

# 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 NST45011MW6T1G is available.

### Features

- Current Gain Matching to 10%
- Base-Emitter Voltage Matched to  $\leq 2$  mV
- Drop-In Replacement for Standard Device
- These are Pb-Free Devices

### MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector – Emitter Voltage	$V_{CEO}$	-45	V
Collector – Base Voltage	$V_{CBO}$	-50	V
Emitter – Base Voltage	$V_{EBO}$	-5.0	V
Collector Current – Continuous	$I_C$	-100	mA

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

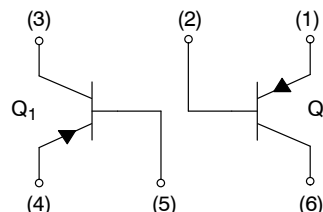
Characteristic	Symbol	Max	Unit
Total Device Dissipation Per Device FR-5 Board (Note 1) $T_A = 25^\circ\text{C}$ Derate Above $25^\circ\text{C}$	$P_D$	380 250 3.0	mW  mW/ $^\circ\text{C}$
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	328	$^\circ\text{C}/\text{W}$
Junction and Storage Temperature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

1. FR-5 = 1.0 x 0.75 x 0.062 in



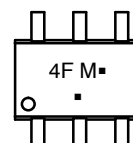
**ON Semiconductor®**

<http://onsemi.com>



**SOT-363  
CASE 419B  
STYLE 1**

### MARKING DIAGRAMS



4F = Device Code  
M = Date Code  
■ = Pb-Free Package

(Note: Microdot may be in either location)

### ORDERING INFORMATION

Device	Package	Shipping†
NST45010MW6T1G	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.

# NST45010MW6T1G

www.DataSheet4U.com ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25°C unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
----------------	--------	-----	-----	-----	------

## OFF CHARACTERISTICS

Collector – Emitter Breakdown Voltage, (I <sub>C</sub> = –10 mA)	V <sub>(BR)CEO</sub>	–45	–	–	V
Collector – Emitter Breakdown Voltage, (I <sub>C</sub> = –10 μA, V <sub>EB</sub> = 0)	V <sub>(BR)CES</sub>	–50	–	–	V
Collector – Base Breakdown Voltage, (I <sub>C</sub> = –10 μA)	V <sub>(BR)CBO</sub>	–50	–	–	V
Emitter – Base Breakdown Voltage, (I <sub>E</sub> = –1.0 μA)	V <sub>(BR)EBO</sub>	–5.0	–	–	V
Collector Cutoff Current (V <sub>CB</sub> = –30 V) (V <sub>CB</sub> = –30 V, T <sub>A</sub> = 150°C)	I <sub>CBO</sub>	–	–	–15 –5.0	nA μA

## ON CHARACTERISTICS

DC Current Gain (I <sub>C</sub> = –10 μA, V <sub>CE</sub> = –5.0 V) (I <sub>C</sub> = –2.0 mA, V <sub>CE</sub> = –5.0 V) (I <sub>C</sub> = –2.0 mA, V <sub>CE</sub> = –5.0 V) (Note 2)	h <sub>FE</sub>  h <sub>FE(1)</sub> /h <sub>FE(2)</sub>	– 220 0.9	150 290 1.0	– 475 –	–
Collector – Emitter Saturation Voltage (I <sub>C</sub> = –10 mA, I <sub>B</sub> = –0.5 mA) (I <sub>C</sub> = –100 mA, I <sub>B</sub> = –5.0 mA)	V <sub>CE(sat)</sub>	– –	– –	–300 –650	mV
Base – Emitter Saturation Voltage (I <sub>C</sub> = –10 mA, I <sub>B</sub> = –0.5 mA) (I <sub>C</sub> = –100 mA, I <sub>B</sub> = –5.0 mA)	V <sub>BE(sat)</sub>	– –	–700 –900	– –	mV
Base – Emitter On Voltage (I <sub>C</sub> = –2.0 mA, V <sub>CE</sub> = –5.0 V) (I <sub>C</sub> = –10 mA, V <sub>CE</sub> = –5.0 V) (I <sub>C</sub> = –2.0 mA, V <sub>CE</sub> = –5.0 V) (Note 3)	V <sub>BE(on)</sub>  V <sub>BE(1)</sub> – V <sub>BE(2)</sub>	–600 – –	– – –1.0	–750 –820 –2.0	mV

## SMALL-SIGNAL CHARACTERISTICS

Current – Gain – Bandwidth Product, (I <sub>C</sub> = –10 mA, V <sub>CE</sub> = –5 Vdc, f = 100 MHz)	f <sub>T</sub>	100	–	–	MHz
Output Capacitance, (V <sub>CB</sub> = –10 V, f = 1.0 MHz)	C <sub>ob</sub>	–	–	4.5	pF
Noise Figure, (I <sub>C</sub> = –0.2 mA, V <sub>CE</sub> = –5 Vdc, R <sub>S</sub> = 2 kΩ, f = 1 kHz, BW = 200Hz)	NF	–	–	10	dB

- h<sub>FE(1)</sub>/h<sub>FE(2)</sub> is the ratio of one transistor compared to the other transistor within the same package. The smaller h<sub>FE</sub> is used as numerator.
- V<sub>BE(1)</sub> – V<sub>BE(2)</sub> is the absolute difference of one transistor compared to the other transistor within the same package.

TYPICAL CHARACTERISTICS

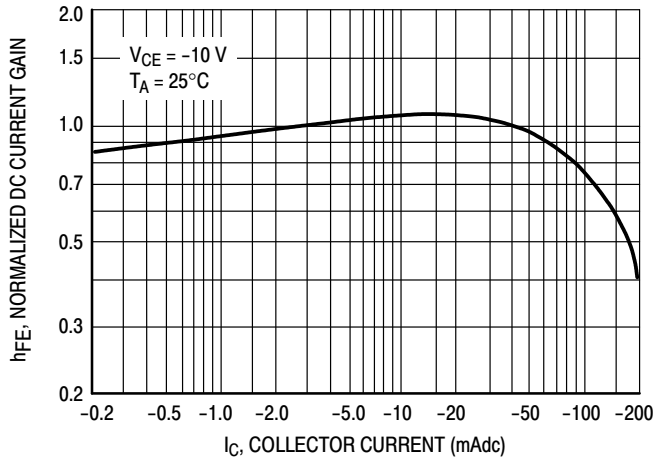


Figure 1. Normalized DC Current Gain

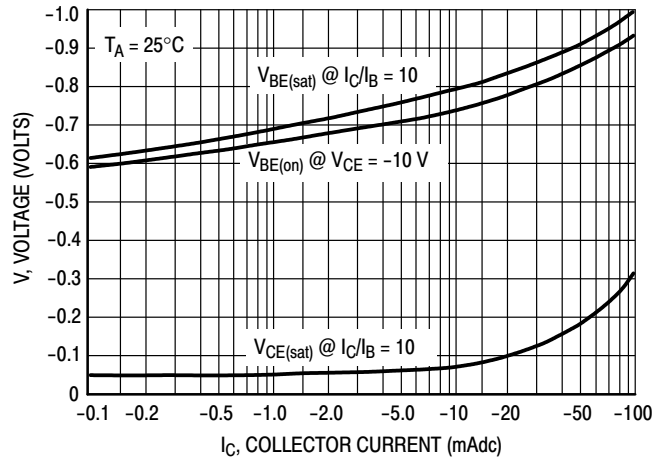


Figure 2. "Saturation" and "On" Voltages

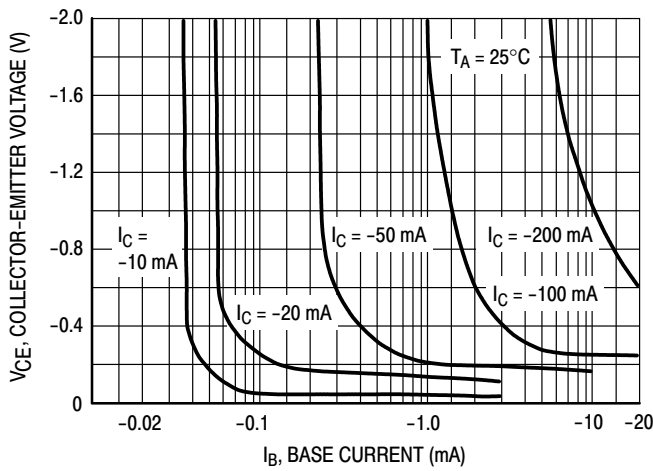


Figure 3. Collector Saturation Region

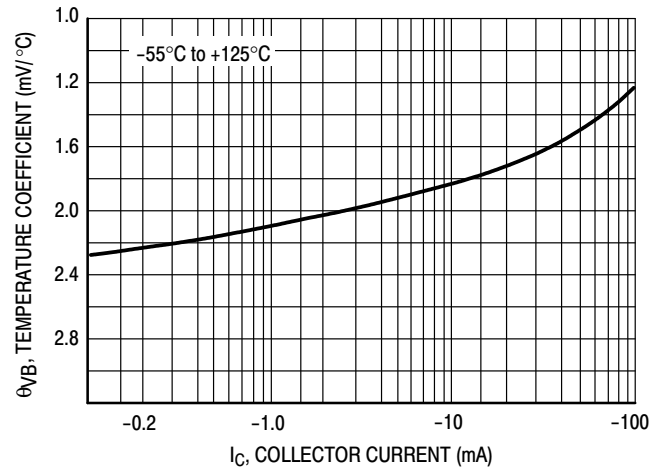


Figure 4. Base-Emitter Temperature Coefficient

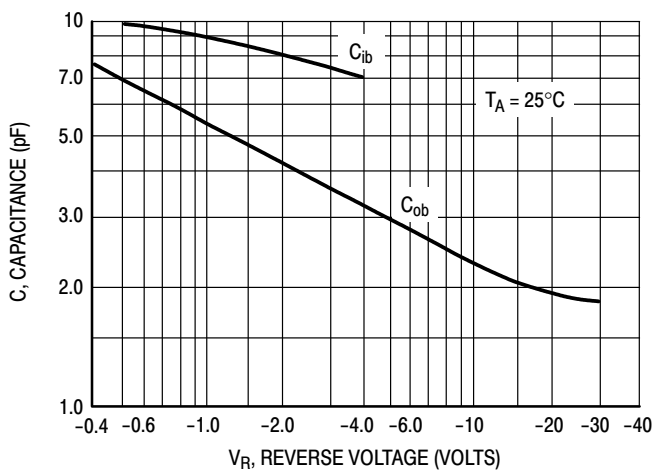


Figure 5. Capacitances

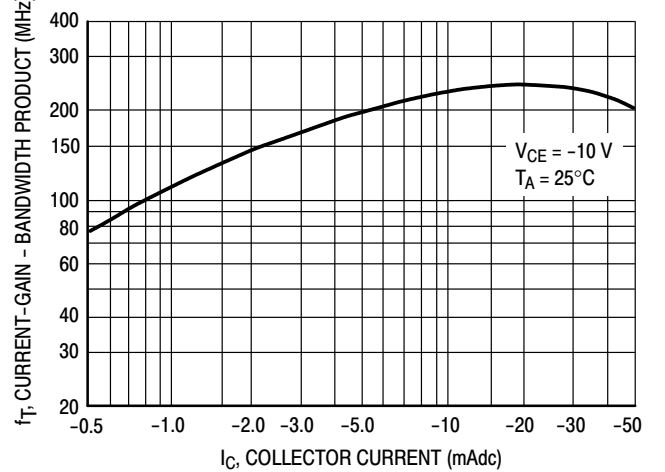


Figure 6. Current-Gain - Bandwidth Product

TYPICAL CHARACTERISTICS

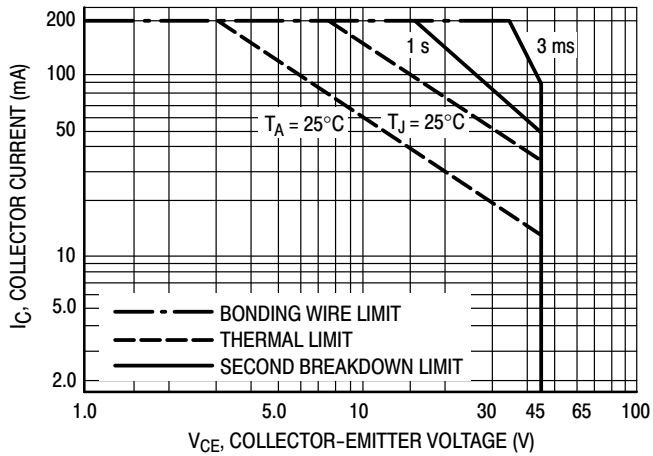


Figure 7. Active Region Safe Operating Area

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.

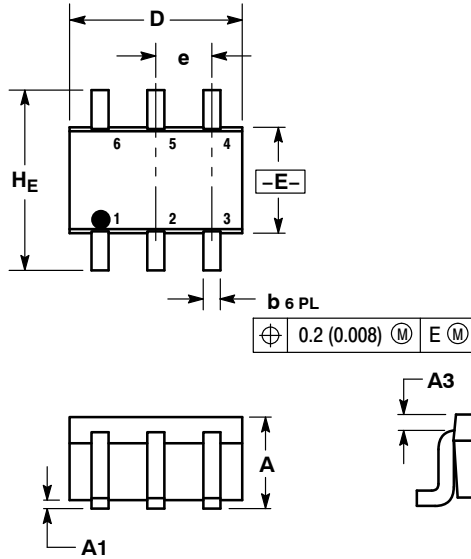
The data of Figure 7 is based upon  $T_{J(pk)} = 150^\circ\text{C}$ ;  $T_C$  or  $T_A$  is variable depending upon conditions.

# NST45010MW6T1G

www.DataSheet4U.com

## PACKAGE DIMENSIONS

### SC-88 (SOT-363) CASE 419B-02 ISSUE W



#### NOTES:

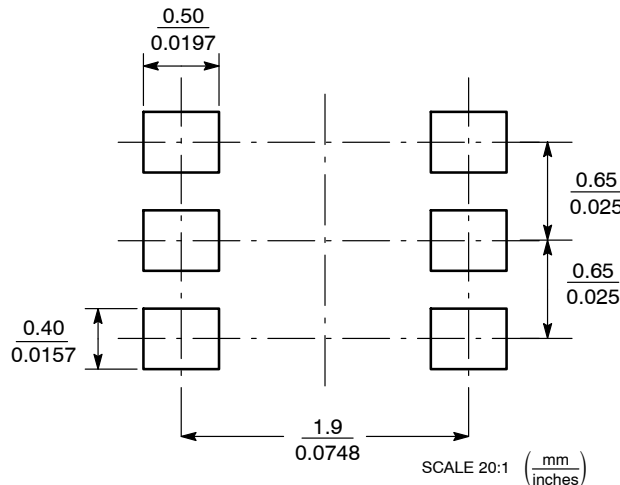
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. 419B-01 OBSOLETE, NEW STANDARD 419B-02.

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
- BASE 2
- COLLECTOR 1
- EMITTER 1
- BASE 1
- 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.

ON Semiconductor and are registered trademarks of Semiconductor Components Industries, LLC (SCILLC). SCILLC reserves the right to make changes without further notice to any products herein. SCILLC makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does SCILLC assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. "Typical" parameters which may be provided in SCILLC data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. SCILLC does not convey any license under its patent rights nor the rights of others. SCILLC products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the SCILLC product could create a situation where personal injury or death may occur. Should Buyer purchase or use SCILLC products for any such unintended or unauthorized application, Buyer shall indemnify and hold SCILLC and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that SCILLC was negligent regarding the design or manufacture of the part. SCILLC is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

## 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  
Fax: 303-675-2176 or 800-344-3867 Toll Free USA/Canada  
Email: orderlit@onsemi.com

N. American Technical Support: 800-282-9855 Toll Free  
USA/Canada  
Europe, Middle East and Africa Technical Support:  
Phone: 421 33 790 2910  
Japan Customer Focus Center  
Phone: 81-3-5773-3850

ON Semiconductor Website: [www.onsemi.com](http://www.onsemi.com)

Order Literature: <http://www.onsemi.com/orderlit>

For additional information, please contact your local Sales Representative