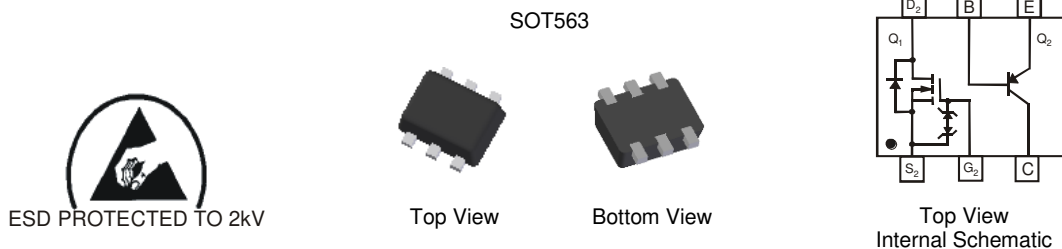


N-CHANNEL ENHANCEMENT MODE MOSFET PLUS PNP TRANSISTOR
Features

- N-Channel MOSFET and PNP Transistor in One Package
- Low On-Resistance
- Very Low Gate Threshold Voltage, 1.0V max
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- Ultra-Small Surface Mount Package
- ESD Protected MOSFET Gate up to 2kV
- **Lead, Halogen and Antimony Free, RoHS Compliant (Note 1)**
- **"Green" Device (Note 2)**
- **For automotive applications requiring specific change control (i.e.: parts qualified to AEC-Q100/101/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please refer to the related automotive grade (Q-suffix) part. A listing can be found at <https://www.diodes.com/products/automotive/automotive-products/>.**
- **This part is qualified to JEDEC standards (as references in AEC-Q101) for High Reliability. <https://www.diodes.com/quality/product-definitions/>**

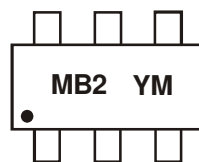
Mechanical Data

- Case: SOT563
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram
- Terminals: Finish - Matte Tin annealed over Copper lead frame. Solderable per MIL-STD-202, Method 208
- Weight: 0.006 grams (approximate)


Ordering Information (Note 3)

| Part Number | Case | Packaging |
|--------------|--------|--------------------|
| DMB54D0UV-7 | SOT563 | 3,000/Tape & Reel |
| DMB54D0UV-13 | SOT563 | 10,000/Tape & Reel |

- Notes:
1. EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant. No purposely added lead. Halogen and Antimony free
 2. Diodes Inc.'s "Green" policy can be found on our website at <http://www.diodes.com>.
 3. For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

Marking Information


MB2 = Marking Code
 YM = Date Code Marking
 Y = Year (ex: V = 2008)
 M = Month (ex: 9 = September)

Date Code Key

| Year | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | | |
|-------|------|------|------|------|------|------|------|------|------|------|-----|-----|
| Code | V | W | X | Y | Z | A | B | C | D | E | | |
| Month | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| Code | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | O | N | D |

Maximum Ratings – MOSFET, Q1 (@T_A = +25°C, unless otherwise specified.)

| Characteristic | Symbol | Value | Units |
|-------------------------------|------------------|-------|-------|
| Drain-Source Voltage | V _{DSS} | 50 | V |
| Gate-Source Voltage | V _{GSS} | ±12 | V |
| Drain Current (Note 4) | I _D | 160 | mA |
| Pulsed Drain Current (Note 4) | I _{DM} | 560 | mA |

Maximum Ratings - PNP Transistor, Q2 (@T_A = +25°C, unless otherwise specified.)

| Characteristic | Symbol | Value | Unit |
|---------------------------|------------------|-------|------|
| Collector-Base Voltage | V _{CBO} | -50 | V |
| Collector-Emitter Voltage | V _{CEO} | -45 | V |
| Emitter-Base Voltage | V _{EBO} | -5.0 | V |
| Collector Current | I _C | -100 | mA |

Thermal Characteristics, Total Device (@T_A = +25°C, unless otherwise specified.)

| Characteristic | Symbol | Value | Unit |
|--|-----------------------------------|-------------|------|
| Total Power Dissipation (Note 4) | P _D | 250 | mW |
| Thermal Resistance, Junction to Ambient (Note 4) | R _{θJA} | 500 | °C/W |
| Operating and Storage Temperature Range | T _J , T _{STG} | -55 to +150 | °C |

Electrical Characteristics - MOSFET @T_A = 25°C unless otherwise specified

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|---|---------------------|-----|-----|------------|------|---|
| OFF CHARACTERISTICS (Note 5) | | | | | | |
| Drain-Source Breakdown Voltage | BV _{DSS} | 50 | — | — | V | V _{GS} = 0V, I _D = 250μA |
| Zero Gate Voltage Drain Current | I _{DSS} | — | — | 10 | μA | V _{DS} = 50V, V _{GS} = 0V |
| Gate-Body Leakage | I _{GSS} | — | — | 1.0 5.0 | μA | V _{GS} = ±8V, V _{DS} = 0V V _{GS} = ±12V, V _{DS} = 0V |
| ON CHARACTERISTICS (Note 5) | | | | | | |
| Gate Threshold Voltage | V _{GS(th)} | 0.7 | 0.8 | 1.0 | V | V _{DS} = V _{GS} , I _D = 250μA |
| Static Drain-Source On-Resistance | R _{DS(on)} | — | 3.1 | 4 | Ω | V _{GS} = 4V, I _D = 100mA |
| | | — | 4 | 5 | | V _{GS} = 2.5V, I _D = 80mA |
| Forward Transconductance | g _{FS} | 180 | — | — | mS | V _{DS} = 10V, I _D = 100mA, f = 1.0KHz |
| DYNAMIC CHARACTERISTICS (Note 6) | | | | | | |
| Input Capacitance | C _{iss} | — | 25 | — | pF | V _{DS} = 10V, V _{GS} = 0V, f = 1.0MHz |
| Output Capacitance | C _{oss} | — | 5 | — | pF | |
| Reverse Transfer Capacitance | C _{rss} | — | 2.1 | — | pF | |

- Notes:
- Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
 - Short duration pulse test used to minimize self-heating effect.
 - Guaranteed by design. Not subject to product testing.

Electrical Characteristics - PNP Transistor (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|---|---------------|------|--------------|--------------|---------------------|--|
| Collector-Base Breakdown Voltage (Note 5) | $V_{(BR)CBO}$ | -50 | — | — | V | $I_C = 10\mu\text{A}, I_B = 0$ |
| Collector-Emitter Breakdown Voltage (Note 5) | $V_{(BR)CEO}$ | -45 | — | — | V | $I_C = 10\text{mA}, I_B = 0$ |
| Emitter-Base Breakdown Voltage (Note 5) | $V_{(BR)EBO}$ | -5 | — | — | V | $I_E = 1\mu\text{A}, I_C = 0$ |
| DC Current Gain (Note 5) | h_{FE} | 220 | 290 | 475 | — | $V_{CE} = -5.0\text{V}, I_C = -2.0\text{mA}$ |
| Collector-Emitter Saturation Voltage (Note 5) | $V_{CE(SAT)}$ | — | — | -100 -400 | mV | $I_C = -10\text{mA}, I_B = -0.5\text{mA}$ $I_C = -100\text{mA}, I_B = -5.0\text{mA}$ |
| Base-Emitter Saturation Voltage (Note 5) | $V_{BE(SAT)}$ | — | -700 -900 | — | mV | $I_C = -10\text{mA}, I_B = -0.5\text{mA}$ $I_C = -100\text{mA}, I_B = -5.0\text{mA}$ |
| Base-Emitter Voltage (Note 5) | $V_{BE(ON)}$ | -600 | — | -750 -820 | mV | $V_{CE} = -5.0\text{V}, I_C = -2.0\text{mA}$ $V_{CE} = -5.0\text{V}, I_C = -10\text{mA}$ |
| Collector-Cutoff Current (Note 5) | I_{CBO} | — | — | -15 -4.0 | nA μA | $V_{CB} = -30\text{V}$ $V_{CB} = -30\text{V}, T_A = 150^\circ\text{C}$ |
| Collector-Emitter Cut-Off Current (Note 5) | I_{CES} | — | — | -100 | nA | $V_{CE} = -45\text{V}$ |
| Gain Bandwidth Product | f_T | 100 | — | — | MHz | $V_{CE} = -5.0\text{V}, I_C = -10\text{mA}, f = 100\text{MHz}$ |
| Output Capacitance | C_{OB} | — | — | 4.5 | pF | $V_{CB} = -10\text{V}, f = 1.0\text{MHz}$ |
| Noise Figure | NF | — | — | 10 | dB | $I_C = -0.2\text{mA}, V_{CE} = -5.0\text{Vdc}$, $R_S = 2.0\text{K}\Omega, f = 1.0\text{KHz}, \text{BW} = 200\text{Hz}$ |

MOSFET

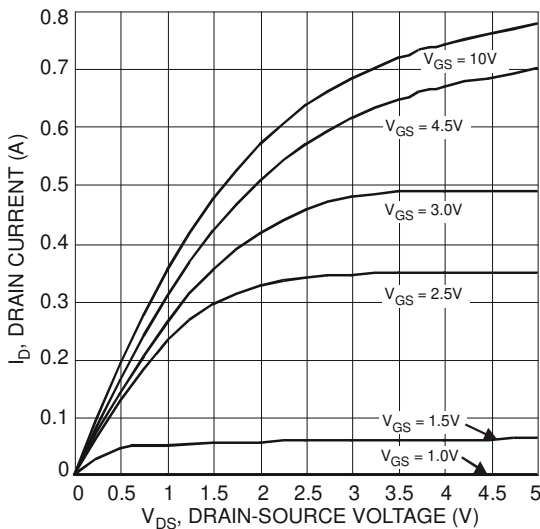


Fig. 1 Typical Output Characteristics

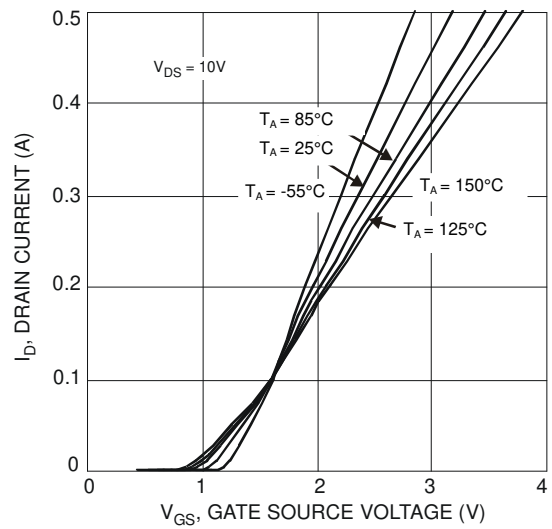


Fig. 2 Typical Transfer Characteristics

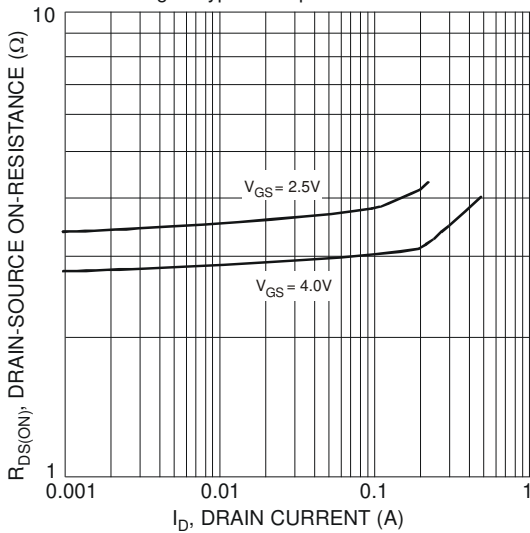


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

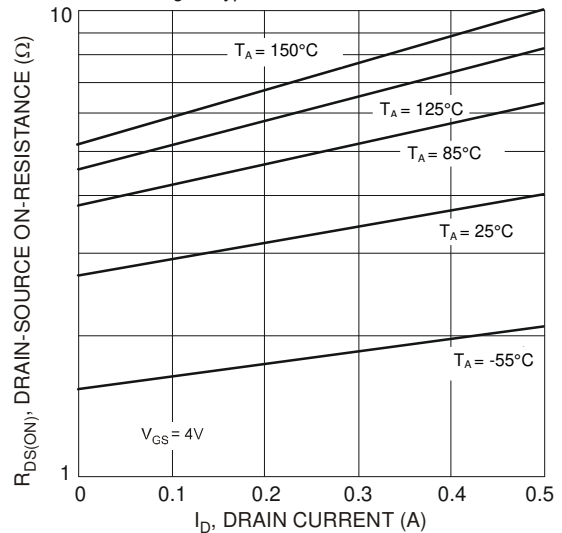


Fig. 4 Typical Drain-Source On-Resistance vs. Drain Current and Temperature

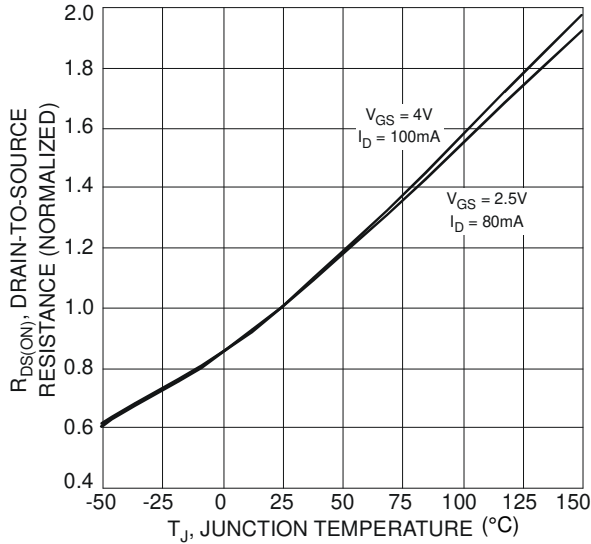


Fig. 5 On-Resistance Variation with Temperature

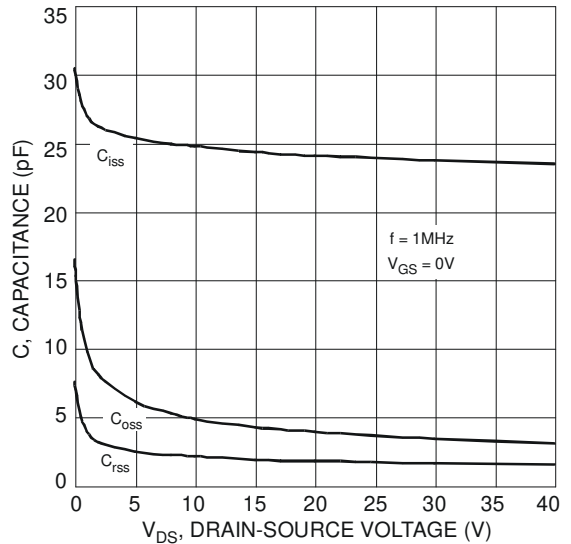


Fig. 6 Typical Capacitance

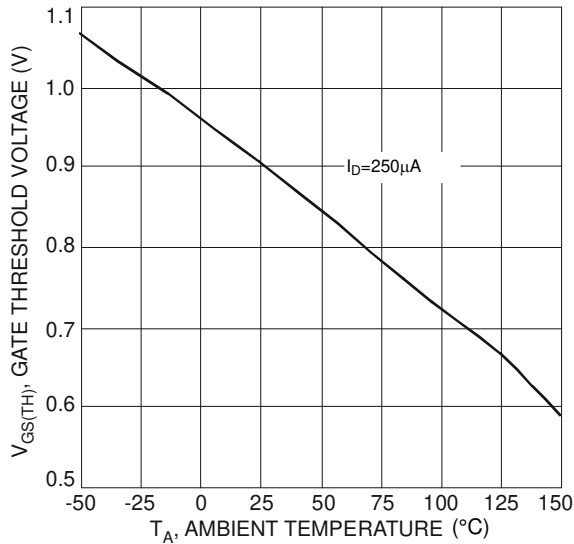


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

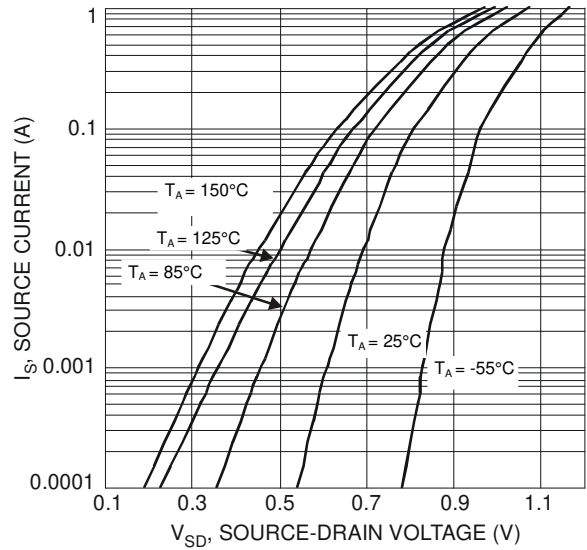


Fig. 8 Diode Forward Voltage vs. Current

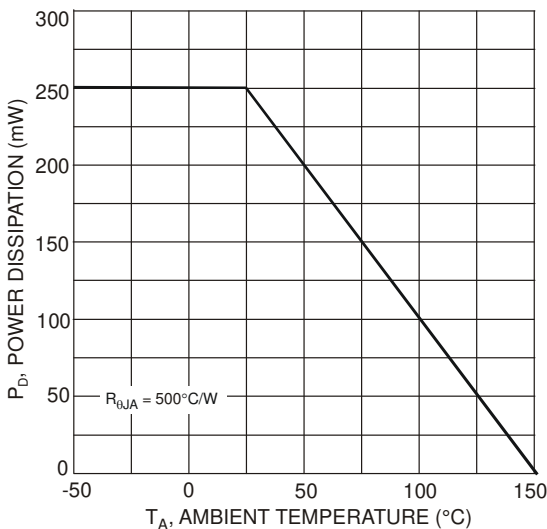


Fig. 9 Derating Curve - Total Package Power Dissipation

PNP Transistor

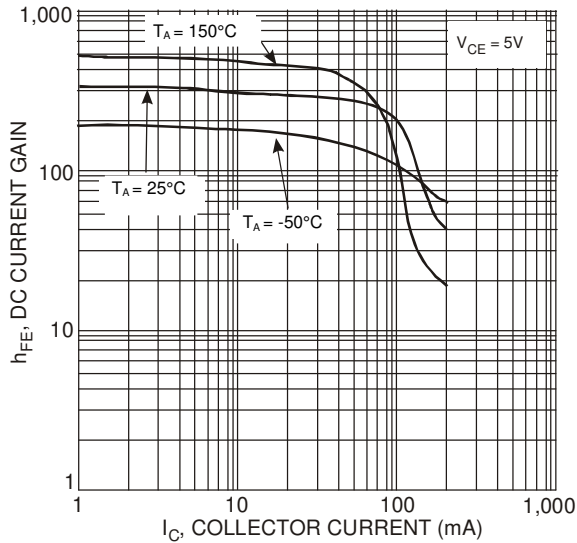


Fig. 10 Typical DC Current Gain vs. Collector Current

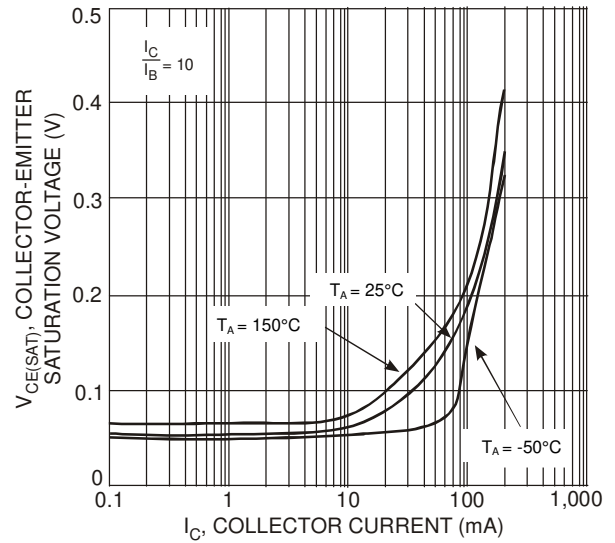


Fig. 11 Collector-Emitter Saturation Voltage vs. Collector Current

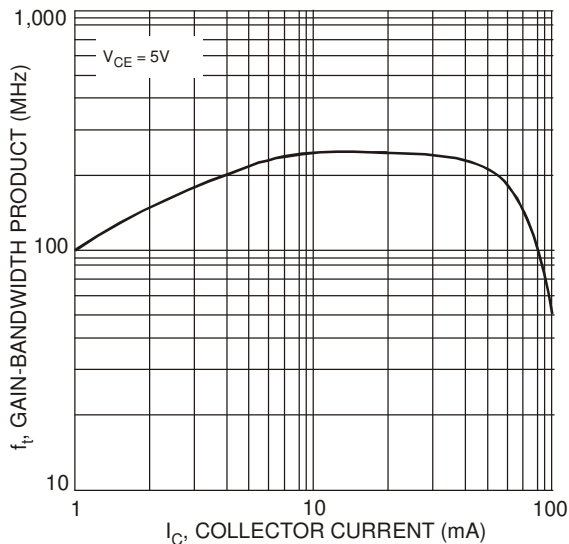
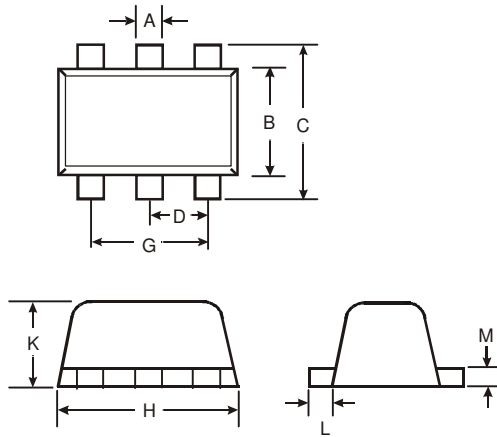


Fig. 12 Typical Gain-Bandwidth Product vs. Collector Current

Package Outline Dimensions

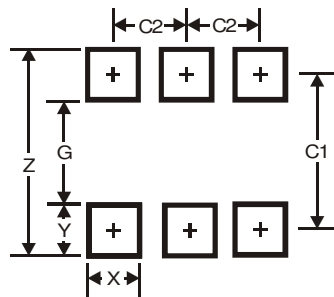
Please see <http://www.diodes.com/package-outlines.html> for the latest version.



| SOT563 | | | |
|----------------------|------|------|------|
| Dim | Min | Max | Typ |
| A | 0.15 | 0.30 | 0.20 |
| B | 1.10 | 1.25 | 1.20 |
| C | 1.55 | 1.70 | 1.60 |
| D | - | - | 0.50 |
| G | 0.90 | 1.10 | 1.00 |
| H | 1.50 | 1.70 | 1.60 |
| K | 0.55 | 0.60 | 0.60 |
| L | 0.10 | 0.30 | 0.20 |
| M | 0.10 | 0.18 | 0.11 |
| All Dimensions in mm | | | |

Suggested Pad Layout

Please see <http://www.diodes.com/package-outlines.html> for the latest version.



| Dimensions | Value (in mm) |
|------------|---------------|
| Z | 2.2 |
| G | 1.2 |
| X | 0.375 |
| Y | 0.5 |
| C1 | 1.7 |
| C2 | 0.5 |

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