



**THE DATASHEET OF
DMG6602SVT-7**



COMPLEMENTARY PAIR ENHANCEMENT MODE MOSFET

Product Summary

| Device | $V_{(BR)DSS}$ | $R_{DS(on)}$ | I_D $T_A = +25^\circ C$ |
|--------|---------------|--------------------------|------------------------------|
| Q1 | 30V | 60mΩ @ $V_{GS} = 10V$ | 3.4A |
| | | 100mΩ @ $V_{GS} = 4.5V$ | 2.7A |
| Q2 | -30V | 95mΩ @ $V_{GS} = -10V$ | -2.8A |
| | | 140mΩ @ $V_{GS} = -4.5V$ | -2.3A |

Features and Benefits

- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

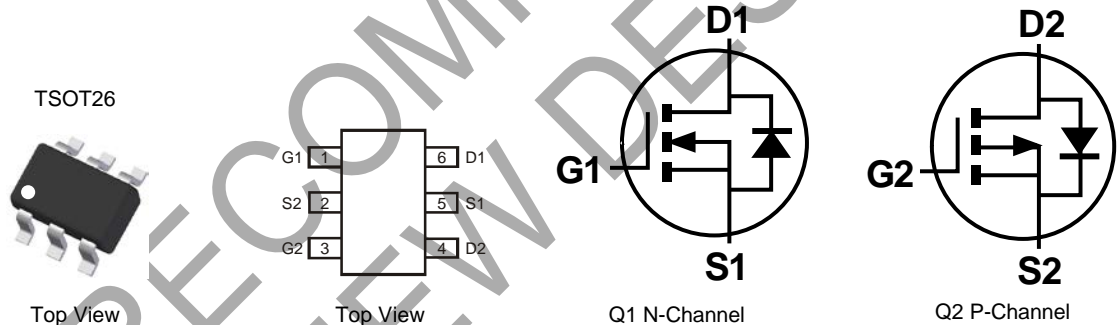
Description and Applications

This new generation MOSFET is designed to minimize the on-state resistance ($R_{DS(on)}$) yet maintain superior switching performance, making it ideal for high-efficiency power management applications.

- Backlighting
- DC-DC Converters
- Power Management Functions

Mechanical Data

- Case: TSOT26
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals Connections: See Diagram
- Terminals: Finish—Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208
- Weight: 0.013 grams (Approximate)

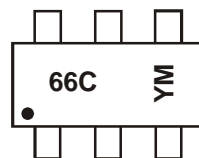


Ordering Information (Note 3)

| Part Number | Case | Packaging |
|--------------|--------|--------------------|
| DMG6602SVT-7 | TSOT26 | 3000 / Tape & Reel |

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
 2. See <https://www.diodes.com/quality/lead-free/> for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
 3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
 4. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

Marking Information



66C = Product Type Marking Code
 YM = Date Code Marking
 Y = Year (ex: X = 2010)
 M = Month (ex: 9 = September)

Date Code Key

| Year | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
|------|------|------|------|------|------|------|------|------|
| Code | 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 – Q1 (@TA = +25°C unless otherwise specified.)

| Characteristic | | | Symbol | Value | Unit |
|--|--------------|------------------------|------------------|-------|------|
| Drain-Source Voltage | | | V _{DSS} | 30 | V |
| Gate-Source Voltage | | | V _{GSS} | ±20 | V |
| Continuous Drain Current (Note 6) V _{GS} = 10V | Steady State | T _A = +25°C | I _D | 3.4 | A |
| | | T _A = +70°C | | 2.7 | |
| Continuous Drain Current (Note 6) V _{GS} = 4.5V | Steady State | T _A = +25°C | I _D | 2.7 | A |
| | | T _A = +70°C | | 2.2 | |
| Maximum Continuous Body Diode Forward Current (Note 6) | | | I _S | 1.5 | A |
| Pulsed Drain Current (Note 6) | | | I _{DM} | 25 | A |

Maximum Ratings – Q2 (@TA = +25°C unless otherwise specified.)

| Characteristic | | | Symbol | Value | Unit |
|---|--------------|------------------------|------------------|-------|------|
| Drain-Source Voltage | | | V _{DSS} | -30 | V |
| Gate-Source Voltage | | | V _{GSS} | ±20 | V |
| Continuous Drain Current (Note 6) V _{GS} = -10V | Steady State | T _A = +25°C | I _D | -2.8 | A |
| | | T _A = +70°C | | -2.4 | |
| Continuous Drain Current (Note 6) V _{GS} = -4.5V | Steady State | T _A = +25°C | I _D | -2.3 | A |
| | | T _A = +70°C | | -2.1 | |
| Maximum Continuous Body Diode Forward Current (Note 6) | | | I _S | -1.5 | A |
| Pulsed Drain Current (Note 6) | | | I _D | -20 | A |

Thermal Characteristics

| Characteristic | | Symbol | Value | Units |
|--|------------------------|-----------------------------------|-------------|-------|
| Total Power Dissipation (Note 5) | T _A = +25°C | P _D | 0.84 | W |
| | T _A = +70°C | | 0.52 | |
| Thermal Resistance, Junction to Ambient (Note 5) | Steady State | R _{θJA} | 155 | °C/W |
| | t < 10s | | 109 | |
| Total Power Dissipation (Note 6) | T _A = +25°C | P _D | 1.27 | W |
| | T _A = +70°C | | 0.8 | |
| Thermal Resistance, Junction to Ambient (Note 6) | Steady State | R _{θJA} | 102 | °C/W |
| | t < 10s | | 71 | |
| Thermal Resistance, Junction to Case (Note 6) | | R _{θJC} | 34 | |
| Operating and Storage Temperature Range | | T _J , T _{STG} | -55 to +150 | °C |

Notes: 5. Device mounted on FR-4 substrate PCB, 2oz copper, with minimum recommended pad layout.
6. Device mounted on FR-4 substrate PCB, 2oz copper, with 1inch square copper plate.

Electrical Characteristics – Q1 NMOS (@TA = +25°C unless otherwise specified.)

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|---|--------------|-----|-----|-----------|------------|--|
| OFF CHARACTERISTICS (Note 7) | | | | | | |
| Drain-Source Breakdown Voltage | V_{DSS} | 30 | — | — | V | $V_{GS} = 0V, I_D = 250\mu A$ |
| Zero Gate Voltage Drain Current | I_{DSS} | — | — | 1.0 | μA | $V_{DS} = 24V, V_{GS} = 0V$ |
| Gate-Source Leakage | I_{GSS} | — | — | ± 100 | nA | $V_{GS} = \pm 20V, V_{DS} = 0V$ |
| ON CHARACTERISTICS (Note 7) | | | | | | |
| Gate Threshold Voltage | $V_{GS(th)}$ | 1.0 | — | 2.3 | V | $V_{DS} = V_{GS}, I_D = 250\mu A$ |
| Static Drain-Source On-Resistance | $R_{DS(on)}$ | — | 38 | 60 | m Ω | $V_{GS} = 10V, I_D = 3.1A$ |
| | | | 55 | 100 | | $V_{GS} = 4.5V, I_D = 2A$ |
| Forward Transfer Admittance | $ Y_{fs} $ | — | 4 | — | S | $V_{DS} = 5V, I_D = 3.1A$ |
| Diode Forward Voltage | V_{SD} | — | 0.8 | 1 | V | $V_{GS} = 0V, I_S = 1A$ |
| DYNAMIC CHARACTERISTICS (Note 8) | | | | | | |
| Input Capacitance | C_{iss} | — | 290 | 400 | pF | $V_{DS} = 15V, V_{GS} = 0V, f = 1.2MHz$ |
| Output Capacitance | C_{oss} | — | 40 | 80 | | |
| Reverse Transfer Capacitance | C_{rss} | — | 40 | 80 | | |
| Gate Resistance | R_g | — | 1.4 | — | Ω | $V_{DS} = 0V, V_{GS} = 0V, f = 1MHz$ |
| Total Gate Charge ($V_{GS} = 4.5V$) | Q_g | — | 4 | 6 | nC | $V_{DS} = 15V, V_{GS} = 4.5V, I_D = 3.1A$ |
| Total Gate Charge ($V_{GS} = 10V$) | Q_g | — | 9 | 13 | | |
| Gate-Source Charge | Q_{gs} | — | 1.2 | — | | |
| Gate-Drain Charge | Q_{gd} | — | 1.5 | — | | |
| Turn-On Delay Time | $t_{D(on)}$ | — | 3 | — | ns | $V_{GS} = 10V, V_{DS} = 15V, R_G = 3\Omega, R_L = 4.7\Omega$ |
| Turn-On Rise Time | t_r | — | 5 | — | | |
| Turn-Off Delay Time | $t_{D(off)}$ | — | 13 | — | | |
| Turn-Off Fall Time | t_f | — | 3 | — | | |

Notes: 7. Short duration pulse test used to minimize self-heating effect.
8. Guaranteed by design. Not subject to product testing.

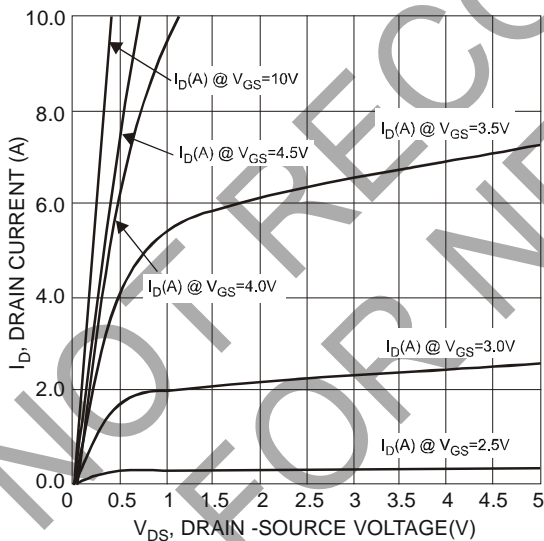


Fig. 1 Typical Output Characteristics

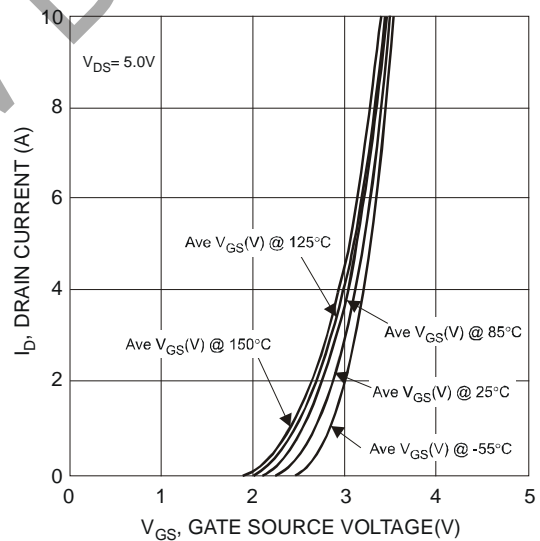


Fig. 2 Typical Transfer Characteristics

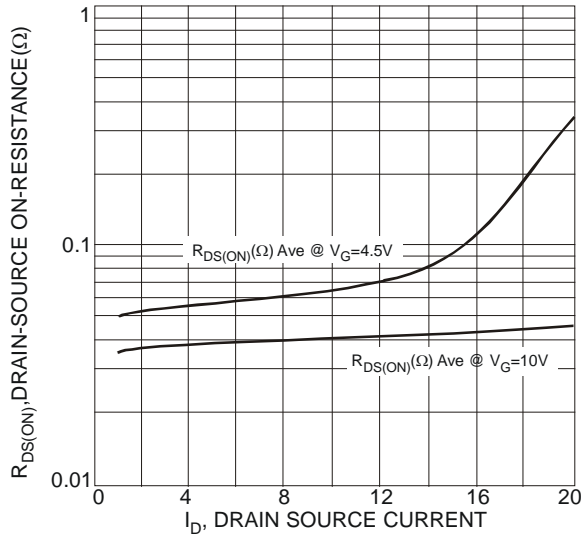


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

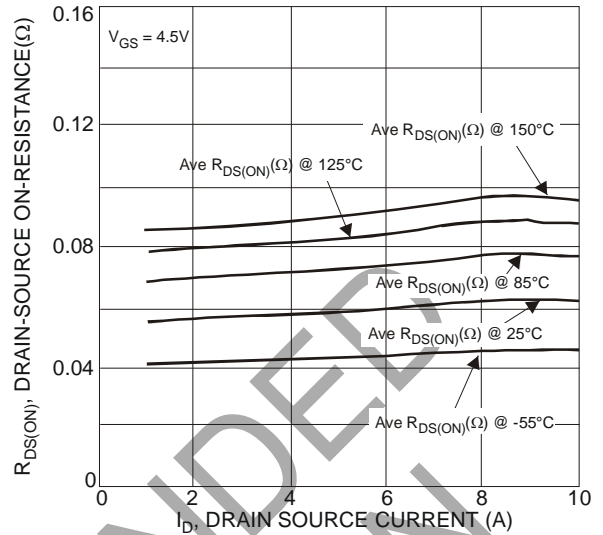


Fig. 4 Typical On-Resistance vs. Drain Current and Temperature

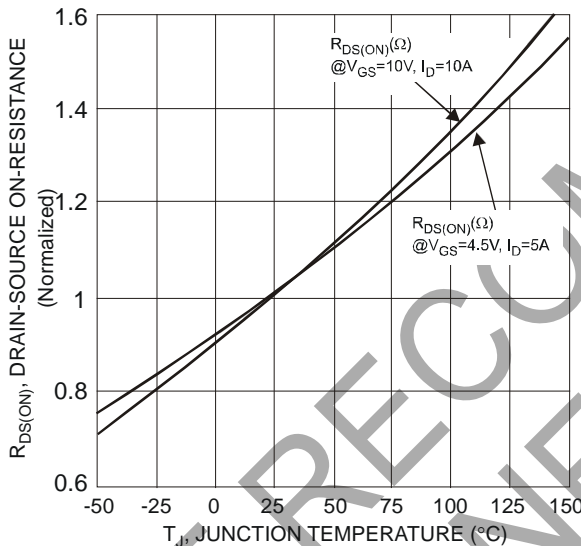


Fig. 5 On-Resistance Variation with Temperature

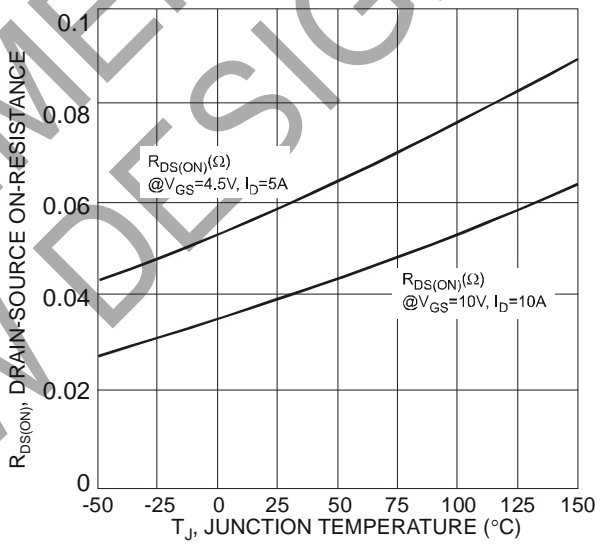


Fig. 6 On-Resistance Variation with Temperature

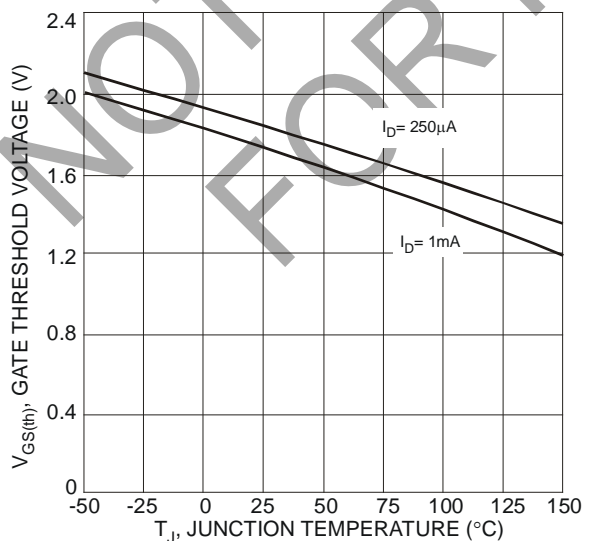


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

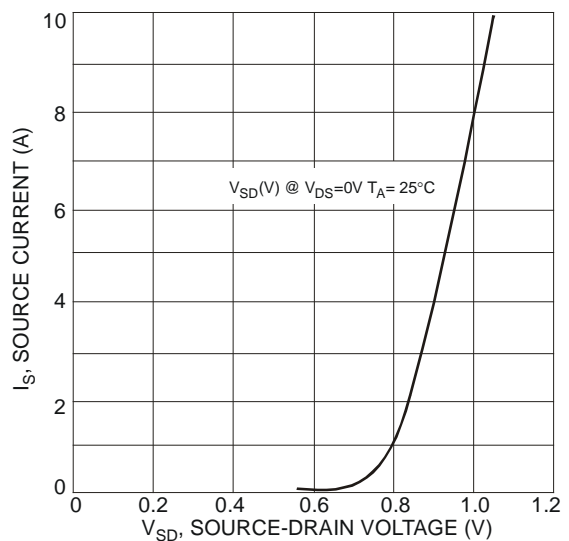
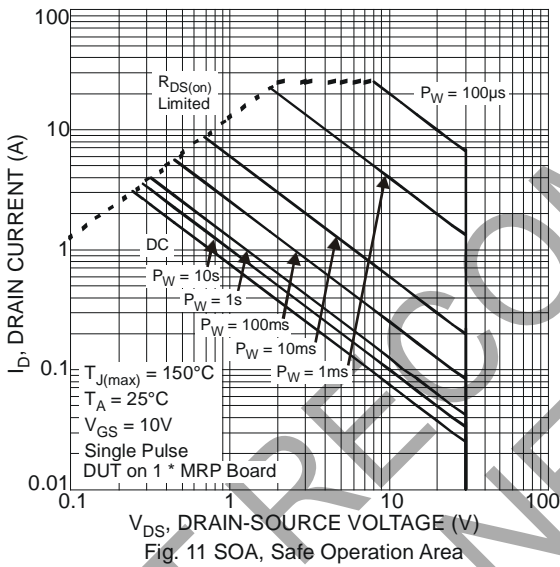
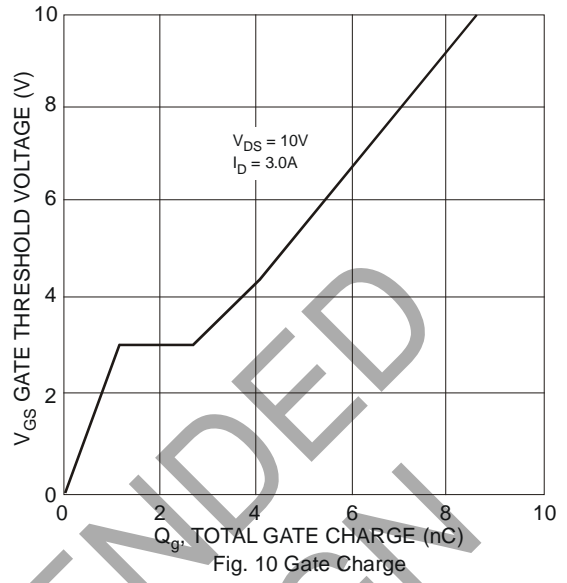
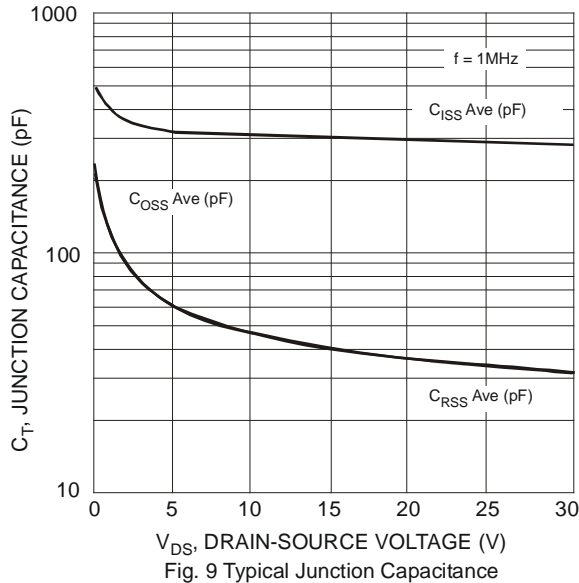


Fig. 8 Diode Forward Voltage vs. Current



NOT RECOMMENDED FOR NEW DESIGN

Electrical Characteristics – Q2 PMOS (@TA = +25°C unless otherwise specified.)

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|---|--------------|------|----------|-----------|------------|--|
| OFF CHARACTERISTICS (Note 7) | | | | | | |
| Drain-Source Breakdown Voltage | BV_{DSS} | -30 | — | — | V | $V_{GS} = 0V, I_D = -250\mu A$ |
| Zero Gate Voltage Drain Current | I_{DSS} | — | — | -1.0 | μA | $V_{DS} = -24V, V_{GS} = 0V$ |
| Gate-Source Leakage | I_{GSS} | — | — | ± 100 | nA | $V_{GS} = \pm 20V, V_{DS} = 0V$ |
| ON CHARACTERISTICS (Note 7) | | | | | | |
| Gate Threshold Voltage | $V_{GS(th)}$ | -1.0 | — | -2.3 | V | $V_{DS} = V_{GS}, I_D = -250\mu A$ |
| Static Drain-Source On-Resistance | $R_{DS(ON)}$ | — | 73 99 | 95 140 | m Ω | $V_{GS} = -10V, I_D = -2.7A$ $V_{GS} = -4.5V, I_D = -2A$ |
| Forward Transfer Admittance | $ Y_{fs} $ | — | 6 | — | S | $V_{DS} = -5V, I_D = -2.7A$ |
| Diode Forward Voltage | V_{SD} | — | -0.8 | -1.0 | V | $V_{GS} = 0V, I_S = -1A$ |
| DYNAMIC CHARACTERISTICS (Note 8) | | | | | | |
| Input Capacitance | C_{iss} | — | 350 | 420 | pF | $V_{DS} = -15V, V_{GS} = 0V,$ $f = 1.2MHz$ |
| Output Capacitance | C_{oss} | — | 50 | 100 | | |
| Reverse Transfer Capacitance | C_{rss} | — | 45 | 80 | | |
| Gate Resistance | R_g | — | 17.1 | — | Ω | $V_{DS} = 0V, V_{GS} = 0V, f = 1MHz$ |
| Total Gate Charge ($V_{GS} = -4.5V$) | Q_g | — | 4 | 6 | nC | $V_{DS} = -15V, V_{GS} = -4.5V, I_D = -3A$ |
| Total Gate Charge ($V_{GS} = -10V$) | Q_g | — | 7 | 9 | | |
| Gate-Source Charge | Q_{gs} | — | 0.9 | — | | |
| Gate-Drain Charge | Q_{gd} | — | 1.2 | — | | |
| Turn-On Delay Time | $t_{D(on)}$ | — | 4.8 | — | ns | $V_{GS} = -10V, V_{DS} = -15V,$ $R_G = 6\Omega, R_L = 15\Omega$ |
| Turn-On Rise Time | t_r | — | 7.3 | — | | |
| Turn-Off Delay Time | $t_{D(off)}$ | — | 20 | — | | |
| Turn-Off Fall Time | t_f | — | 13 | — | | |

Notes: 7. Short duration pulse test used to minimize self-heating effect.
8. Guaranteed by design. Not subject to production testing.

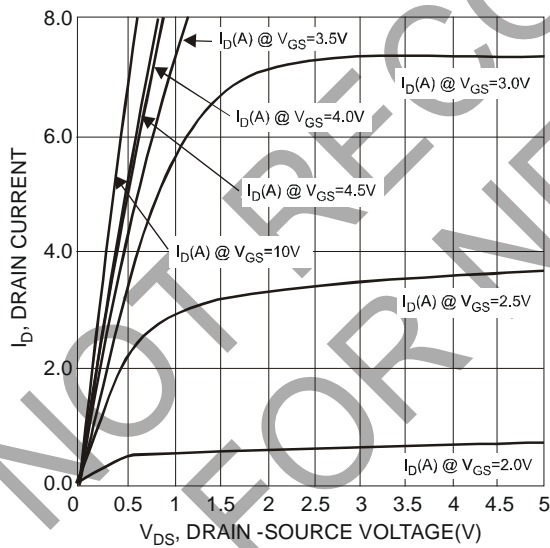


Fig. 12 Typical Output Characteristics

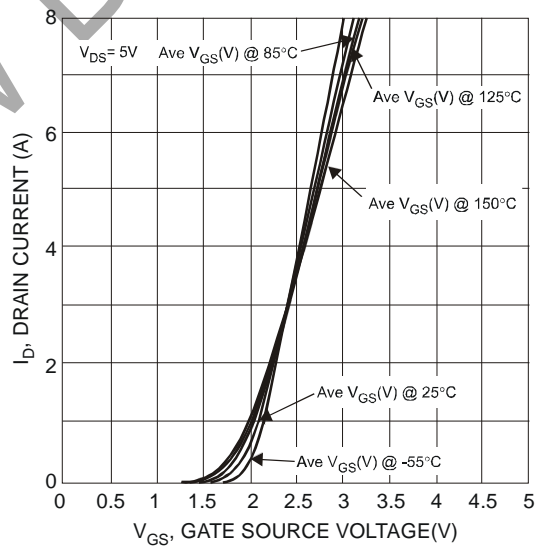


Fig. 13 Typical Transfer Characteristics

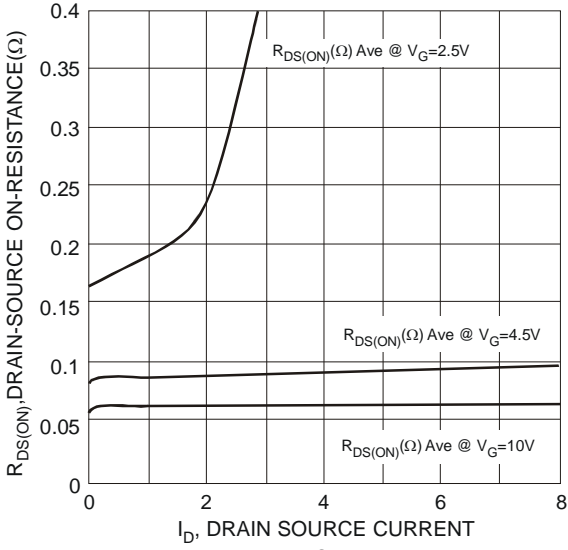


Fig. 14 Typical On-Resistance vs. Drain Current and Gate Voltage

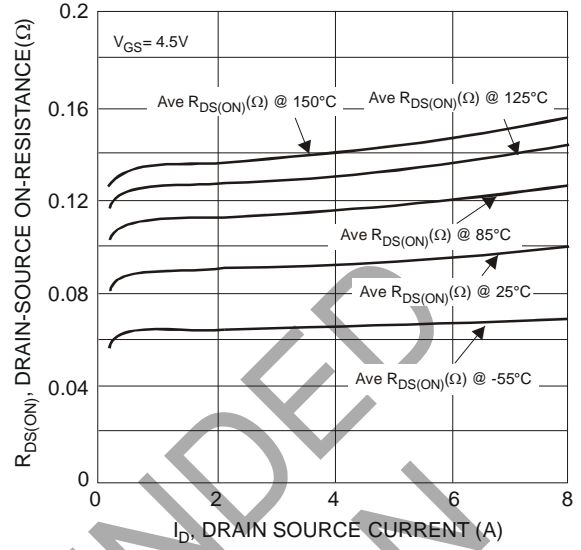


Fig. 15 Typical On-Resistance vs. Drain Current and Temperature

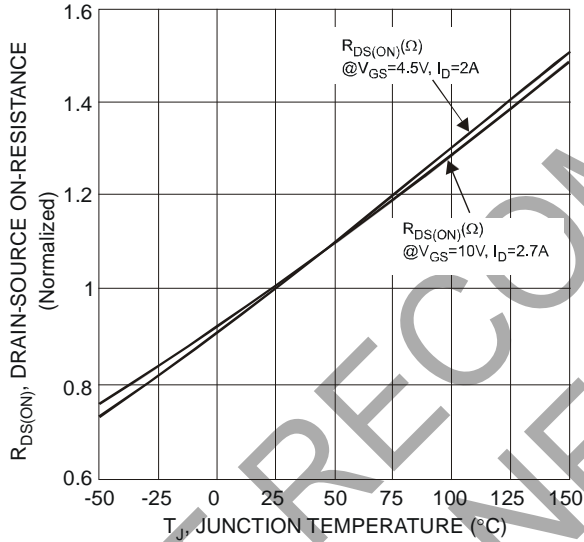


Fig. 16 On-Resistance Variation with Temperature

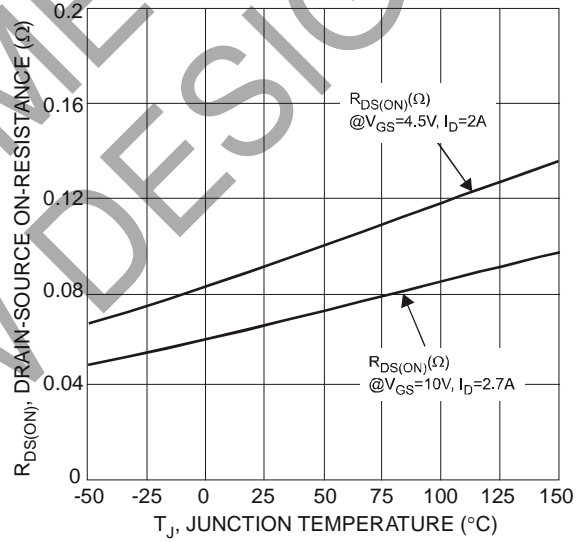


Fig. 17 On-Resistance Variation with Temperature

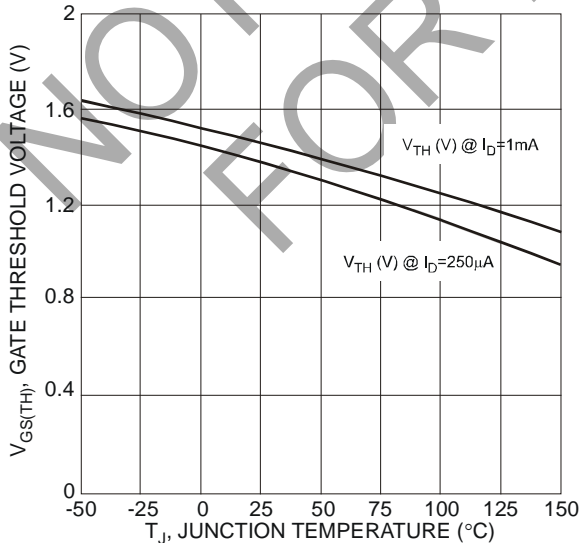


Fig. 18 Gate Threshold Variation vs. Ambient Temperature

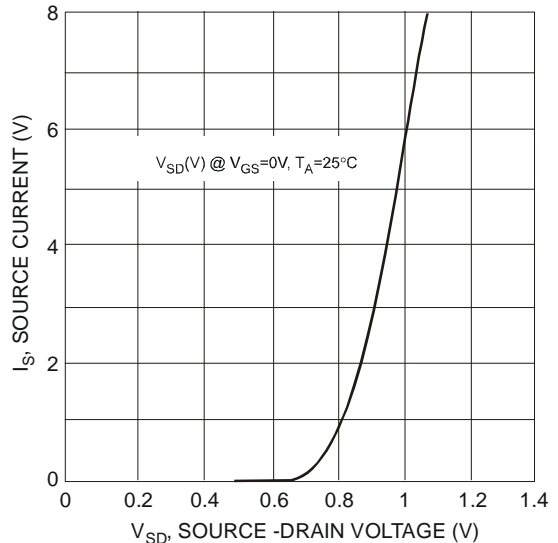
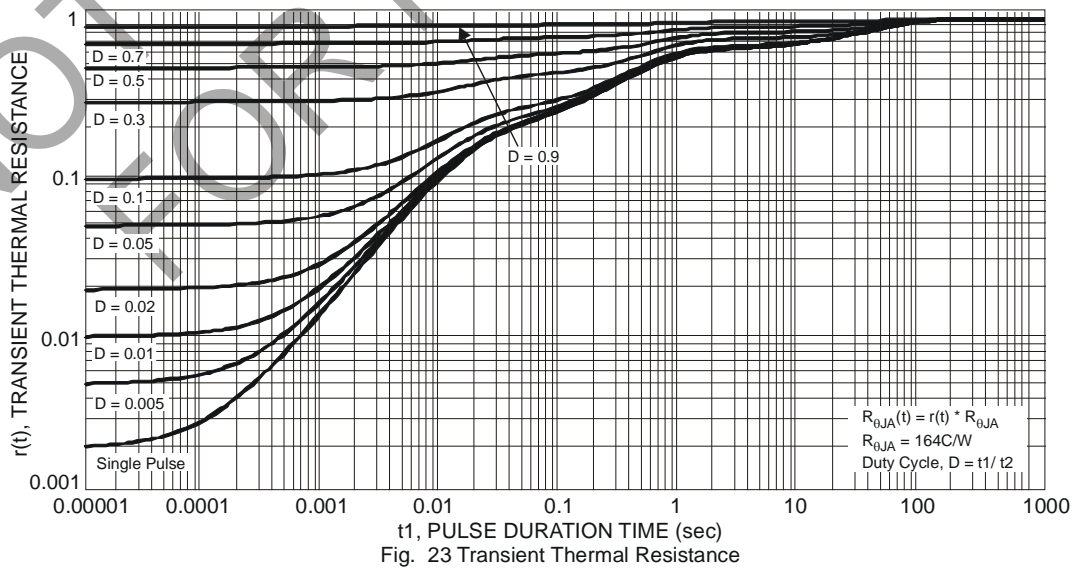
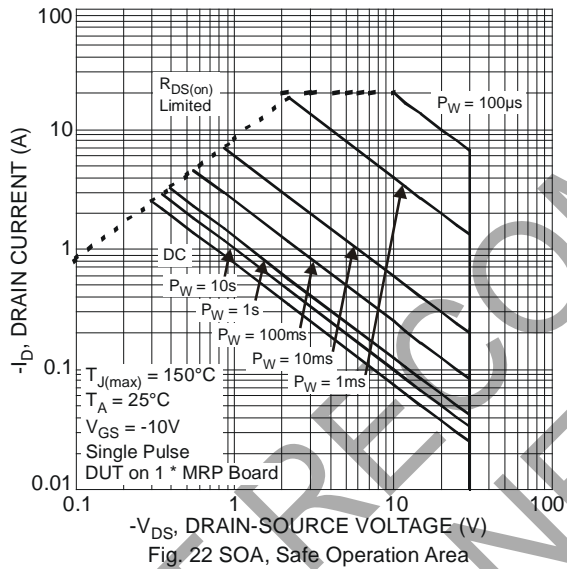
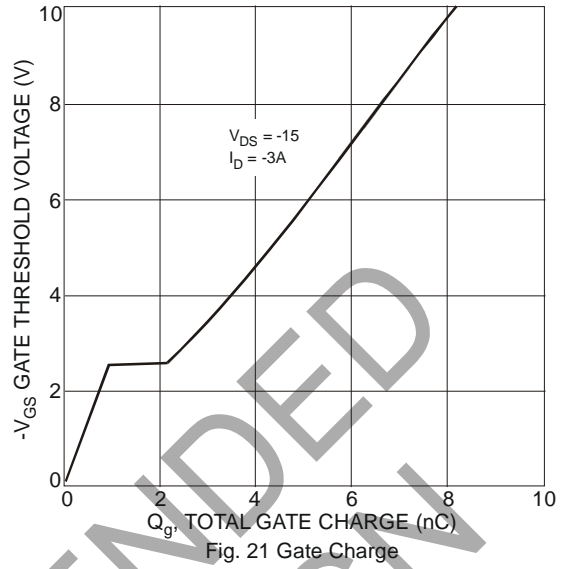
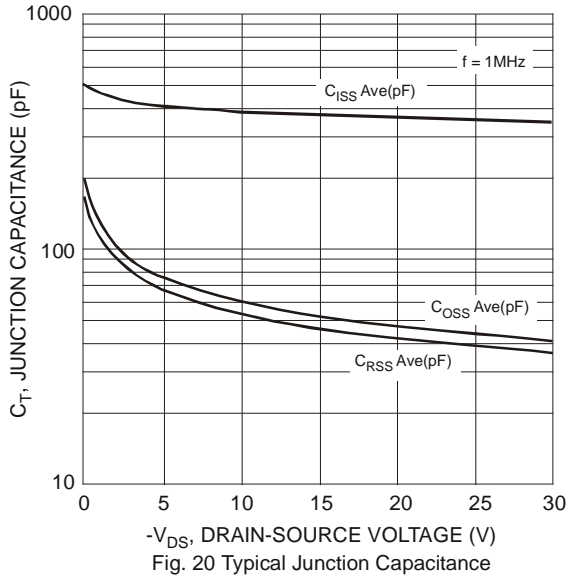
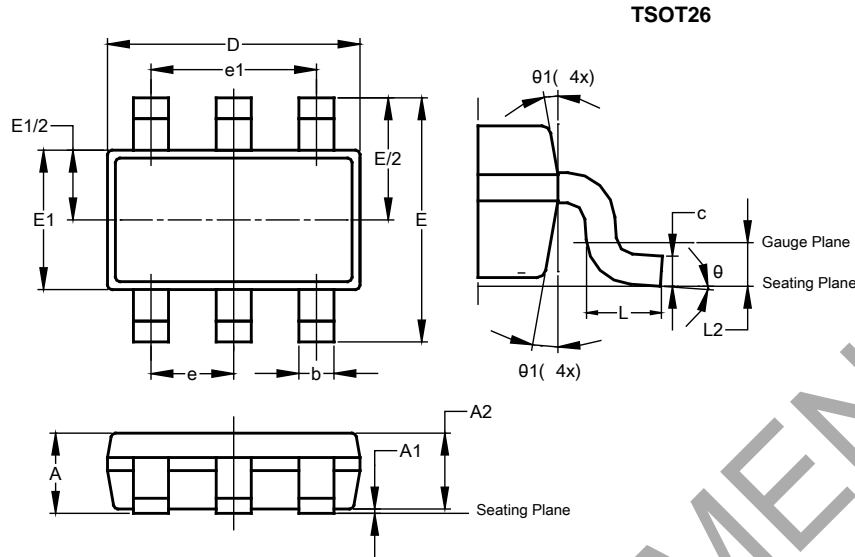


Fig. 19 Diode Forward Voltage vs. Current



Package Outline Dimensions

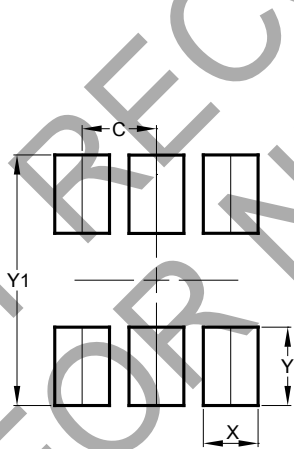
Please see <http://www.diodes.com/package-outlines.html> for the latest version.



| TSOT26 | | | |
|-----------------------------|-----------|-------|-------|
| Dim | Min | Max | Typ |
| A | – | 1.00 | – |
| A1 | 0.010 | 0.100 | – |
| A2 | 0.840 | 0.900 | – |
| D | 2.800 | 3.000 | 2.900 |
| E | 2.800 BSC | | |
| E1 | 1.500 | 1.700 | 1.600 |
| b | 0.300 | 0.450 | – |
| c | 0.120 | 0.200 | – |
| e | 0.950 BSC | | |
| e1 | 1.900 BSC | | |
| L | 0.30 | 0.50 | – |
| L2 | 0.250 BSC | | |
| θ | 0° | 8° | 4° |
| θ1 | 4° | 12° | – |
| All Dimensions in mm | | | |

Suggested Pad Layout

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



| Dimensions | Value (in mm) |
|------------|---------------|
| C | 0.950 |
| X | 0.700 |
| Y | 1.000 |
| Y1 | 3.199 |

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