NST65010MW6

Dual Matched General Purpose Transistor

PNP Matched Pair

These transistors are housed in an ultra−small SOT−363 package ideally suited for portable products. They are assembled to create a pair of devices highly matched in all parameters, eliminating the need for costly trimming. Applications are Current Mirrors; Differential, Sense and Balanced Amplifiers; Mixers; Detectors and Limiters. Complementary NPN equivalent NST65011MW6T1G is available.

Features

- Current Gain Matching to 10%
- Base−Emitter Voltage Matched to ≤ 2 mV
- Drop−In Replacement for Standard Device
- NSV Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC−Q101 Qualified and PPAP Capable
- These Devices are Pb−Free, Halogen Free/BFR Free and are RoHS Compliant

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector − Emitter Voltage	V_{CEO}	−65	V
Collector − Base Voltage	V_{CBO}	−80	V
Emitter − Base Voltage	V_{EBO}	−5.0	V
Collector Current − Continuous	I_C	−100	mAdc

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Total Device Dissipation Per Device FR−5 Board (Note 1) T_A = 25°C Derate Above 25°C	P_D	380 250 3.0	mW mW/°C
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	328	°C/W
Junction and Storage Temperature Range	T_J, T_{stg}	−55 to +150	°C

1. FR−5 = 1.0 x 0.75 x 0.062 in.

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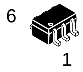
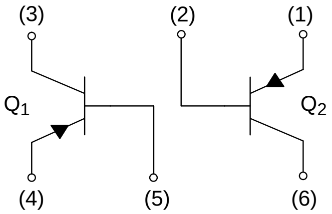
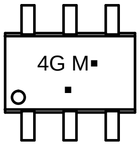


SOT−363
CASE 419B
STYLE 1



MARKING DIAGRAMS



4G = Device Code
M = Date Code
▪ = Pb−Free Package
(Note: Microdot may be in either location)

ORDERING INFORMATION

Device	Package	Shipping†
NST65010MW6T1G	SOT−363 (Pb−Free)	3000 / Tape & Reel
NSVT65010MW6T1G	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 Specifications Brochure, BRD8011/D.

July, 2015 − Rev. 0

ELECTRICAL CHARACTERISTICS (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 = −1.0 μA)	$V_{(BR)EBO}$	−5.0	−	−	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	h_{FE}				−
(I_C = −10 μA, V_{CE} = −5.0 V)		−	150	−	
(I_C = −2.0 mA, V_{CE} = −5.0 V)		220	290	475	
(I_C = −2.0 mA, V_{CE} = −5.0 V) (Note 2)	$h_{FE(1)}/h_{FE(2)}$	0.9	1.0	1.1	
Collector−Emitter Saturation Voltage	$V_{CE(sat)}$				mV
(I_C = −10 mA, I_B = −0.5 mA)		−	−	−300	
(I_C = −100 mA, I_B = −5.0 mA)		−	−	−650	
Base−Emitter Saturation Voltage	$V_{BE(sat)}$				mV
(I_C = −10 mA, I_B = −0.5 mA)		−	−700	−	
(I_C = −100 mA, I_B = −5.0 mA)		−	−900	−	
Base−Emitter On Voltage	$V_{BE(on)}$				mV
(I_C = −2.0 mA, V_{CE} = −5.0 V)		−600	−	−750	
(I_C = −10 mA, V_{CE} = −5.0 V)		−	−	−820	
(I_C = −2.0 mA, V_{CE} = −5.0 V) (Note 3)	$V_{BE(1)} - V_{BE(2)}$	−	−1.0	−2.0	
SMALL−SIGNAL CHARACTERISTICS					
Current−Gain − Bandwidth Product, (I_C = −10 mA, V_{CE} = −5 Vdc, f = 100 MHz)	f_T	100	−	−	MHz
Output Capacitance, (V_{CB} = −10 V, f = 1.0 MHz)	C_{ob}	−	−	4.5	pF
Noise Figure, (I_C = −0.2 mA, V_{CE} = −5 Vdc, R_S = 2 kΩ, f = 1 kHz, BW = 200Hz)	NF	−	−	10	dB

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

2. $h_{FE(1)}/h_{FE(2)}$ is the ratio of one transistor compared to the other transistor within the same package. The smaller h_{FE} is used as numerator.
3. $V_{BE(1)} - V_{BE(2)}$ is the absolute difference of one transistor compared to the other transistor within the same package.

TYPICAL CHARACTERISTICS

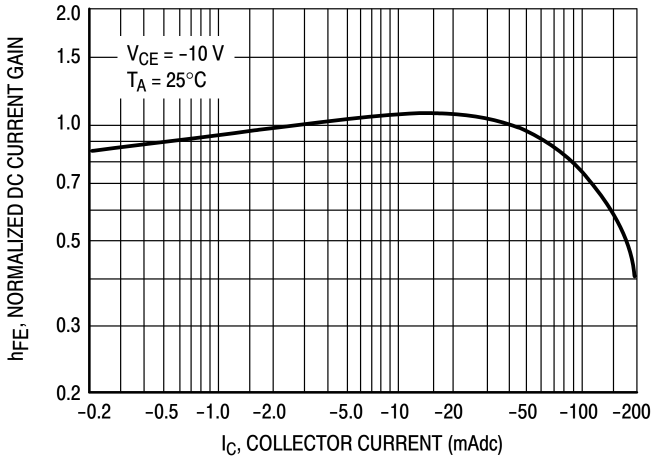


Figure 1. Normalized DC Current Gain

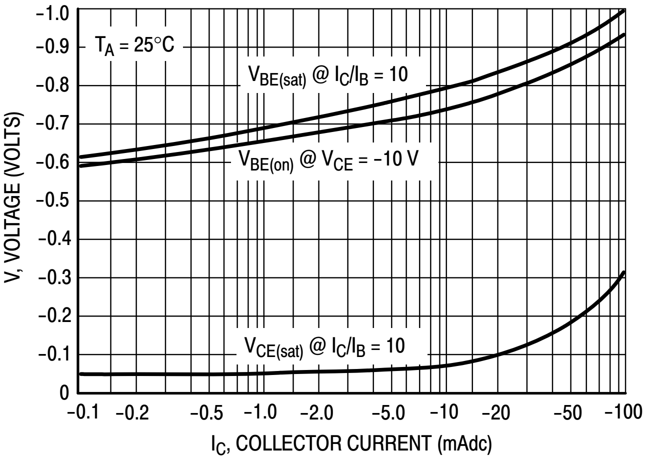


Figure 2. “Saturation” and “On” Voltages

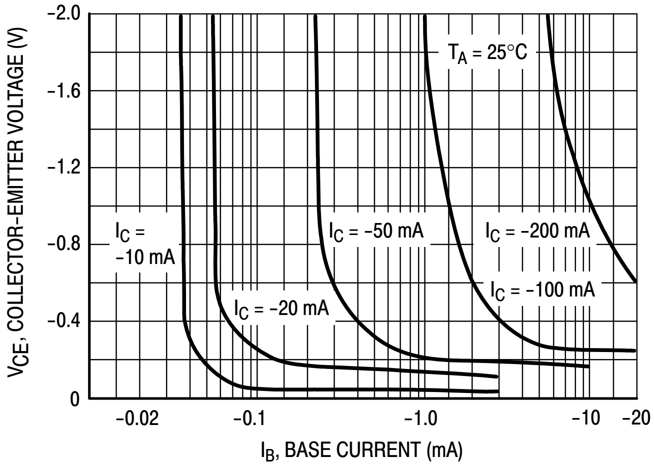


Figure 3. Collector Saturation Region

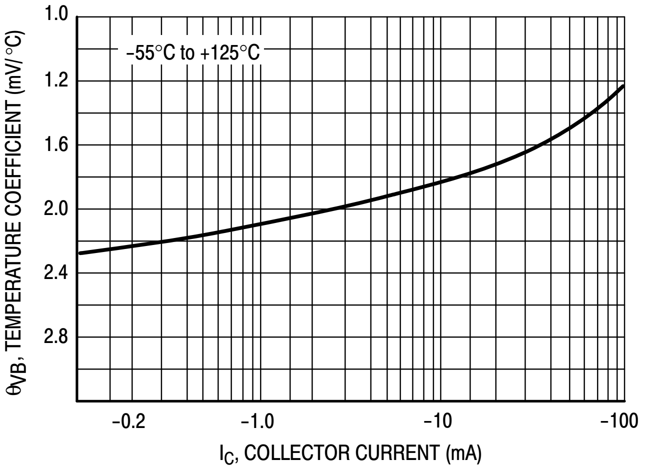


Figure 4. Base−Emitter Temperature Coefficient

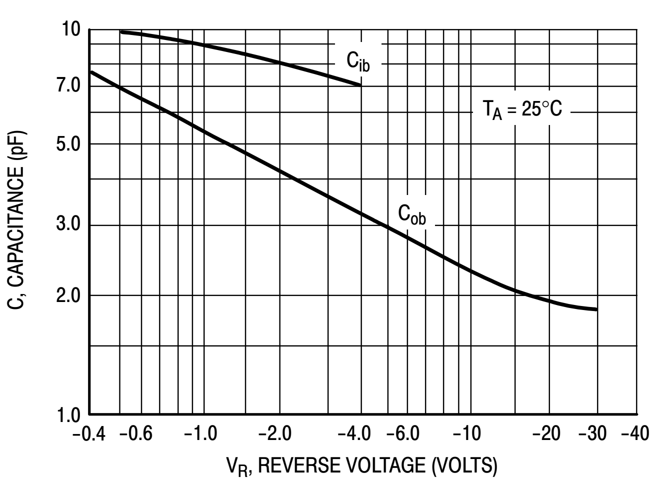


Figure 5. Capacitances

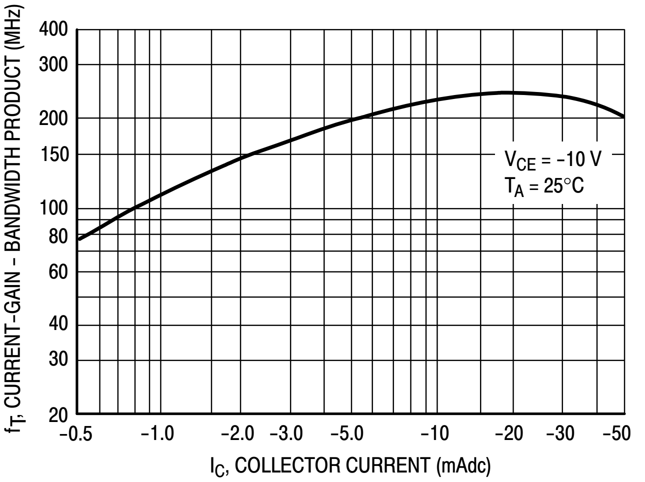


Figure 6. Current−Gain − Bandwidth Product

TYPICAL CHARACTERISTICS

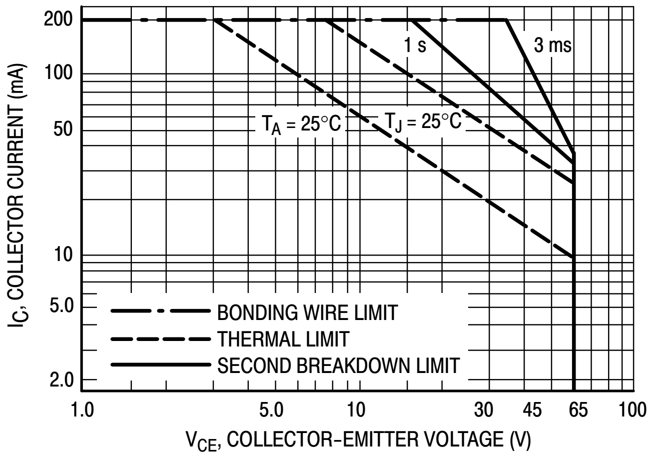


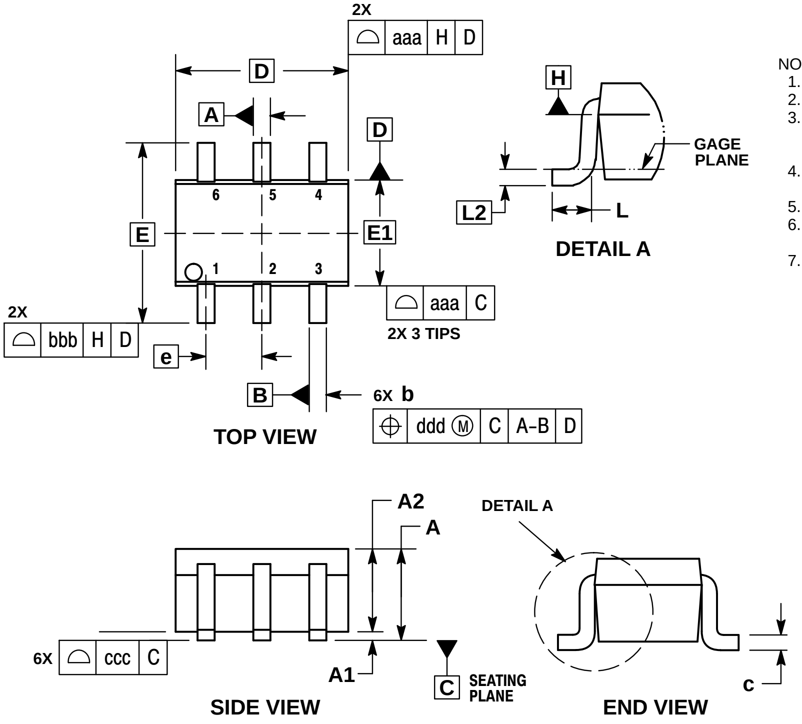
Figure 7. Active Region Safe Operating Area

The safe operating area curves indicate $I_C - V_{CE}$ limits of the transistor that must be observed for reliable operation. Collector load lines for specific circuits must fall below the limits indicated by the applicable curve.

The data of Figure 7 is based upon $T_{J(pk)}$ = 150°C; T_C or T_A is variable depending upon conditions.

PACKAGE DIMENSIONS

SC−88 (SOT−363)
CASE 419B−02
ISSUE Y

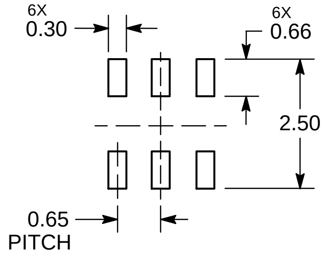


NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. DIMENSIONS D AND E1 DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS. MOLD FLASH, PROTRUSIONS, OR GATE BURRS SHALL NOT EXCEED 0.20 PER END.
4. DIMENSIONS D AND E1 AT THE OUTERMOST EXTREMES OF THE PLASTIC BODY AND DATUM H.
5. DATUMS A AND B ARE DETERMINED AT DATUM H.
6. DIMENSIONS b AND c APPLY TO THE FLAT SECTION OF THE LEAD BETWEEN 0.08 AND 0.15 FROM THE TIP.
7. DIMENSION b DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.08 TOTAL IN EXCESS OF DIMENSION b AT MAXIMUM MATERIAL CONDITION. THE DAMBAR CANNOT BE LOCATED ON THE LOWER RADIUS OF THE FOOT.

	MILLIMETERS			INCHES		
DIM	MIN	NOM	MAX	MIN	NOM	MAX
A	−−−	−−−	1.10	−−−	−−−	0.043
A1	0.00	−−−	0.10	0.000	−−−	0.004
A2	0.70	0.90	1.00	0.027	0.035	0.039
b	0.15	0.20	0.25	0.006	0.008	0.010
C	0.08	0.15	0.22	0.003	0.006	0.009
D	1.80	2.00	2.20	0.070	0.078	0.086
E	2.00	2.10	2.20	0.078	0.082	0.086
E1	1.15	1.25	1.35	0.045	0.049	0.053
e	0.65 BSC			0.026 BSC		
L	0.26	0.36	0.46	0.010	0.014	0.018
L2	0.15 BSC			0.006 BSC		
aaa	0.15			0.006		
bbb	0.30			0.012		
ccc	0.10			0.004		
ddd	0.10			0.004		

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

RECOMMENDED SOLDERING FOOTPRINT*



DIMENSIONS: MILLIMETERS

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

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:
Literature Distribution Center for ON Semiconductor
P.O. Box 5163, Denver, Colorado 80217 USA
Phone: 303−675−2175 or 800−344−3860 Toll Free USA/Canada
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