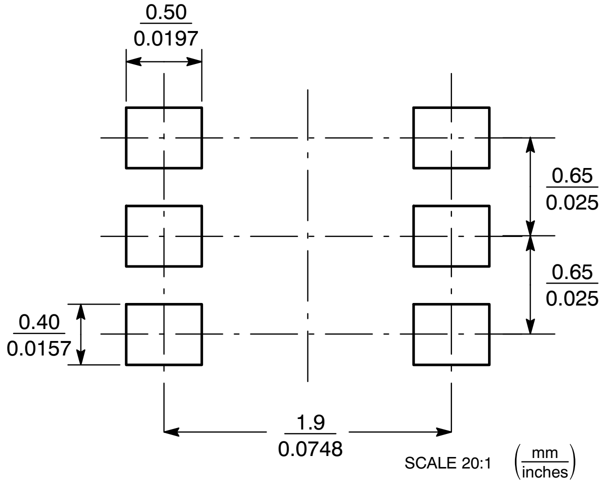


NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. 419B−01 OBSOLETE, NEW STANDARD 419B−02.

	MILLIMETERS			INCHES		
DIM	MIN	NOM	MAX	MIN	NOM	MAX
A	0.80	0.95	1.10	0.031	0.037	0.043
A1	0.00	0.05	0.10	0.000	0.002	0.004
A3	0.20 REF			0.008 REF		
b	0.10	0.21	0.30	0.004	0.008	0.012
C	0.10	0.14	0.25	0.004	0.005	0.010
D	1.80	2.00	2.20	0.070	0.078	0.086
E	1.15	1.25	1.35	0.045	0.049	0.053
e	0.65 BSC			0.026 BSC		
L	0.10	0.20	0.30	0.004	0.008	0.012
H_E	2.00	2.10	2.20	0.078	0.082	0.086

STYLE 1:
PIN 1. EMITTER 2
2. BASE 2
3. COLLECTOR 1
4. EMITTER 1
5. BASE 1
6. COLLECTOR 2

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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