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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
- **Lead, Halogen and Antimony Free, RoHS Compliant (Note 2)**
- **ESD Protected MOSFET Gate up to 2kV**
- **"Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

Mechanical Data

- Case: SOT-363
- 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 Alloy 42 lead frame. Solderable per MIL-STD-202, Method 208
- Marking Information: See Page 5
- Ordering Information: See Page 5
- Weight: 0.006 grams (approximate)


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 1) Continuous | I _D | 160 | mA |
| Pulsed Drain Current (Note 1) | I _{DM} | 560 | mA |

Maximum Ratings - PNP Transistor, Q2 @_{T_A} = 25°C unless otherwise specified

| Characteristic | Symbol | Value | Unit |
|---------------------------|------------------|-------|------|
| Collector-Base Voltage | V _{CB0} | -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 1) | P _D | 250 | mW |
| Thermal Resistance, Junction to Ambient (Note 1) | R _{θJA} | 500 | °C/W |
| Operating and Storage Temperature Range | T _J , T _{STG} | -55 to +150 | °C |

- Notes:
1. Device mounted on FR-4 PCB, 1 inch x 0.85 inch x 0.062 inch; pad layout as shown on Diodes Inc. suggested pad layout document AP02001, which can be found on our website at <http://www.diodes.com/datasheets/ap02001.pdf>.
 2. No purposefully added lead. Halogen and Antimony Free.
 3. Diodes Inc.'s "Green" policy can be found on our website at http://www.diodes.com/products/lead_free/index.php.

Electrical Characteristics - MOSFET @ $T_A = 25^\circ\text{C}$ unless otherwise specified

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|-------------------------------------|--------------|-----|-----|------------|----------|-------------------------------------------------------------------|
| OFF CHARACTERISTICS (Note 2) | | | | | | |
| Drain-Source Breakdown Voltage | BV_{DSS} | 50 | — | — | V | $V_{GS} = 0V, I_D = 250\mu A$ |
| 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 | $V_{GS} = \pm 8V, V_{DS} = 0V$ $V_{GS} = \pm 12V, V_{DS} = 0V$ |
| ON CHARACTERISTICS (Note 2) | | | | | | |
| Gate Threshold Voltage | $V_{GS(th)}$ | 0.7 | 0.8 | 1.0 | V | $V_{DS} = V_{GS}, I_D = 250\mu A$ |
| 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 | | | | | | |
| 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 | |

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 4) | $V_{(BR)CBO}$ | -50 | — | — | V | $I_C = 10\mu A, I_B = 0$ |
| Collector-Emitter Breakdown Voltage (Note 4) | $V_{(BR)CEO}$ | -45 | — | — | V | $I_C = 10mA, I_B = 0$ |
| Emitter-Base Breakdown Voltage (Note 4) | $V_{(BR)EBO}$ | -5 | — | — | V | $I_E = 1\mu A, I_C = 0$ |
| DC Current Gain (Note 4) | h_{FE} | 220 | 290 | 475 | — | $V_{CE} = -5.0V, I_C = -2.0mA$ |
| Collector-Emitter Saturation Voltage (Note 4) | $V_{CE(SAT)}$ | — | — | -100 | mV | $I_C = -10mA, I_B = -0.5mA$ |
| | | — | — | -400 | | $I_C = -100mA, I_B = -5.0mA$ |
| Base-Emitter Saturation Voltage (Note 4) | $V_{BE(SAT)}$ | — | -700 | — | mV | $I_C = -10mA, I_B = -0.5mA$ |
| | | — | -900 | — | | $I_C = -100mA, I_B = -5.0mA$ |
| Base-Emitter Voltage (Note 4) | $V_{BE(ON)}$ | -600 | — | -750 | mV | $V_{CE} = -5.0V, I_C = -2.0mA$ |
| | | — | — | -820 | | $V_{CE} = -5.0V, I_C = -10mA$ |
| Collector-Cutoff Current (Note 4) | I_{CBO} | — | — | -15 | nA | $V_{CB} = -30V$ |
| | | — | — | -4.0 | | $V_{CB} = -30V, T_A = 150^\circ C$ |
| Collector-Emitter Cut-Off Current (Note 4) | I_{CES} | — | — | -100 | nA | $V_{CE} = -45V$ |
| Gain Bandwidth Product | f_T | 100 | — | — | MHz | $V_{CE} = -5.0V, I_C = -10mA, f = 100MHz$ |
| Output Capacitance | C_{OB} | — | — | 4.5 | pF | $V_{CB} = -10V, f = 1.0MHz$ |
| Noise Figure | NF | — | — | 10 | dB | $I_C = -0.2mA, V_{CE} = -5.0V_{dc},$ $R_S = 2.0K\Omega, f = 1.0KHz, BW = 200Hz$ |

Notes: 4. Short duration pulse test used to minimize self-heating effect.

MOSFET

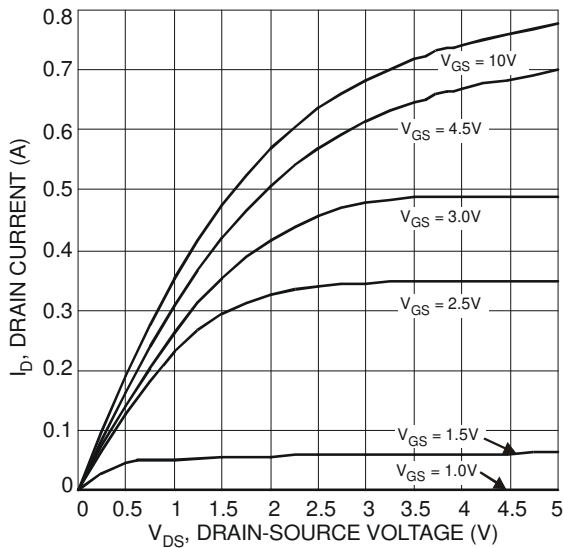


Fig. 1 Typical Output Characteristics

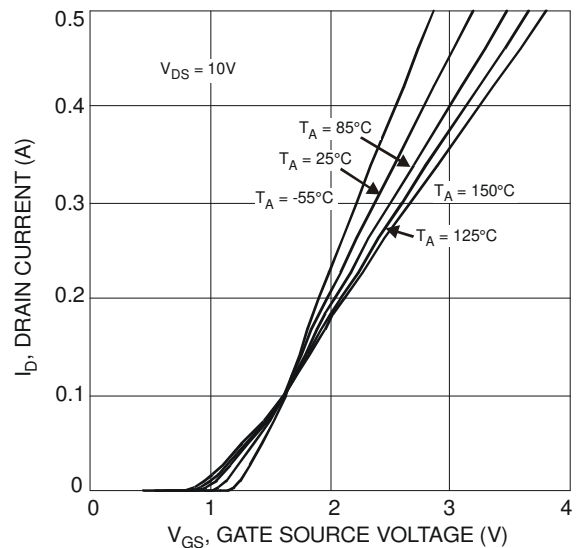


Fig. 2 Typical Transfer Characteristics

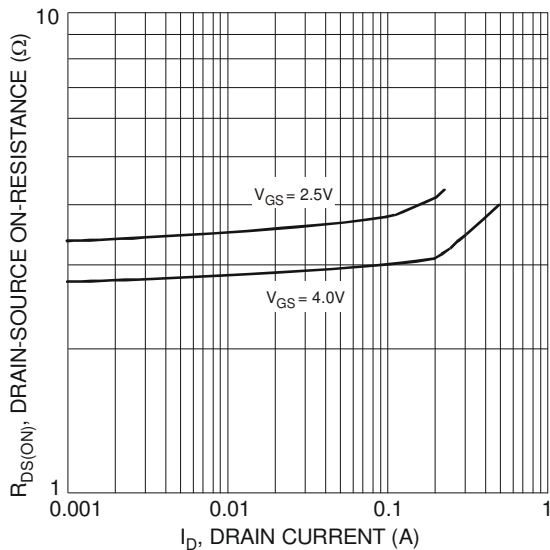


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

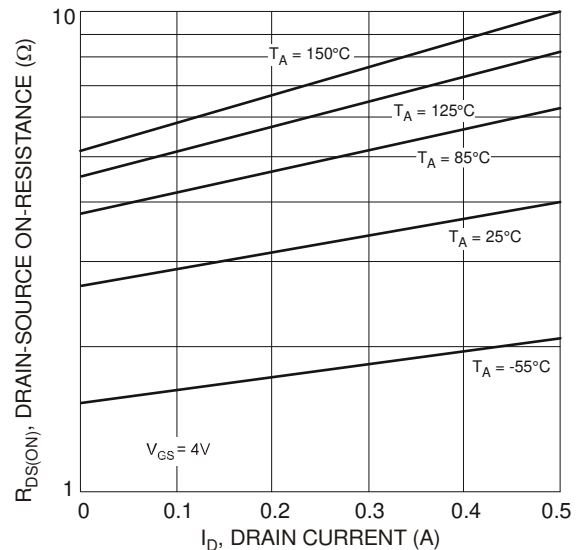


Fig. 4 Typical Drain-Source On-Resistance vs. Drain Current and Temperature

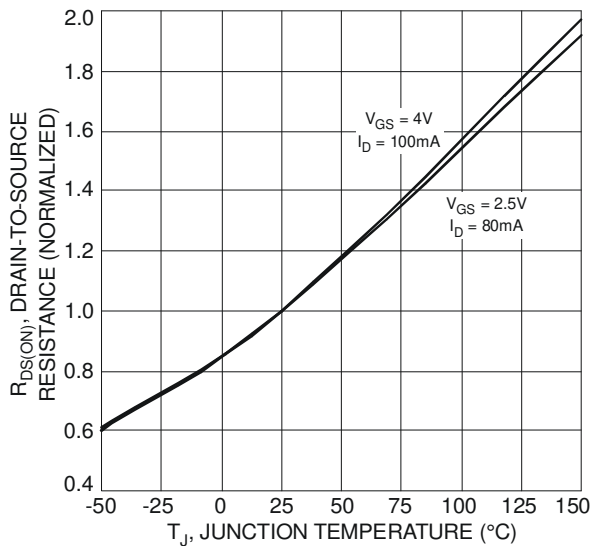


Fig. 5 On-Resistance Variation with Temperature

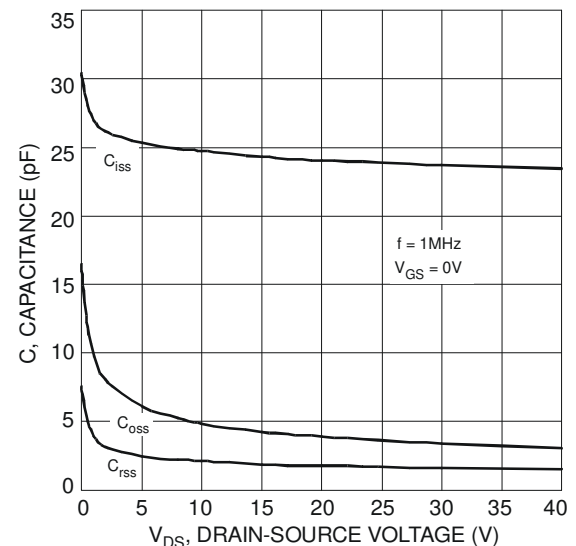


Fig. 6 Typical Capacitance

MOSFET (continued)

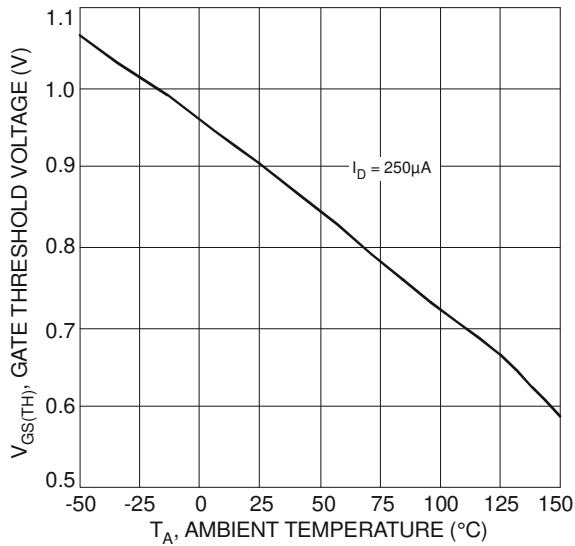


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

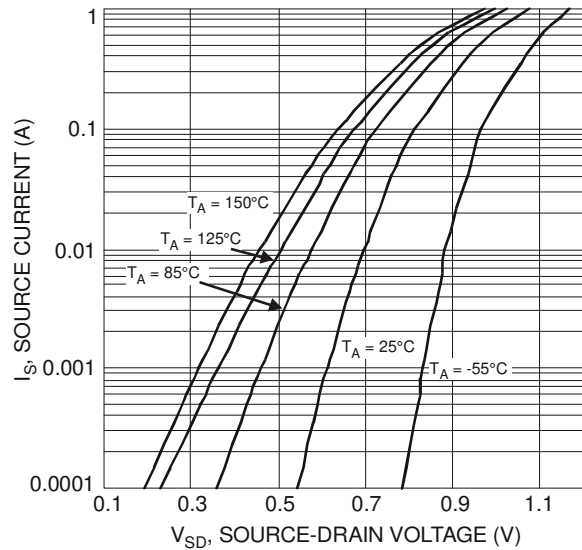


Fig. 8 Diode Forward Voltage vs. Current

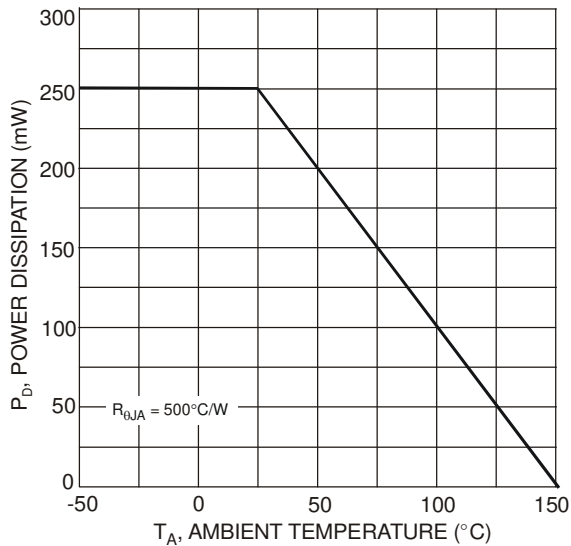


Fig. 9 Derating Curve - Total Package Power Dissipation

PNP Transistor

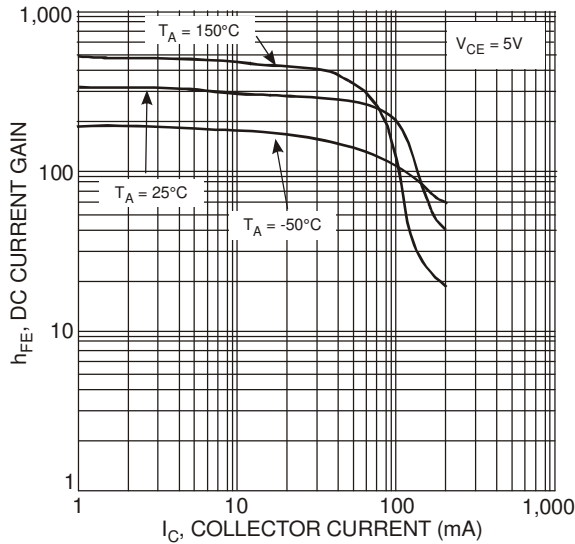


Fig. 10 Typical DC Current Gain vs. Collector Current

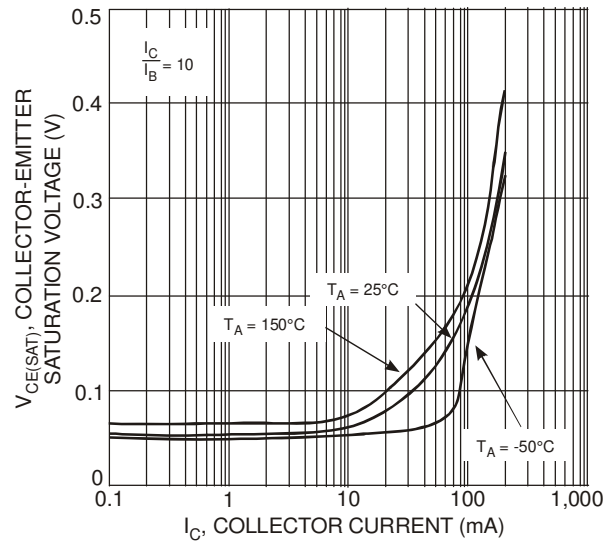


Fig. 11 Collector-Emitter Saturation Voltage vs. Collector Current

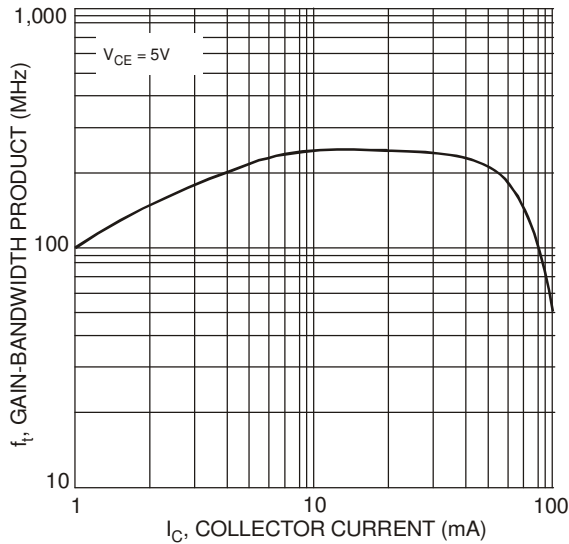


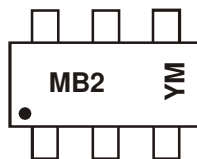
Fig. 12 Typical Gain-Bandwidth Product vs. Collector Current

Ordering Information (Note 5)

| Part Number | Case | Packaging |
|--------------|---------|------------------|
| DMB54D0UDW-7 | SOT-363 | 3000/Tape & Reel |

Notes: 5. For packaging details, go to our website at <http://www.diodes.com/datasheets/ap02007.pdf>.

Marking Information



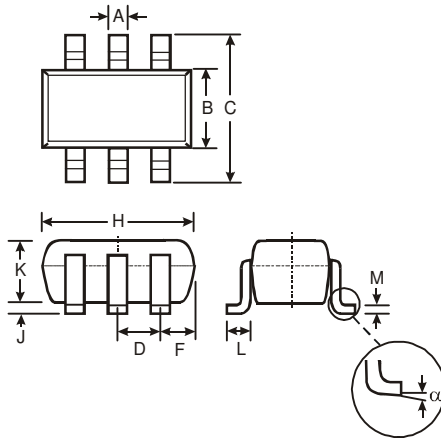
MB2 = Marking Code
YM = Date Code Marking
Y = Year (ex: V = 2008)
M = Month (ex: 9 = September)

Date Code Key

| Year | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|------|------|------|------|------|------|------|------|------|
| Code | V | W | X | Y | Z | A | B | C |

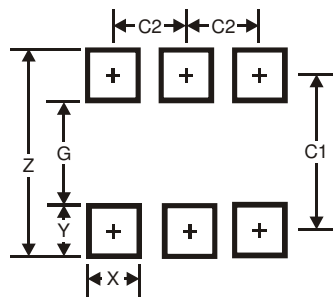
| Month | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Code | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | O | N | D |

Package Outline Dimensions



| SOT-363 | | |
|----------------------|----------|------|
| Dim | Min | Max |
| A | 0.10 | 0.30 |
| B | 1.15 | 1.35 |
| C | 2.00 | 2.20 |
| D | 0.65 Typ | |
| F | 0.40 | 0.45 |
| H | 1.80 | 2.20 |
| J | 0 | 0.10 |
| K | 0.90 | 1.00 |
| L | 0.25 | 0.40 |
| M | 0.10 | 0.22 |
| α | 0° | 8° |
| All Dimensions in mm | | |

Suggested Pad Layout



| Dimensions | Value (in mm) |
|------------|---------------|
| Z | 2.5 |
| G | 1.3 |
| X | 0.42 |
| Y | 0.6 |
| C1 | 1.9 |
| C2 | 0.65 |

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