

Product Summary

| Device | $V_{(BR)DSS}$ | $R_{DS(ON)}$ | I_D |
|-----------|---------------|--------------|-------|
| N-Channel | 30V | 0.135Ω | 2.3A |
| P-Channel | -30V | 0.185Ω | -2.0A |

Description

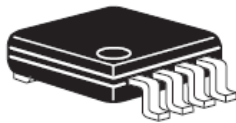
This new generation of high density MOSFETs from Diodes Incorporated utilizes a unique structure that combines the benefits of low on-resistance with fast switching speed. This makes them ideal for high efficiency, low voltage, power management applications.

Features

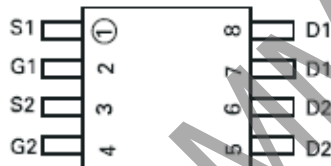
- Low On-resistance
- Fast Switching Speed
- Low Threshold
- Low Gate Drive
- Low Profile SOIC Package

Applications

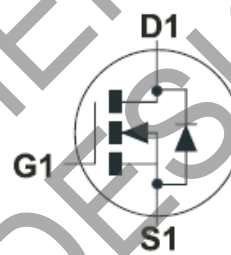
- DC - DC Converters
- Power Management Functions
- Disconnect Switches
- Motor Control



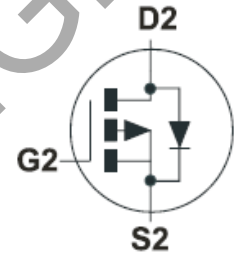
MSOP8



Pin-Out
Top View



N-channel



P-channel

Ordering Information

| Part Number | Device Marking | Reel Size (inches) | Tape Width (mm) | Quantity Per Reel |
|--------------|----------------|--------------------|-----------------|-------------------|
| ZXMD63C03XTA | ZXM63C03 | 7 | 12mm Embossed | 1000 Units |
| ZXMD63C03XTC | ZXM63C03 | 13 | 12mm Embossed | 4000 Units |

Maximum Ratings

| PARAMETER | SYMBOL | N-CHANNEL | P-CHANNEL | UNIT |
|--|---------------|-------------|-----------|---------------------|
| Drain-Source Voltage | V_{DSS} | 30 | -30 | V |
| Gate- Source Voltage | V_{GS} | ± 20 | | V |
| Continuous Drain Current ($V_{GS}=4.5V$; $T_A=25^\circ C$)(b)(d) ($V_{GS}=4.5V$; $T_A=70^\circ C$)(b)(d) | I_D | 2.3 | -2.0 | A |
| | | 1.8 | -1.6 | A |
| Pulsed Drain Current (c)(d) | I_{DM} | 14 | -9.6 | A |
| Continuous Source Current (Body Diode)(b)(d) | I_S | 1.5 | -1.4 | A |
| Pulsed Source Current (Body Diode)(c)(d) | I_{SM} | 14 | -9.6 | A |
| Power Dissipation at $T_A=25^\circ C$ (a)(d) Linear Derating Factor | P_D | 0.87 6.9 | | W mW/ $^\circ C$ |
| Power Dissipation at $T_A=25^\circ C$ (a)(e) Linear Derating Factor | P_D | 1.04 8.3 | | W mW/ $^\circ C$ |
| Power Dissipation at $T_A=25^\circ C$ (b)(d) Linear Derating Factor | P_D | 1.25 10 | | W mW/ $^\circ C$ |
| Operating and Storage Temperature Range | $T_J:T_{stg}$ | -55 to +150 | | $^\circ C$ |

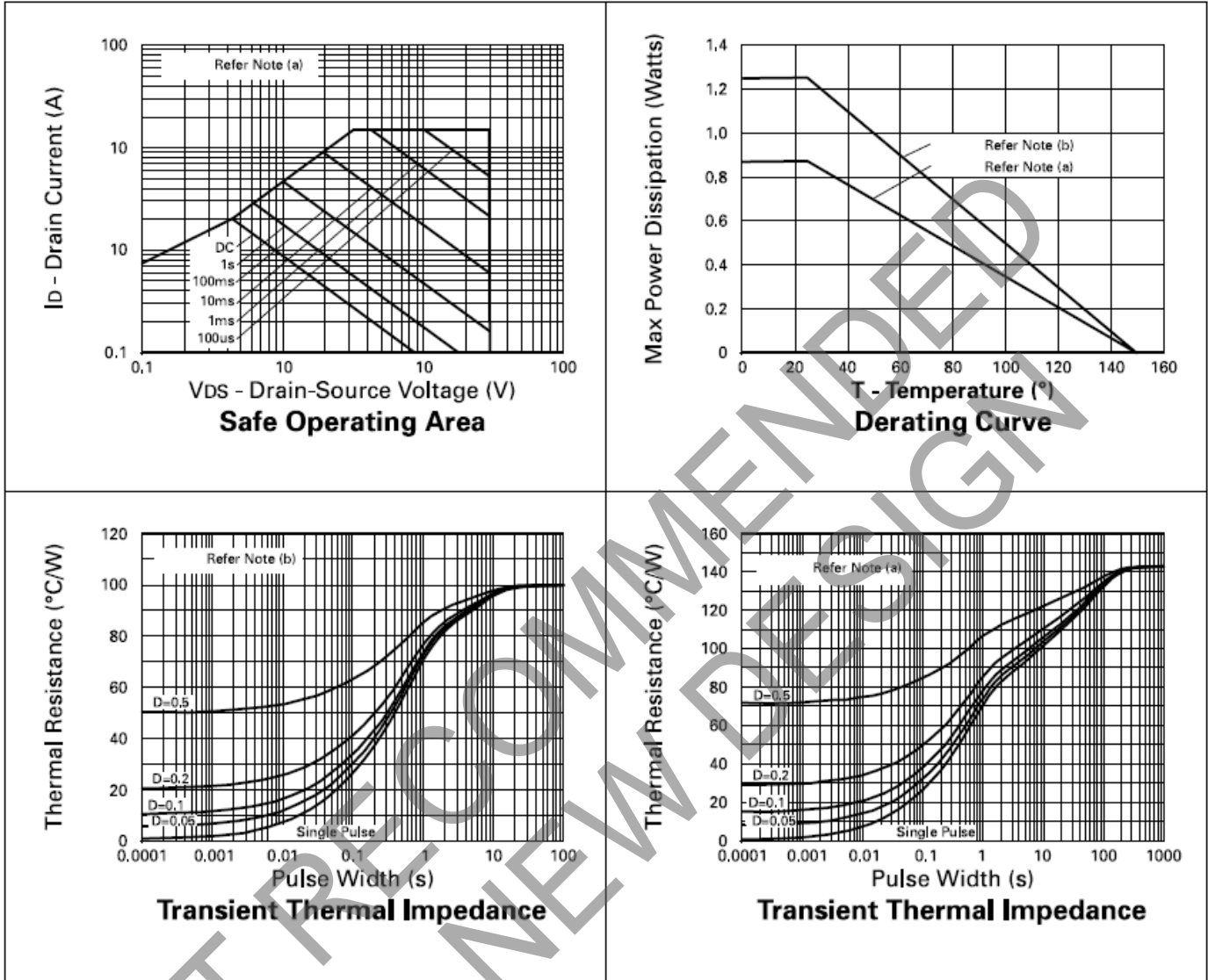
Thermal Characteristics

| PARAMETER | SYMBOL | VALUE | UNIT |
|----------------------------|-----------------|-------|--------------|
| Junction to Ambient (a)(d) | $R_{\theta JA}$ | 143 | $^\circ C/W$ |
| Junction to Ambient (b)(d) | $R_{\theta JA}$ | 100 | $^\circ C/W$ |
| Junction to Ambient (a)(e) | $R_{\theta JA}$ | 120 | $^\circ C/W$ |

NOTES:

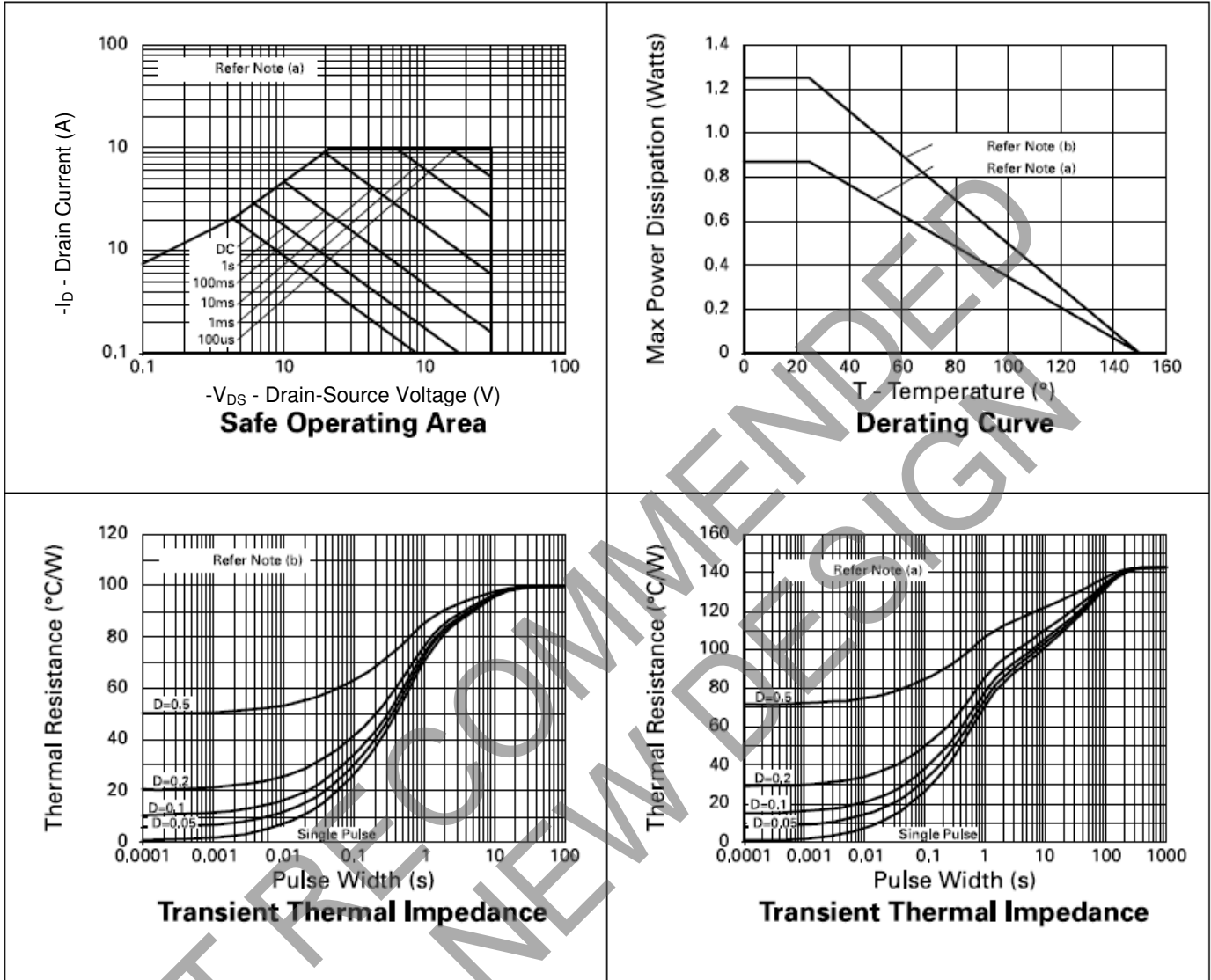
- (a) For a device surface mounted on 25mm x 25mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions
- (b) For a device surface mounted on FR4 PCB measured at $t \leq 10$ secs.
- (c) Repetitive rating - pulse width limited by maximum junction temperature. Refer to Transient Thermal Impedance graph.
- (d) For device with one active die.
- (e) For device with two active die running at equal power.

N-Channel Characteristics



NOT RECOMMENDED FOR NEW DESIGN

P-Channel Characteristics



NOT FOR NEW DESIGN

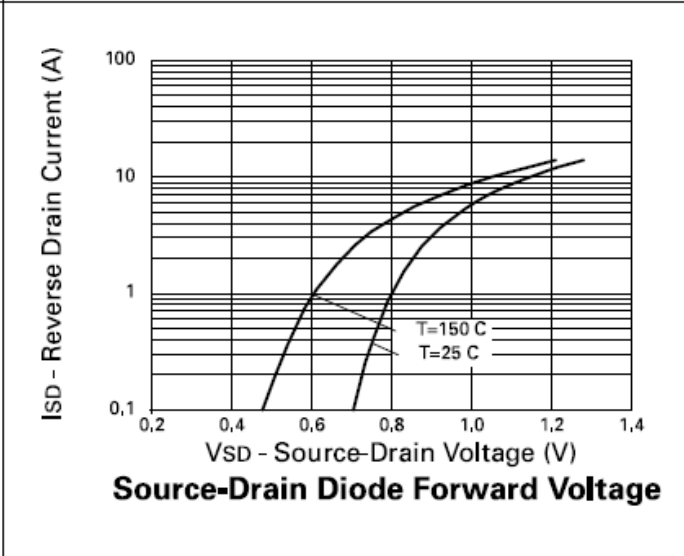
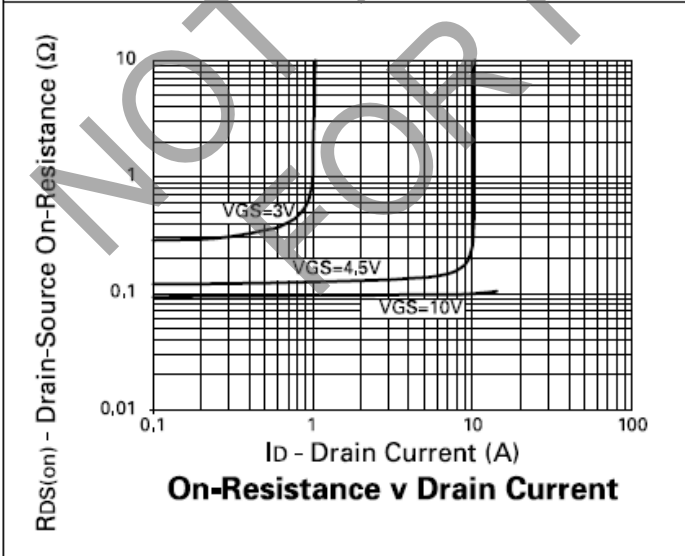
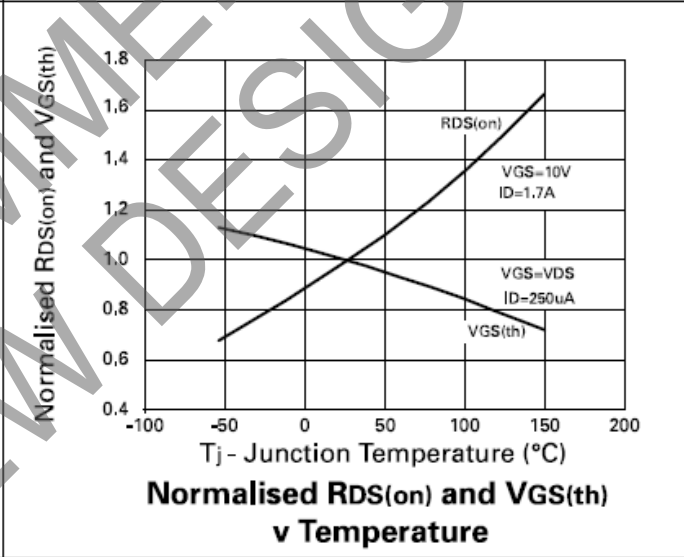
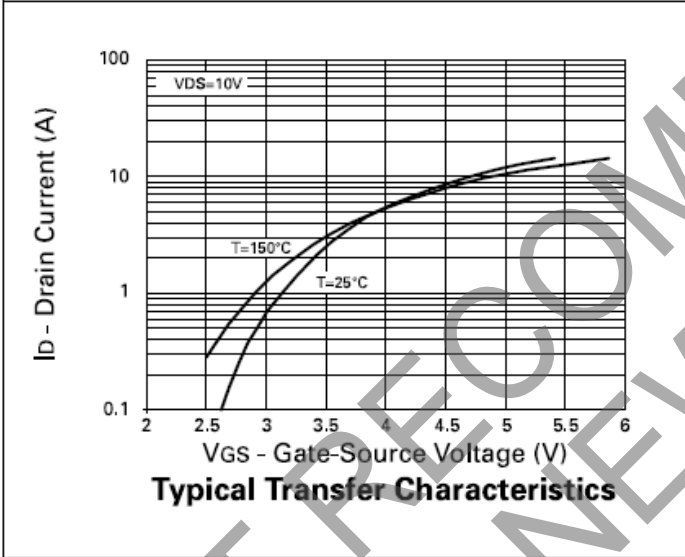
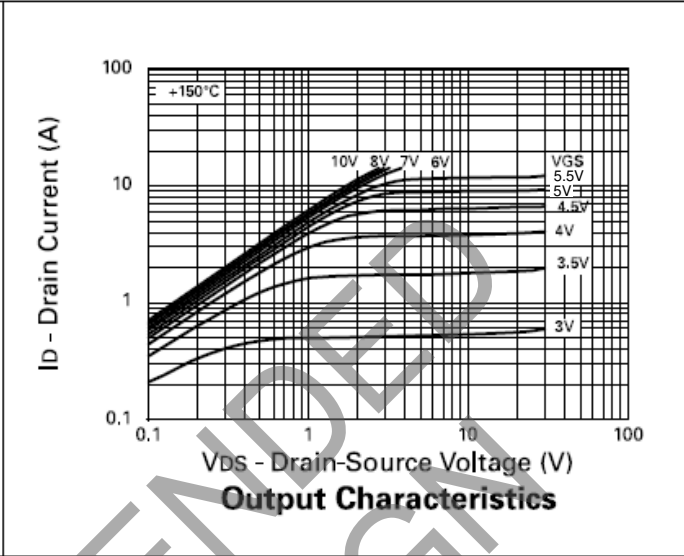
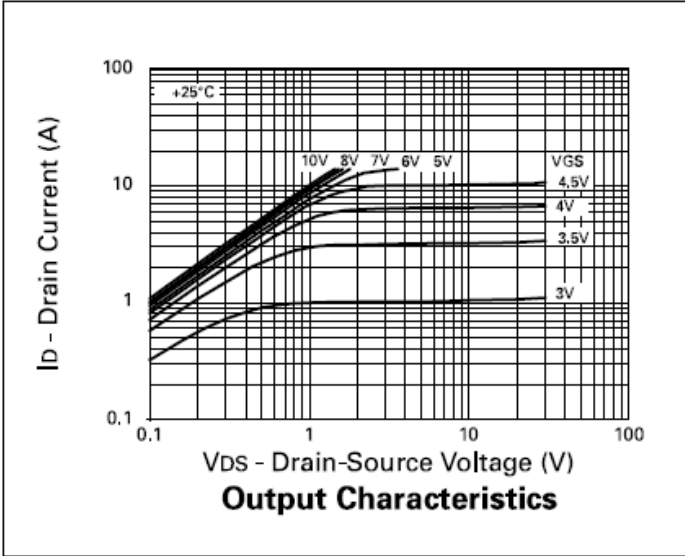
Electrical Characteristics – N-Channel (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

| PARAMETER | SYMBOL | MIN. | TYP. | MAX. | UNIT | CONDITIONS |
|---|---------------|------|------|----------------|---------------|---|
| STATIC | | | | | | |
| Drain-Source Breakdown Voltage | $V_{(BR)DSS}$ | 30 | | | V | $I_D=250\mu\text{A}, V_{GS}=0\text{V}$ |
| Zero Gate Voltage Drain Current | I_{DSS} | | | 1 | μA | $V_{DS}=30\text{V}, V_{GS}=0\text{V}$ |
| Gate-Body Leakage | I_{GSS} | | | 100 | nA | $V_{GS}=\pm 20\text{V}, V_{DS}=0\text{V}$ |
| Gate-Source Threshold Voltage | $V_{GS(th)}$ | 1.0 | | | V | $I_D=250\mu\text{A}, V_{DS}=V_{GS}$ |
| Static Drain-Source On-State Resistance (1) | $R_{DS(on)}$ | | | 0.135 0.200 | Ω | $V_{GS}=10\text{V}, I_D=1.7\text{A}$ $V_{GS}=4.5\text{V}, I_D=0.85\text{A}$ |
| Forward Transconductance (3) | g_{fs} | 1.9 | | | S | $V_{DS}=10\text{V}, I_D=0.85\text{A}$ |
| DYNAMIC (3) | | | | | | |
| Input Capacitance | C_{iss} | | 290 | | pF | $V_{DS}=25\text{V}, V_{GS}=0\text{V},$ $f=1\text{MHz}$ |
| Output Capacitance | C_{oss} | | 70 | | pF | |
| Reverse Transfer Capacitance | C_{rss} | | 20 | | pF | |
| SWITCHING(2) (3) | | | | | | |
| Turn-On Delay Time | $t_{d(on)}$ | | 2.5 | | ns | $V_{DD}=15\text{V}, I_D=1.7\text{A}$ $R_G=6.1\Omega, R_D=8.7\Omega$ (Refer to test circuit) |
| Rise Time | t_r | | 4.1 | | ns | |
| Turn-Off Delay Time | $t_{d(off)}$ | | 9.6 | | ns | |
| Fall Time | t_f | | 4.4 | | ns | |
| Total Gate Charge | Q_g | | | 8 | nC | $V_{DS}=24\text{V}, V_{GS}=10\text{V},$ $I_D=1.7\text{A}$ (Refer to test circuit) |
| Gate-Source Charge | Q_{gs} | | | 1.2 | nC | |
| Gate Drain Charge | Q_{gd} | | | 2 | nC | |
| SOURCE-DRAIN DIODE | | | | | | |
| Diode Forward Voltage (1) | V_{SD} | | | 0.95 | V | $T_J=25^\circ\text{C}, I_S=1.7\text{A},$ $V_{GS}=0\text{V}$ |
| Reverse Recovery Time (3) | t_{rr} | | 16.9 | | ns | $T_J=25^\circ\text{C}, I_F=1.7\text{A},$ $di/dt= 100\text{A}/\mu\text{s}$ |
| Reverse Recovery Charge(3) | Q_{rr} | | 9.5 | | nC | |

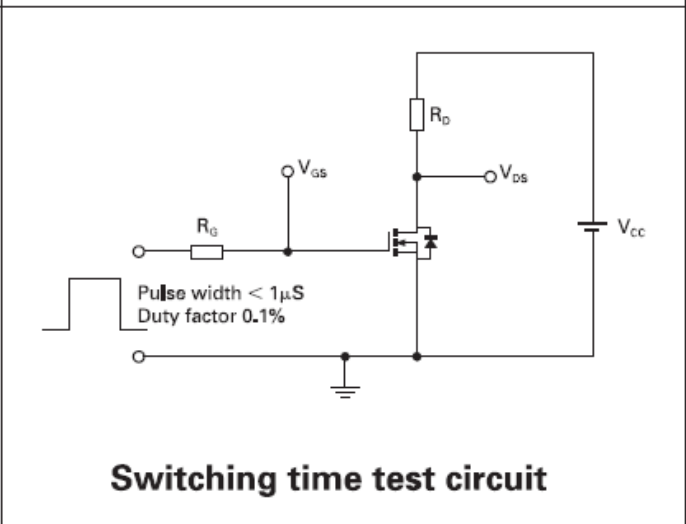
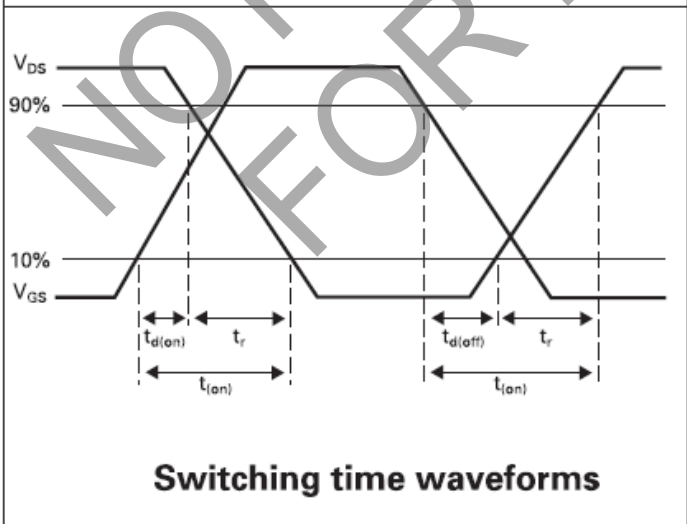
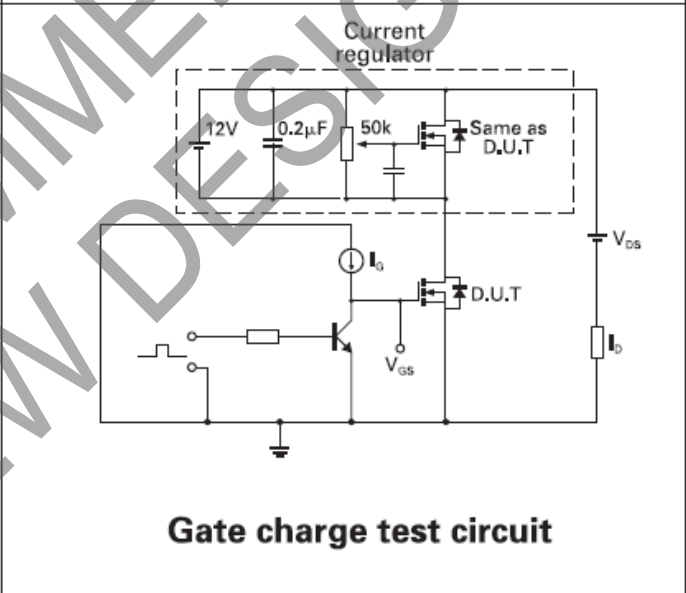
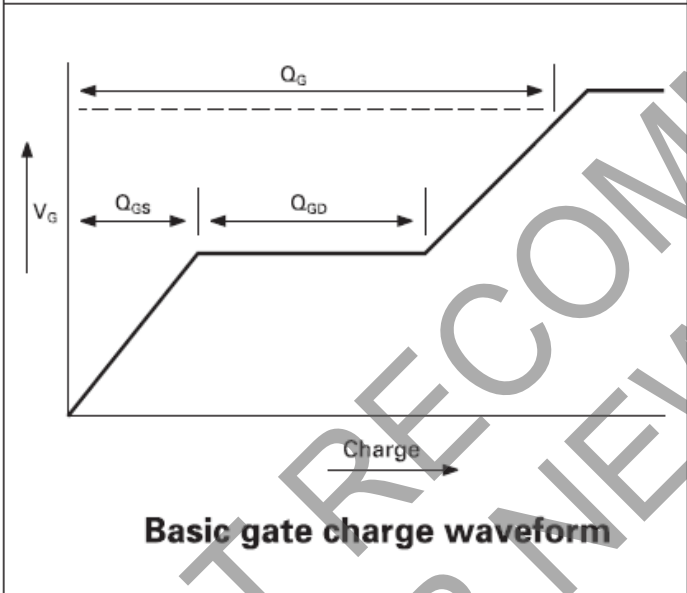
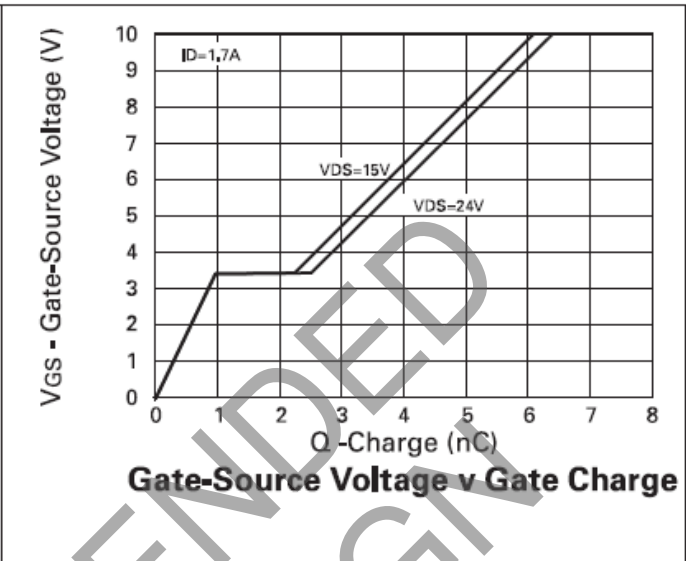
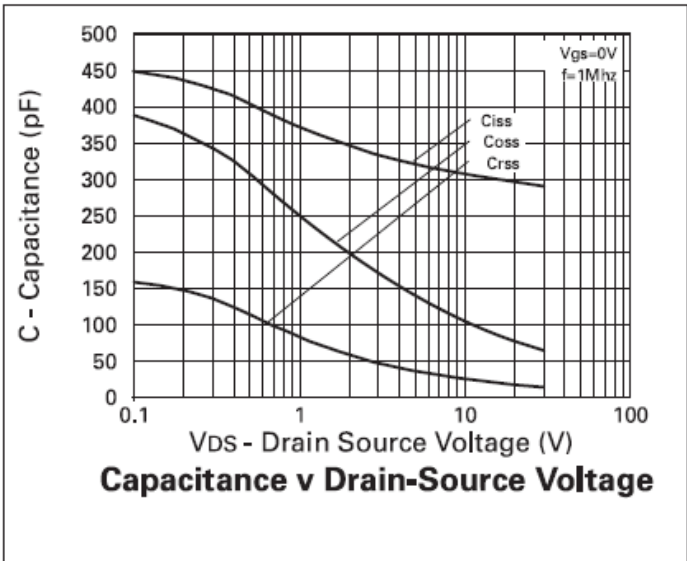
NOTES:

- (1) Measured under pulsed conditions. Width=300 μs . Duty cycle $\leq 2\%$.
- (2) Switching characteristics are independent of operating junction temperature.
- (3) For design aid only, not subject to production testing.

N-Channel Typical Characteristics



N-Channel Characteristics



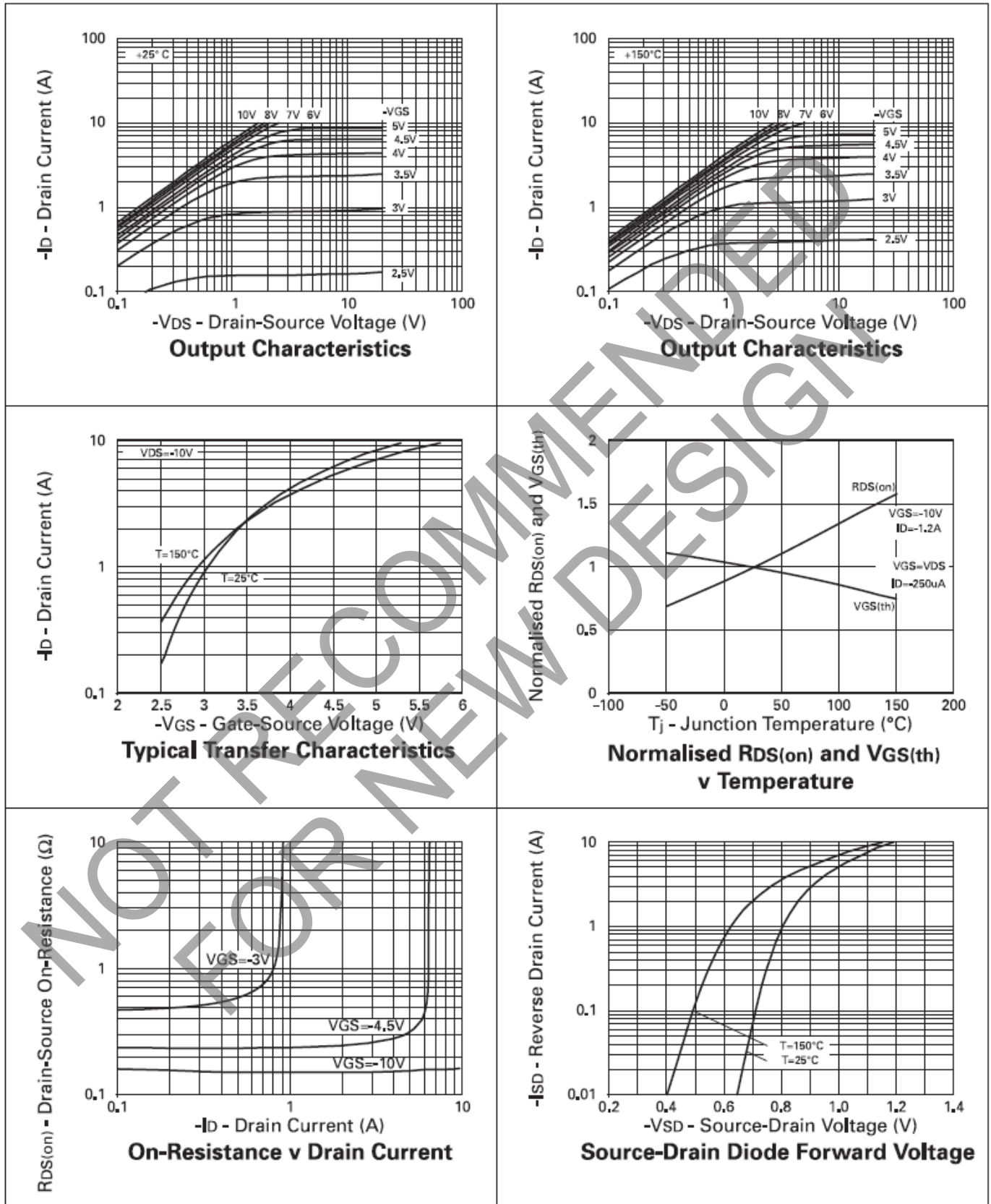
Electrical Characteristics – P-Channel (@T_A = +25°C, unless otherwise specified.)

| PARAMETER | SYMBOL | MIN. | TYP. | MAX. | UNIT | CONDITIONS |
|---|----------------------|------|------|---------------|--------|---|
| STATIC | | | | | | |
| Drain-Source Breakdown Voltage | V _{(BR)DSS} | -30 | | | V | I _D =-250μA, V _{GS} =0V |
| Zero Gate Voltage Drain Current | I _{DSS} | | | -1 | μA | V _{DS} =-30V, V _{GS} =0V |
| Gate-Body Leakage | I _{GSS} | | | ±100 | nA | V _{GS} =±20V, V _{DS} =0V |
| Gate-Source Threshold Voltage | V _{GS(th)} | -1.0 | | | V | I _D =-250μA, V _{DS} =V _{GS} |
| Static Drain-Source On-State Resistance (1) | R _{DS(on)} | | | 0.185 0.27 | Ω Ω | V _{GS} =-10V, I _D =1.2A V _{GS} =-4.5V, I _D =0.6A |
| Forward Transconductance (3) | g _{fs} | 0.92 | | | S | V _{DS} =-10V, I _D =-0.6A |
| DYNAMIC (3) | | | | | | |
| Input Capacitance | C _{iss} | | 270 | | pF | V _{DS} =-25V, V _{GS} =0V, f=1MHz |
| Output Capacitance | C _{oss} | | 80 | | pF | |
| Reverse Transfer Capacitance | C _{rss} | | 30 | | pF | |
| SWITCHING(2) (3) | | | | | | |
| Turn-On Delay Time | t _{d(on)} | | 2.6 | | ns | V _{DD} =-15V, I _D =-1.2A R _G =6.2Ω, R _D =6.2Ω (Refer to test circuit) |
| Rise Time | t _r | | 4.8 | | ns | |
| Turn-Off Delay Time | t _{d(off)} | | 13.1 | | ns | |
| Fall Time | t _f | | 9.3 | | ns | |
| Total Gate Charge | Q _g | | | 7 | nC | V _{DS} =-24V, V _{GS} =-10V, I _D =-1.2A (Refer to test circuit) |
| Gate-Source Charge | Q _{gs} | | | 1.2 | nC | |
| Gate Drain Charge | Q _{gd} | | | 2 | nC | |
| SOURCE-DRAIN DIODE | | | | | | |
| Diode Forward Voltage (1) | V _{SD} | | | -0.95 | V | T _J =25°C, I _S =-1.2A, V _{GS} =0V |
| Reverse Recovery Time (3) | t _{rr} | | 21.4 | | ns | T _J =25°C, I _F =-1.2A, di/dt= 100A/μs |
| Reverse Recovery Charge(3) | Q _{rr} | | 15.7 | | nC | |

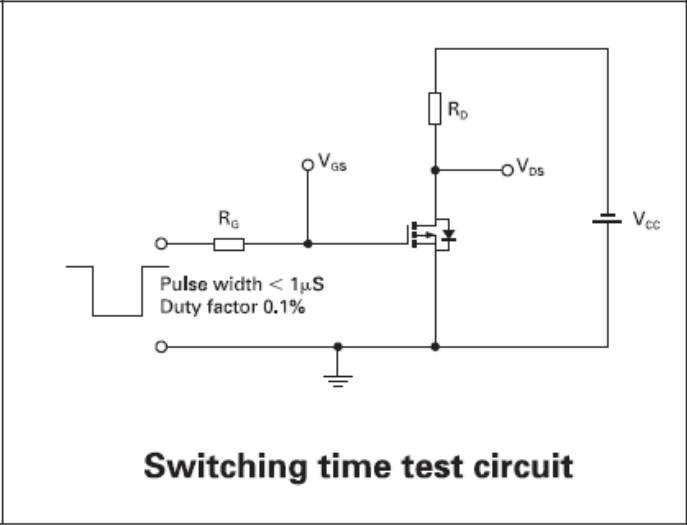
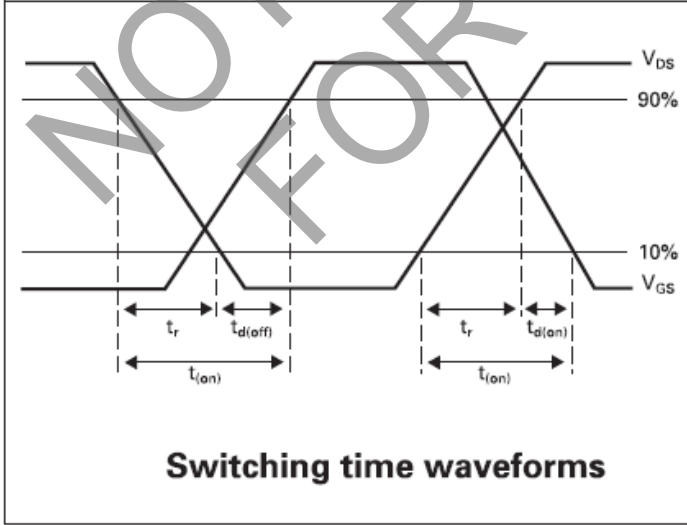
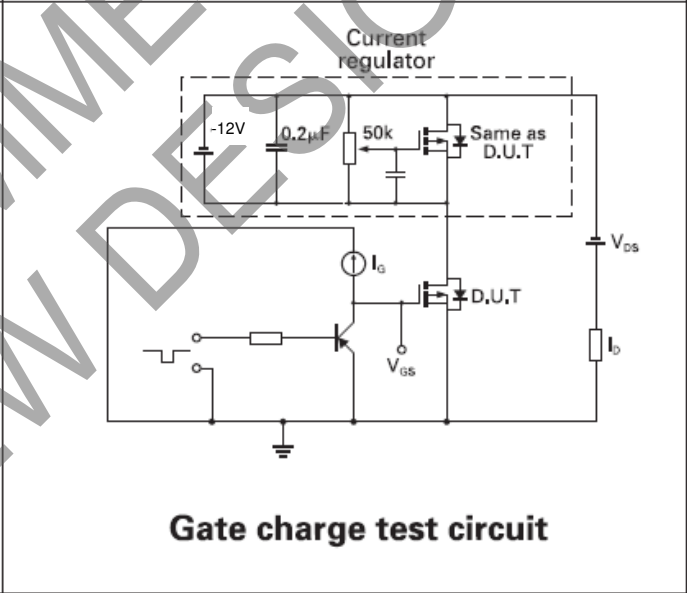
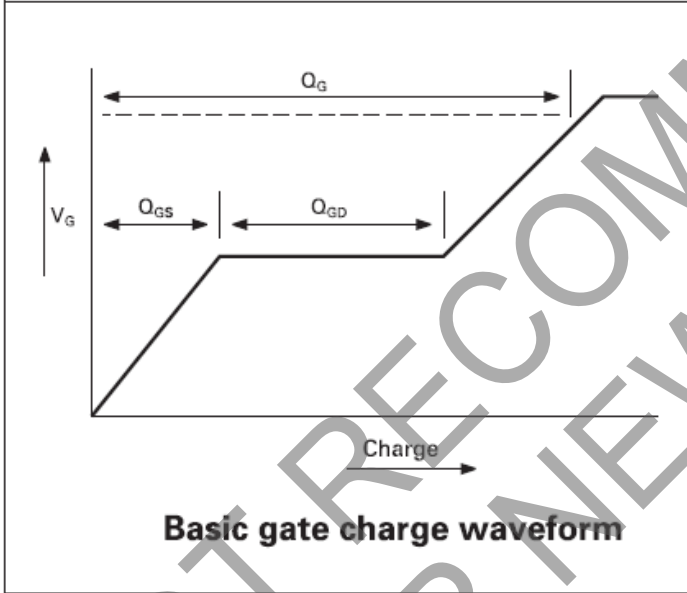
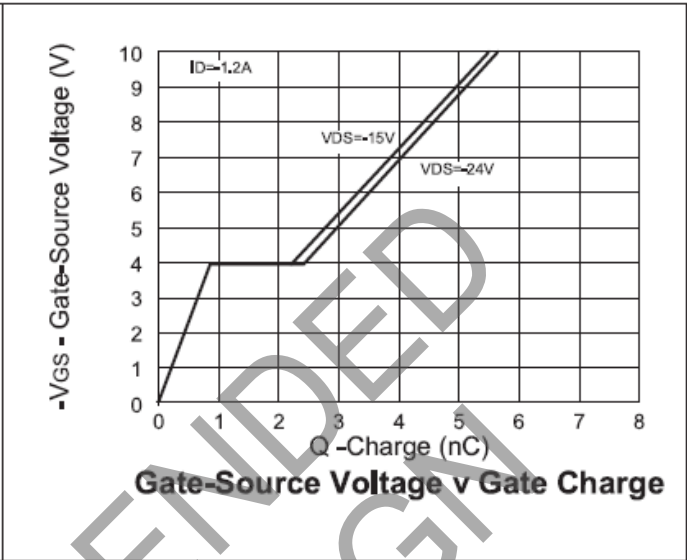
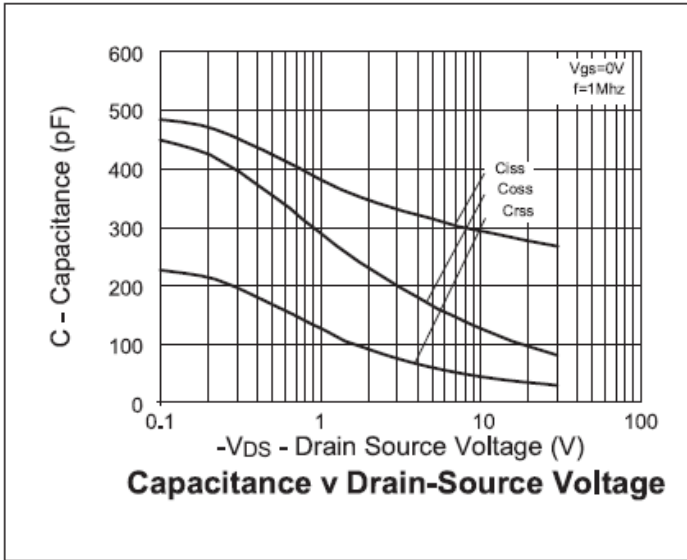
NOTES:

- (1) Measured under pulsed conditions. Width=300μs. Duty cycle ≤2% .
- (2) Switching characteristics are independent of operating junction temperature.
- (3) For design aid only, not subject to production testing.

P-Channel Characteristics



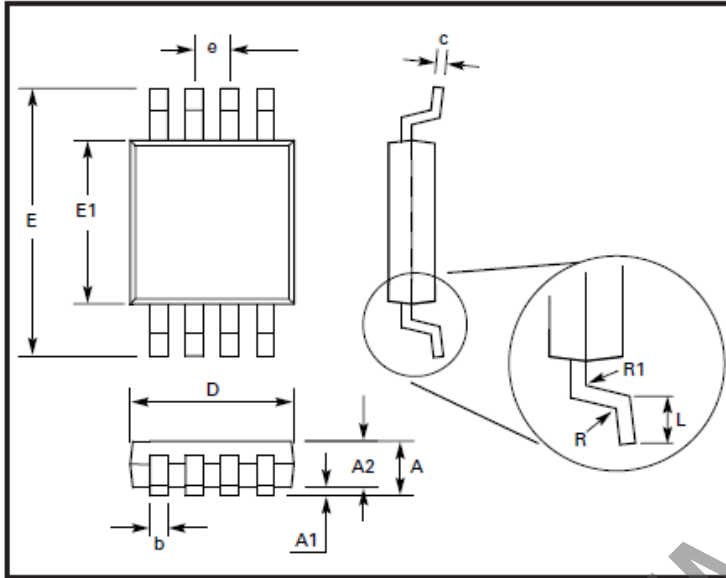
P-Channel Typical Characteristics



Package Outline Dimensions

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

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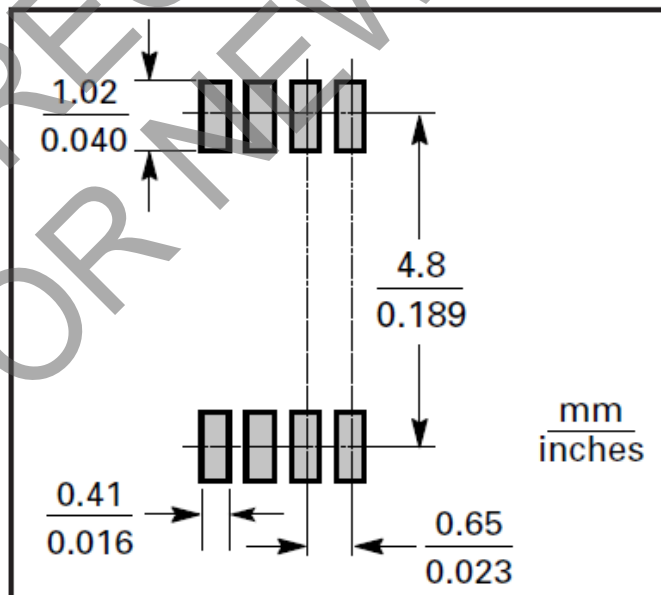


| DIM | Millimeters | | Inches | |
|-----|-------------|------|-----------|--------|
| | Min. | Max. | Min. | Max. |
| A | - | 1.10 | - | 0.0433 |
| A1 | 0.05 | 0.15 | 0.002 | 0.006 |
| A2 | 0.75 | 0.95 | 0.0295 | 0.0374 |
| b | 0.25 | 0.40 | 0.010 | 0.0157 |
| c | 0.13 | 0.23 | 0.005 | 0.009 |
| D | 2.90 | 3.10 | 0.114 | 0.122 |
| E | 4.90 BSC | | 0.193 BSC | |
| E1 | 2.90 | 3.10 | 0.114 | 0.122 |
| e | 0.65 BSC | | 0.025 BSC | |
| L | 0.40 | 0.70 | 0.0157 | 0.0192 |
| R | 0.07 | - | 0.0027 | - |
| R1 | 0.07 | - | 0.0027 | - |

Suggested Pad Layout

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

MSOP8



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