

NST45011MW6T1G

Dual Matched General Purpose Transistor

NPN 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.

Features

- Current Gain Matching to 10%
- Base-Emitter Voltage Matched to 2 mV
- Drop-In Replacement for Standard Device
- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant

MAXIMUM RATINGS

| Rating | Symbol | Value | Unit |
|--------------------------------|-----------|-------|------|
| Collector-Emitter Voltage | V_{CE0} | 45 | V |
| Collector-Base Voltage | V_{CBO} | 50 | V |
| Emitter-Base Voltage | V_{EBO} | 6.0 | V |
| Collector Current - Continuous | 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.

THERMAL CHARACTERISTICS

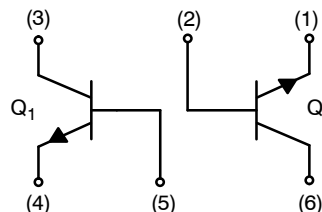
| Characteristic | Symbol | Max | Unit |
|--|-----------------|-------------------|--------------------------------|
| Total Device Dissipation Per Device FR-5 Board (Note 1) $T_A = 25^\circ\text{C}$ Derate Above 25°C | P_D | 380 250 3.0 | mW mW/ $^\circ\text{C}$ |
| Thermal Resistance, Junction to Ambient | $R_{\theta JA}$ | 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



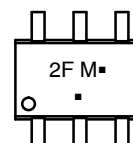
ON Semiconductor®

<http://onsemi.com>



SOT-363
CASE 419B
STYLE 1

MARKING DIAGRAMS



2F = Device Code
M = Date Code
▪ = Pb-Free Package

(Note: Microdot may be in either location)

ORDERING INFORMATION

| Device | Package | Shipping† |
|----------------|----------------------|------------------|
| NST45011MW6T1G | 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.

NST45011MW6T1G

ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise noted)

| Characteristic | Symbol | Min | Typ | Max | Unit |
|---|---------------|-----|-----|-----------|---------------------|
| OFF CHARACTERISTICS | | | | | |
| Collector - Emitter Breakdown Voltage, ($I_C = 10\text{ mA}$) | $V_{(BR)CEO}$ | 45 | - | - | V |
| Collector - Emitter Breakdown Voltage, ($I_C = 10\ \mu\text{A}$, $V_{EB} = 0$) | $V_{(BR)CES}$ | 50 | - | - | V |
| Collector - Base Breakdown Voltage, ($I_C = 10\ \mu\text{A}$) | $V_{(BR)CBO}$ | 50 | - | - | V |
| Emitter - Base Breakdown Voltage, ($I_E = 1.0\ \mu\text{A}$) | $V_{(BR)EBO}$ | 6.0 | - | - | V |
| Collector Cutoff Current ($V_{CB} = 30\text{ V}$) ($V_{CB} = 30\text{ V}$, $T_A = 150^\circ\text{C}$) | I_{CBO} | - | - | 15 5.0 | nA μA |

ON CHARACTERISTICS

| | | | | | |
|--|---|-------------------|-----------------|-------------------|----|
| DC Current Gain ($I_C = 10\ \mu\text{A}$, $V_{CE} = 5.0\text{ V}$) ($I_C = 2.0\text{ mA}$, $V_{CE} = 5.0\text{ V}$) ($I_C = 2.0\text{ mA}$, $V_{CE} = 5.0\text{ V}$) (Note 2) | h_{FE} $h_{FE(1)}/h_{FE(2)}$ | 150 200 0.9 | - 300 1.0 | - 500 - | - |
| Collector - Emitter Saturation Voltage ($I_C = 10\text{ mA}$, $I_B = 0.5\text{ mA}$) ($I_C = 100\text{ mA}$, $I_B = 5.0\text{ mA}$) | $V_{CE(sat)}$ | - - | - - | 250 600 | mV |
| Base - Emitter Saturation Voltage ($I_C = 10\text{ mA}$, $I_B = 0.5\text{ mA}$) ($I_C = 100\text{ mA}$, $I_B = 5.0\text{ mA}$) | $V_{BE(sat)}$ | 700 850 | 750 890 | 800 950 | mV |
| Base - Emitter On Voltage ($I_C = 2.0\text{ mA}$, $V_{CE} = 5.0\text{ V}$) ($I_C = 10\text{ mA}$, $V_{CE} = 5.0\text{ V}$) ($I_C = 2.0\text{ mA}$, $V_{CE} = 5.0\text{ V}$) (Note 3) | $V_{BE(on)}$ $V_{BE(1)} - V_{BE(2)}$ | 580 - - | 660 - 1.0 | 700 770 2.0 | mV |

SMALL-SIGNAL CHARACTERISTICS

| | | | | | |
|--|----------|-----|---|-----|-----|
| Current - Gain - Bandwidth Product, ($I_C = 10\text{ mA}$, $V_{CE} = 5\text{ Vdc}$, $f = 100\text{ MHz}$) | f_T | 100 | - | - | MHz |
| Output Capacitance, ($V_{CB} = 10\text{ V}$, $f = 1.0\text{ MHz}$) | C_{ob} | - | - | 4.5 | pF |
| Noise Figure, ($I_C = 0.2\text{ mA}$, $V_{CE} = 5\text{ Vdc}$, $R_S = 2\text{ k}\Omega$, $f = 1\text{ kHz}$, $BW = 200\text{ Hz}$) | NF | - | - | 10 | dB |

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.

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TYPICAL CHARACTERISTICS

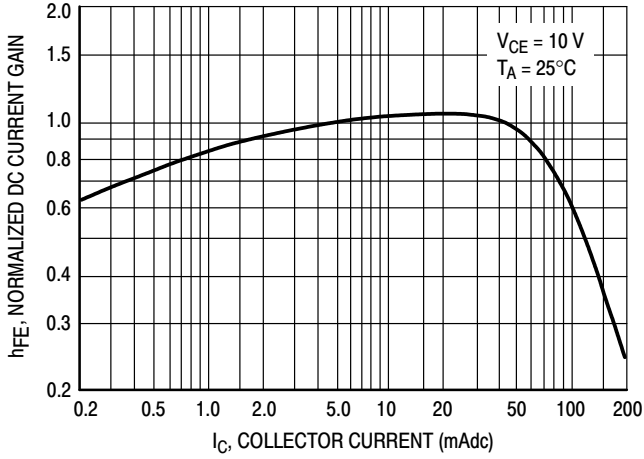


Figure 1. Normalized DC Current Gain

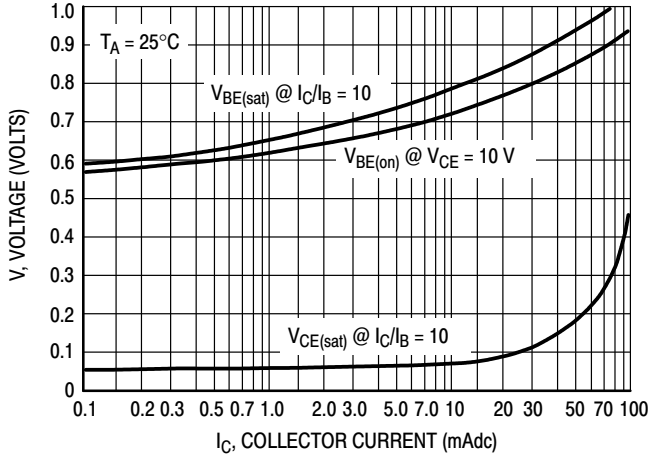


Figure 2. "Saturation" and "On" Voltages

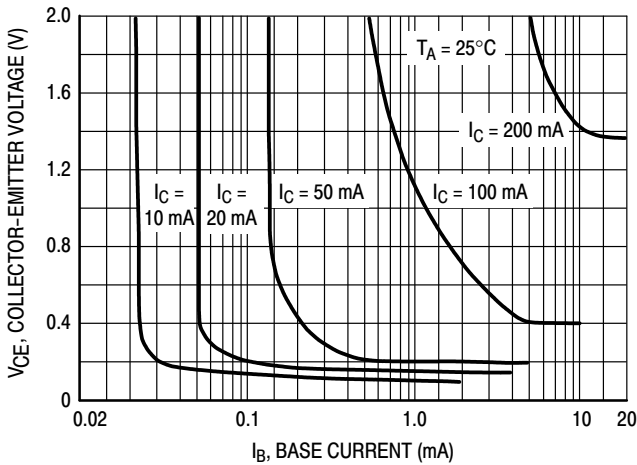


Figure 3. Collector Saturation Region

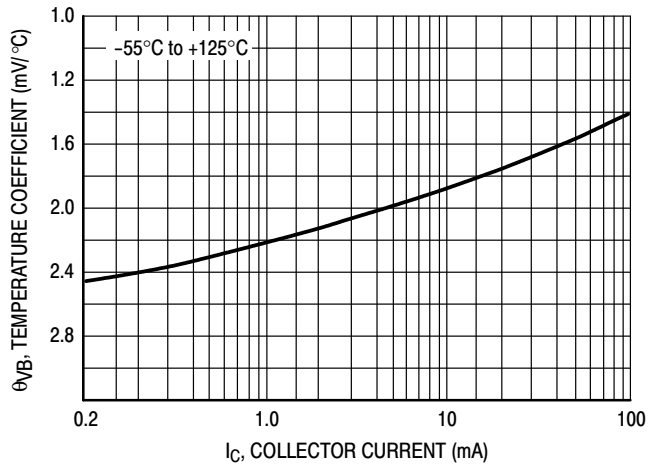


Figure 4. Base-Emitter Temperature Coefficient

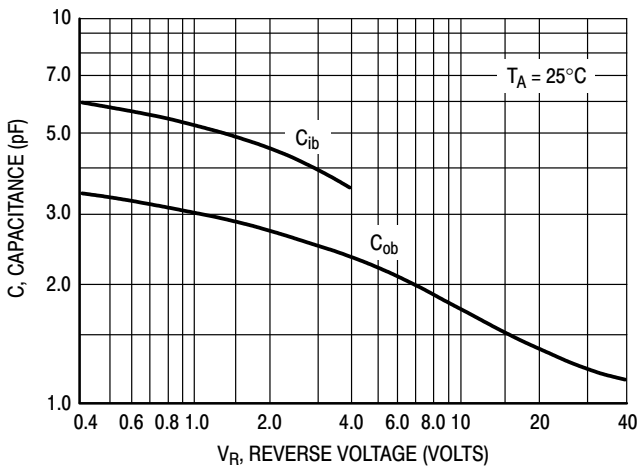


Figure 5. Capacitances

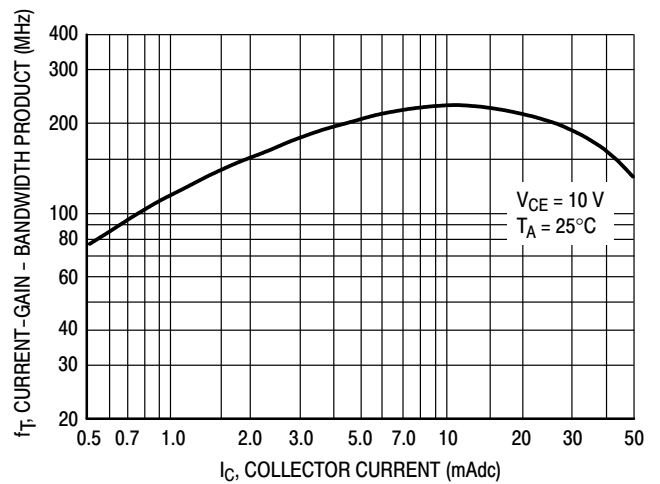


Figure 6. Current-Gain - Bandwidth Product

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TYPICAL CHARACTERISTICS

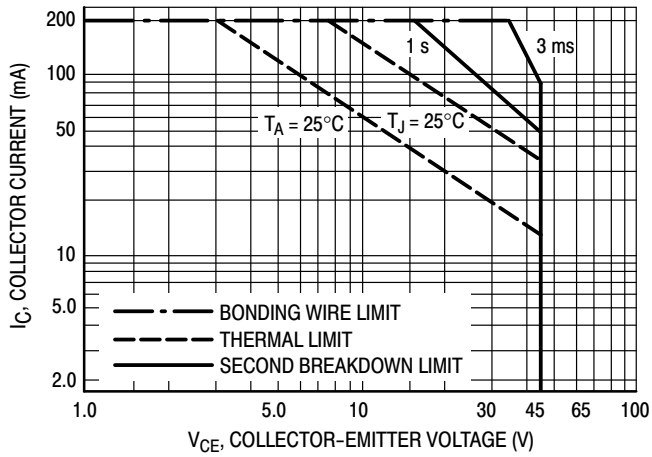


Figure 7. Active Region Safe Operating Area

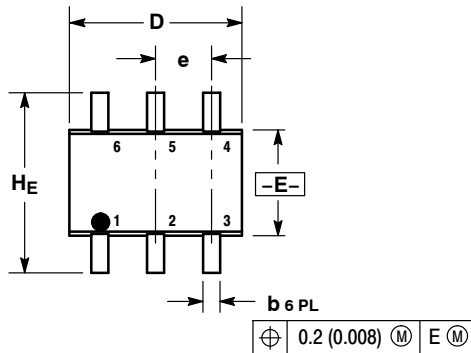
The safe operating area curves indicate I_C - V_{CE} limits of the transistor that must be observed for reliable operation. Collector load lines for specific circuits must fall below the limits indicated by the applicable curve.

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.

NST45011MW6T1G

PACKAGE DIMENSIONS

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



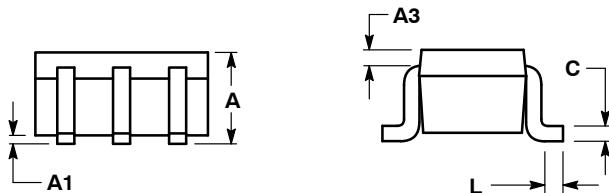
NOTES:

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

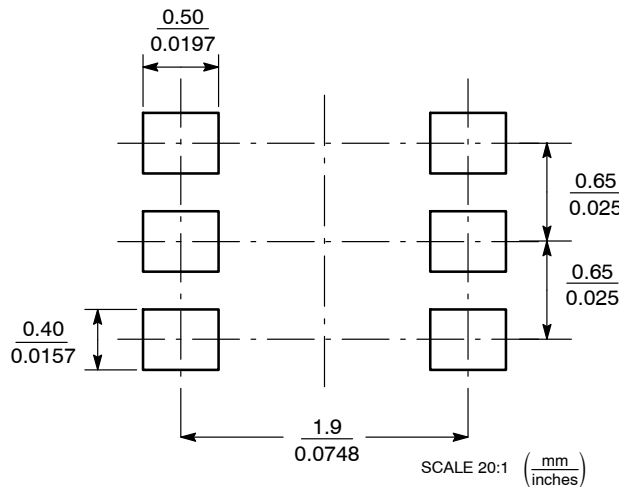
| DIM | MILLIMETERS | | | INCHES | | |
|-----|-------------|------|------|-----------|-------|-------|
| | MIN | NOM | MAX | MIN | NOM | MAX |
| A | 0.80 | 0.95 | 1.10 | 0.031 | 0.037 | 0.043 |
| A1 | 0.00 | 0.05 | 0.10 | 0.000 | 0.002 | 0.004 |
| A3 | 0.20 REF | | | 0.008 REF | | |
| b | 0.10 | 0.21 | 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.

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