

NSTB60BDW1T1G

PNP General Purpose and NPN Bias Resistor Transistor Combination

- Simplifies Circuit Design
- Reduces Board Space
- Reduces Component Count
- Available in 8 mm, 7 inch/3000 Unit Tape and Reel
- ESD Rating – Human Body Model: Class 1B
– Machine Model: Class B
- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant

MAXIMUM RATINGS

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

Rating	Symbol	Q_1	Q_2	Unit
Collector-Emitter Voltage	V_{CEO}	-50	50	Vdc
Collector-Base Voltage	V_{CBO}	-50	50	Vdc
Emitter-Base Voltage	V_{EBO}	-6.0	5.0	Vdc
Collector Current – Continuous	I_C	-150	150	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.

THERMAL CHARACTERISTICS

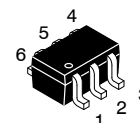
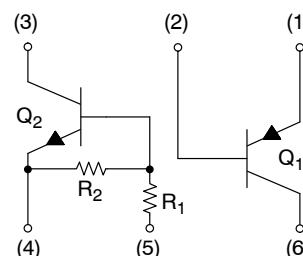
Characteristic (One Junction Heated)	Symbol	Max	Unit
Total Device Dissipation $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D	187 (Note 1) 256 (Note 2) 1.5 (Note 1) 2.0 (Note 2)	mW mW/ $^\circ\text{C}$
Thermal Resistance – Junction-to-Ambient	$R_{\theta JA}$	670 (Note 1) 490 (Note 2)	$^\circ\text{C}/\text{W}$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

1. FR-4 @ Minimum Pad
2. FR-4 @ 1.0 x 1.0 inch Pad



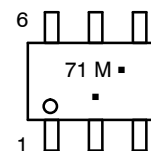
ON Semiconductor®

<http://onsemi.com>



SOT-363
CASE 419B
STYLE 1

MARKING DIAGRAM



71 = 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†
NSTB60BDW1T1G	SOT-363 (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.

NSTB60BDW1T1G

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

Characteristic	Symbol	Min	Typ	Max	Unit
Q₁					
Collector-Base Breakdown Voltage (I _C = -50 μAdc, I _E = 0)	V _{(BR)CBO}	-50	-	-	Vdc
Collector-Emitter Breakdown Voltage (I _C = -1.0 mAdc, I _B = 0)	V _{(BR)CEO}	-50	-	-	Vdc
Emitter-Base Breakdown Voltage (I _E = -50 μAdc, I _E = 0)	V _{(BR)EBO}	-6.0	-	-	Vdc
Collector-Base Cutoff Current (V _{CB} = -50 Vdc, I _E = 0)	I _{CBO}	-	-	-0.1	μA
Emitter-Base Cutoff Current (V _{EB} = -6.0 Vdc, I _B = 0)	I _{EBO}	-	-	-0.1	μA
Collector-Emitter Saturation Voltage (I _C = -50 mAdc, I _B = -5.0 mAdc) (Note 3)	V _{CE(sat)}	-	-	-0.5	Vdc
DC Current Gain (V _{CE} = -10 V, I _C = -5.0 mA) (Note 3)	h _{FE}	120	-	560	-
Transition Frequency (V _{CE} = -12 Vdc, I _C = -2.0 mAdc, f = 100 MHz)	f _T	-	140	-	MHz
Output Capacitance (V _{CB} = -12 Vdc, I _E = 0 Adc, f = 1.0 MHz)	C _{OB}	-	3.5	-	pF

Q₂

Collector-Base Breakdown Voltage (I _C = 50 μA, I _E = 0)	V _{(BR)CBO}	50	-	-	Vdc
Collector-Emitter Breakdown Voltage (I _C = 1.0 mA, I _B = 0) (Note 3)	V _{(BR)CEO}	50	-	-	Vdc
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}	-	-	0.13	mAdc
Collector-Emitter Saturation Voltage (I _C = 10 mA, I _B = 5.0 mA) (Note 3)	V _{CE(sat)}	-	-	0.25	Vdc
DC Current Gain (V _{CE} = 10 V, I _C = 5.0 mA) (Note 3)	h _{FE}	80	-	-	
Output Voltage (on) (V _{CC} = 5.0 V, V _B = 4.0 V, R _L = 1.0 kΩ) (Note 3)	V _{OL}	-	-	0.2	Vdc
Output Voltage (off) (V _{CC} = 5.0 V, V _B = 0.25 V, R _L = 1.0 kΩ) (Note 3)	V _{OH}	4.9	-	-	Vdc
Input Resistor (Note 3)	R1	15.4	22	28.6	kΩ
Resistor Ratio (Note 3)	R2/R1	1.70	2.13	2.55	

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

NSTB60BDW1T1G

Typical Electrical Characteristics – PNP Transistor

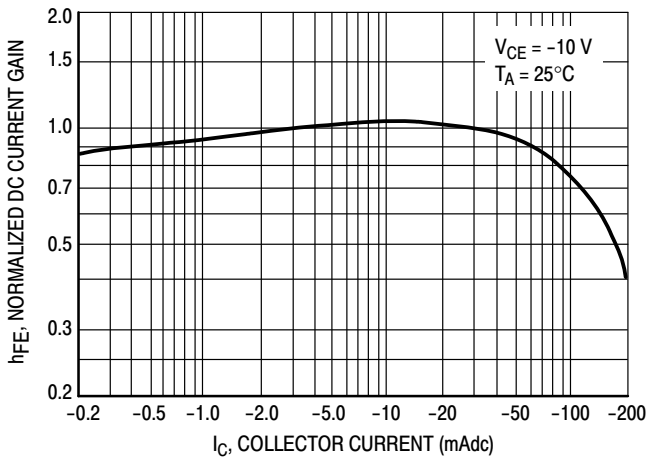


Figure 1. Normalized DC Current Gain

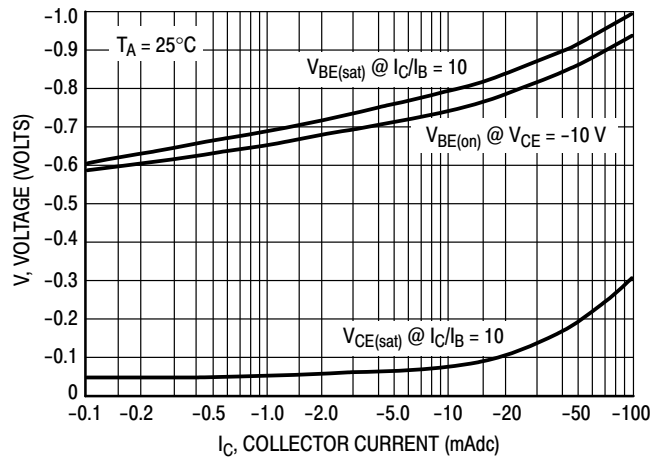


Figure 2. "Saturation" and "On" Voltages

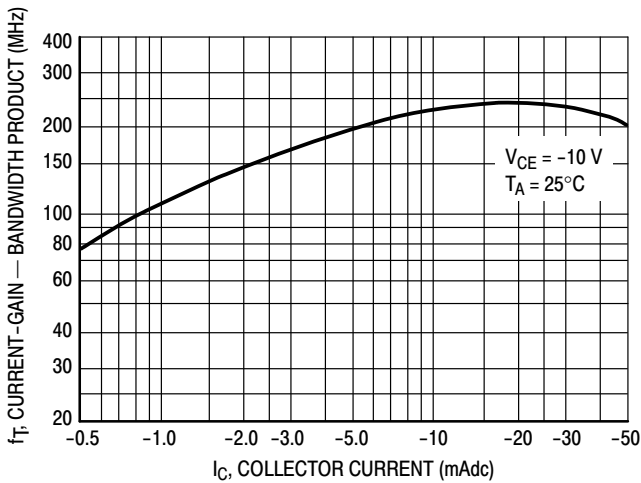


Figure 3. Current-Gain - Bandwidth Product

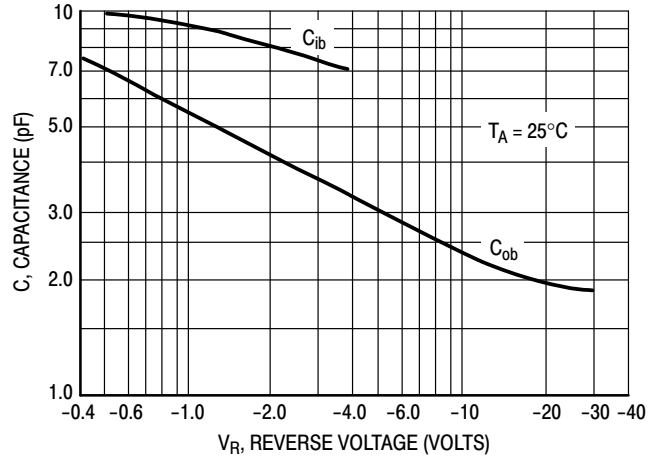


Figure 4. Capacitances

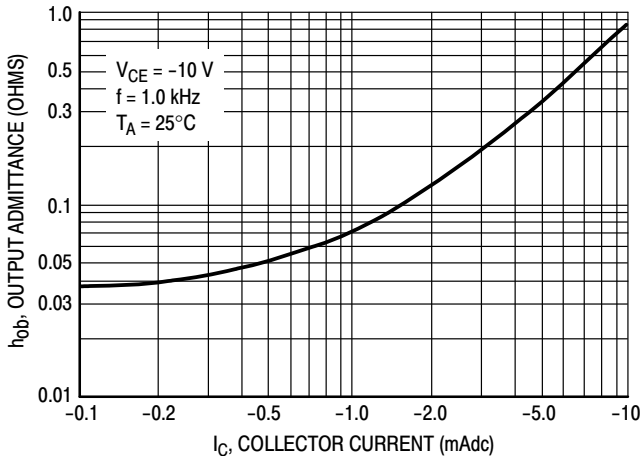


Figure 5. Output Admittance

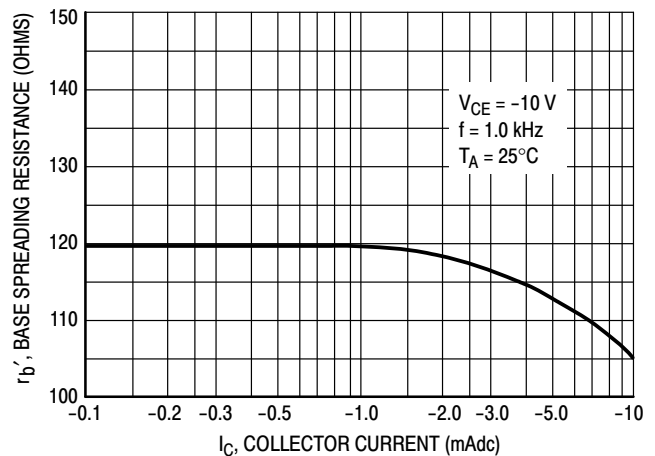


Figure 6. Base Spreading Resistance

NSTB60BDW1T1G

Typical Electrical Characteristics – NPN Transistor

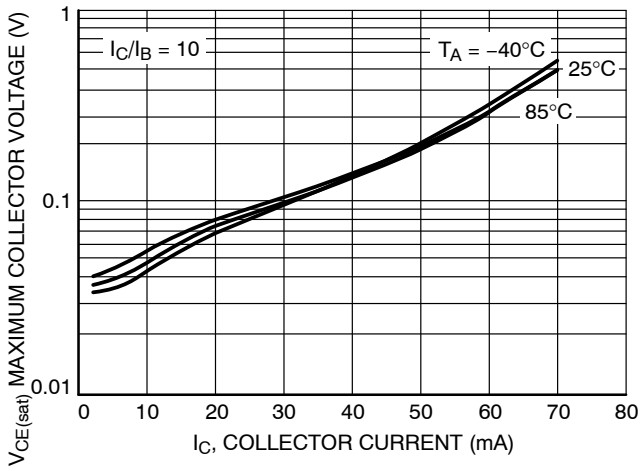


Figure 7. Maximum Collector Voltage versus Collector Current

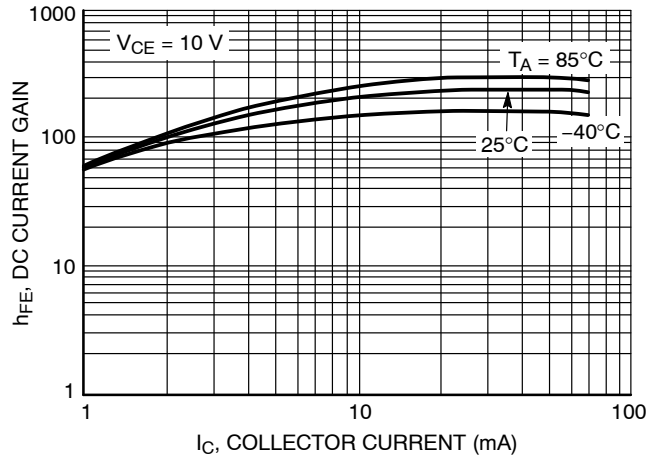


Figure 8. DC Current Gain

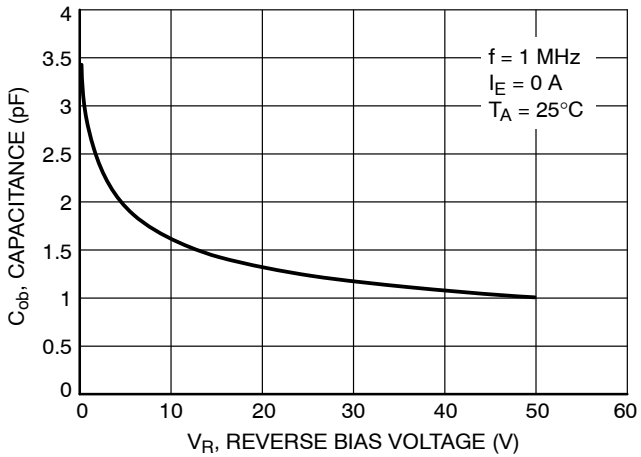


Figure 9. Output Capacitance

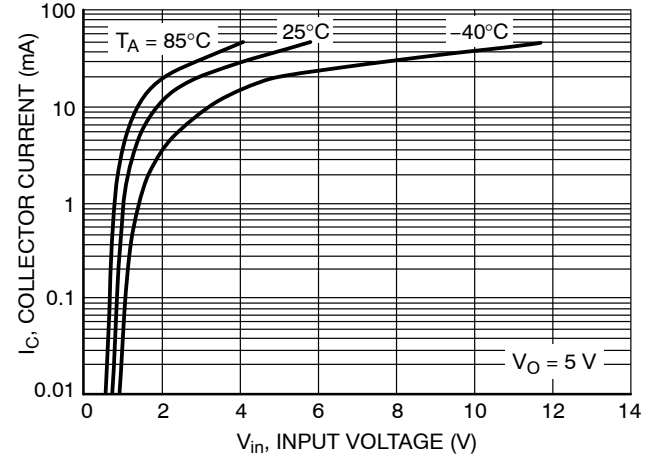


Figure 10. Output Current versus Input Voltage

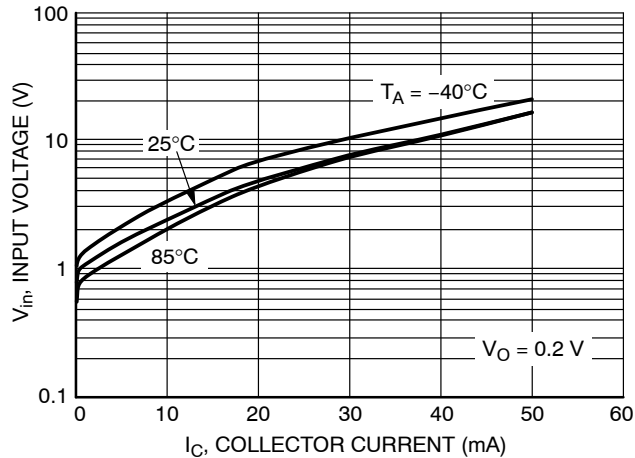
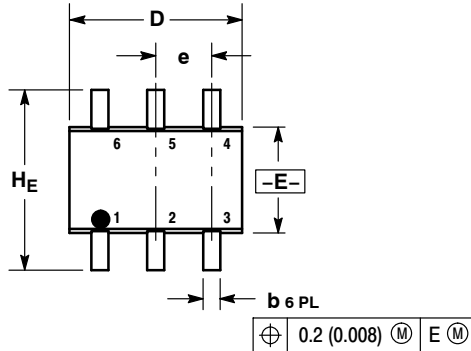


Figure 11. Input Voltage versus Output Current

NSTB60BDW1T1G

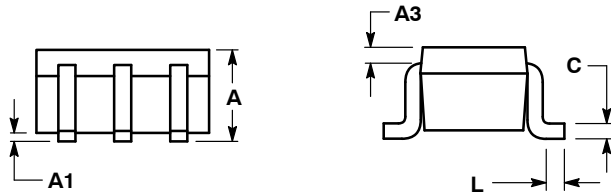
PACKAGE DIMENSIONS

SOT-363/SC-88/SC70-6
CASE 419B-02
ISSUE W



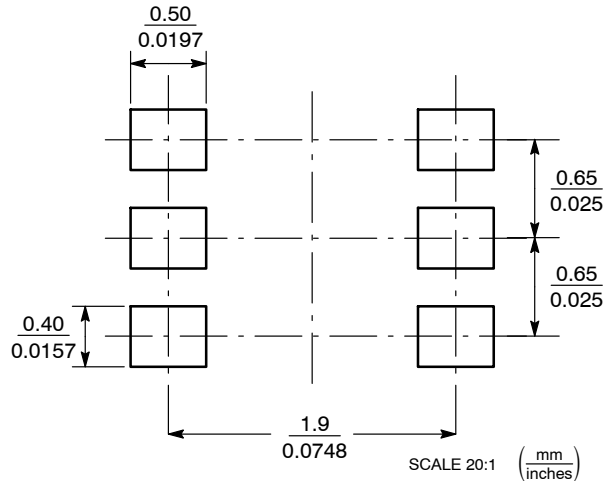
- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
 2. CONTROLLING DIMENSION: INCH.
 3. 419B-01 OBSOLETE, NEW STANDARD 419B-02.

DIM	MILLIMETERS			INCHES		
	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
HE	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*



SC-88/SC70-6/SOT-363

*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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- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



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