**P & N-Channel 100-V(D-S) MOSFET**

## ◆ DESCRIPTION

These miniature surface mount MOSFETs utilize High Cell Density process. Low $R_{DS(on)}$ assures minimal power loss and conserves energy, making this device ideal for use in power management circuitry.

Typical applications are PWM DC-DC converters, power management in portable and battery-powered products such as computers, printers, battery charger, telecommunication power system, and telephones power system.

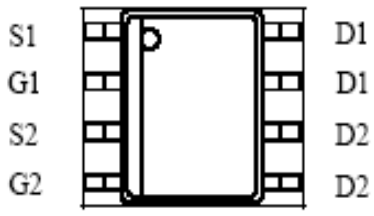
## ◆ FEATURES

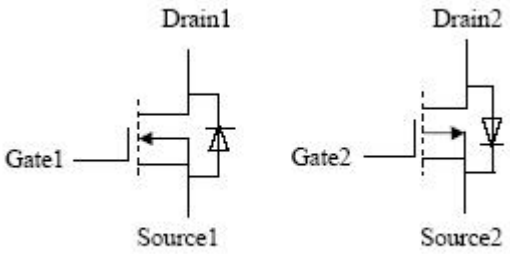
- 100V/9.8A, $R_{DS(ON)}$ = 155mΩ @ $V_{GS}$ = 10V
- -100V/-9A, $R_{DS(ON)}$ = 160mΩ @ $V_{GS}$ = -10V
- 100V/9.8A, $R_{DS(ON)}$ = 175mΩ @ $V_{GS}$ = 4.5V
- -100V/-9A, $R_{DS(ON)}$ = 185mΩ @ $V_{GS}$ = -4.5V
- Fast switching speed
- SOP-8 package design

## ◆ APPLICATIONS

- Power Management in Note
- Portable Equipment
- Battery Powered System
- Load Switch
- LCD Display inverter

## ◆ PIN CONFIGURATION



## ◆ ABSOLUTE MAXIMUM RATINGS

($T_A$=25°C Unless Otherwise Noted)

| Parameter | | Symbol | N-Channel | P-Channel | Unit |
|---|---|---|---|---|---|
| Drain-Source Voltage | | $V_{DS}$ | 100 | -100 | V |
| Gate-Source Voltage | | $V_{GS}$ | 20 | 20 | V |
| Continuous Drain Current[a] | $T_A$=25°C | $I_D$ | 9.8 | -9 | A |
| | $T_A$=70°C | | 7 | -6 | |
| Pulsed Drain Current[b] | | $I_{DM}$ | 37 | -37 | A |
| Power Dissipation[a] | $T_A$=25°C | $P_D$ | 2.5 | | W |
| | $T_A$=70°C | | 1.6 | | |
| Operating Junction and Storage Temperature Range | | $T_J$,$T_{STG}$ | -55 to 150 | | °C |
| LeadTemperature(1/16” from case for 10sec) | | $T_L$ | 275 | | °C |

## ◆ THERMAL RESISTANCE RATINGS

| Thermal Resistance | Symbol | Maximum | Unit |
|---|---|---|---|
| Junction-to-Ambient | $R_{\theta JA}$ | 50 | °C/W |
| Junction-to-Case | $R_{\theta JC}$ | 30 | °C/W |

Note :

a. Pulse width limited by maximum junction temperature.

b. Duty cycle ≤1%

## ◆ ORDERING INFORMATION

| Device | Package | Shipping |
|---|---|---|
| MT4600 | SOP-8 | 2,500 Units/ Tape & Reel |

## ◆ ELECTRICAL CHARACTERISTICS

ELECTRICAL CHARACTERISTICS (TC = 25 °C, Unless Otherwise Noted)

| Static Parameters | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Parameter** | **Symbol** | **Test Conditions** | **Limits** | | | | **Unit** |
| | | | **Ch** | **Min** | **Typ** | **Max** | |
| Drain-Source Breakdown voltage | $V_{(BR)DSS}$ | $V_{GS}$=0V,$I_D$=250uA | N | 100 | - | - | V |
| | | $V_{GS}$=0V,$I_D$=250uA | P | -100 | - | - | |
| Gate threshold Voltage | $V_{GS(th)}$ | $V_{DS}$=$V_{GS}$,$I_D$=250uA | N | 2 | 3 | 4 | |
| | | $V_{DS}$=$V_{GS}$,$I_D$=250uA | P | -2 | -3 | -4 | |
| Gate-Body Leakage | $I_{GSS}$ | $V_{DS}$=0V,$V_{GS}$=±20V | N | - | - | ±250 | nA |
| | | $V_{DS}$=0V,$V_{GS}$=±20V | P | - | - | ±250 | |
| Zero Gate Voltage Drain current | $I_{DSS}$ | $V_{DS}$=80V,$V_{GS}$=0V | N | - | - | 1 | uA |
| | | $V_{DS}$=-80V,$V_{GS}$=0V | P | - | - | -1 | |
| On-State Drain Current[1] | $I_{D(ON)}$ | $V_{DS}$=5V,$V_{GS}$=10V | N | 20 | - | - | A |
| | | $V_{DS}$=-5V,$V_{GS}$=-10V | P | -20 | - | - | |
| Drain-Source On-State Resistance[1] | $R_{DS(on)}$ | $V_{GS}$=10V,$I_D$=5.5A | N | - | 125 | 155 | mΩ |
| | | $V_{GS}$=-10V,$I_D$=-5.5A | P | - | 130 | 160 | |
| | | $V_{GS}$=4.5V,$I_D$=4A | N | - | 140 | 175 | |
| | | $V_{GS}$=-4.5V,$I_D$=-4A | P | - | 145 | 185 | |
| Forward Transconductance[1] | $g_{fs}$ | $V_{DS}$=50V,$I_D$=5.5A | N | - | 2 | - | S |
| | | $V_{DS}$=-50V,$I_D$=-5.5A | P | - | 1.6 | - | |
| **Dynamic Parameters** | | | | | | | |
| **Parameter** | **Symbol** | **Test Conditions** | **Limits** | | | | **Unit** |
| | | | **Ch** | **Min** | **Typ** | **Max** | |
| Input Capacitance | $C_{ISS}$ | N-Channel $V_{GS}$=0V, $V_{DS}$ =25V, f=1MHz P-Channel $V_{GS}$=0V, $V_{DS}$=-25V, f=1MHz | N | - | 560 | - | pF |
| | | | P | - | 1200 | - | |
| Output Capacitance | $C_{OSS}$ | | N | - | 81 | - | |
| | | | P | - | 100 | - | |
| Reverse Transfer Capacitance | $C_{RSS}$ | | N | - | 10 | - | |
| | | | P | - | 65 | - | |
| Gate Resistance | Rg | $V_{GS}$=0V, $V_{DS}$=0V, f=1MHz | N | - | 1.7 | 3 | Ω |
| | | | P | - | 3 | 5 | |
| Total Gate Charge[2] | $Q_g$ | N-Channel $V_{DS}$=0.5$V_{(BR)DSS}$,,$V_{GS}$=10V, $I_D$=9.6A , P-Channel $V_{DS}$=-0.5$V_{(BR)DSS}$,$V_{GS}$=-10V, $I_D$=-5.5A , | N | - | 22 | - | nC |
| | | | P | - | 43 | - | |
| Gate-Source Charge[2] | $Q_{gs}$ | | N | - | 5.2 | - | |
| | | | P | - | 8 | - | |
| Gate-Drain Charge[2] | $Q_{gd}$ | | N | - | 7 | - | |
| | | | P | - | 16 | - | |
| Turn-On Delay Time[2] | $t_{d(on)}$ | N-Channel $V_{DS}$ = 10V, $I_D$ ≅ 1A, $V_{GS}$ = 10V, $R_{GEN}$ = 6Ω P-Channel $V_{DS}$ = -10V, $I_D$ ≅ -1A, $V_{GS}$ = -10V, $R_{GEN}$ = 6Ω | N | - | 2.2 | 4.4 | nS |
| | | | P | - | 6.7 | 13.4 | |
| Rise Time[2] | $t_r$ | | N | - | 7.5 | 15 | |
| | | | P | - | 9.7 | 19.4 | |
| Turn-Off Delay Time[2] | $t_{d(off)}$ | | N | - | 11.8 | 21.3 | |
| | | | P | - | 19.8 | 35.6 | |
| Fall-Time[2] | $t_f$ | | N | - | 3.7 | 7.4 | |
| | | | P | - | 12.3 | 22.2 | |

## ◆ ELECTRICAL CHARACTERISTICS

ELECTRICAL CHARACTERISTICS (TC = 25 °C, Unless Otherwise Noted)

| Parameter | Symbol | Test Conditions | Limits | | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | Ch | Min | Typ | Max | |
| Source-Drain Diode Ratings and Characteristis($T_C$=25°C) | | | | | | | |
| Continuous Current | $I_S$ | | N | - | - | 9.6 | A |
| | | | P | - | - | -9.6 | |
| Pulsed Current[3] | $I_{SM}$ | | N | - | - | 37 | |
| | | | P | - | - | -37 | |
| Forward Voltage[1] | $V_{SD}$ | $I_F$=$I_S$,$V_{GS}$=0V | N | - | - | 1.4 | V |
| | | $I_F$=$I_S$,$V_{GS}$=0V | P | - | - | -1.4 | |

Note :

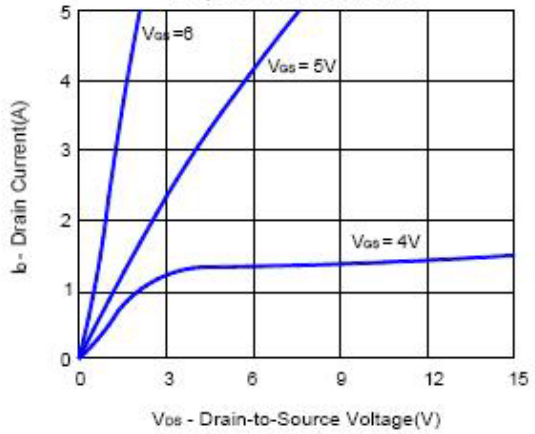
A . Pulse test: PW<=300usec, duty cycle <=2%

B. Independent of operating temperature.

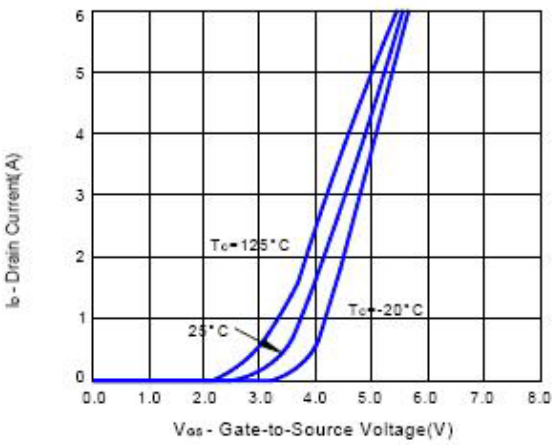
C. Pulse width Limited by maximum junction temperature

## ◆ TYPICAL CHARACTERICTICS (N-Channel)

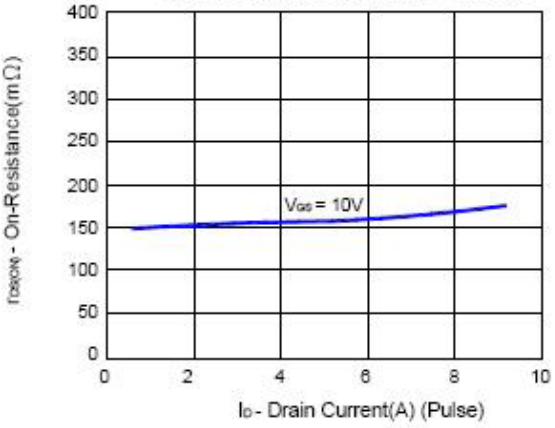
Output Characteristics



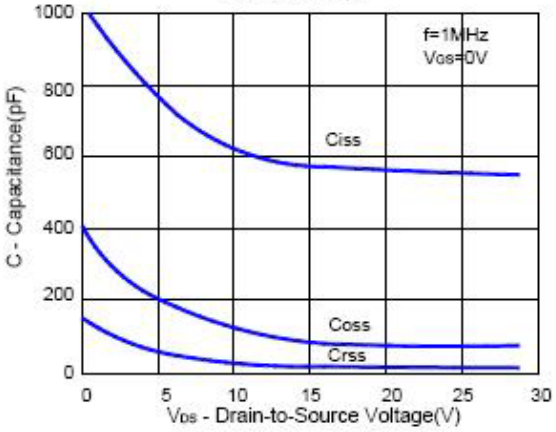

Transfer Characteristics



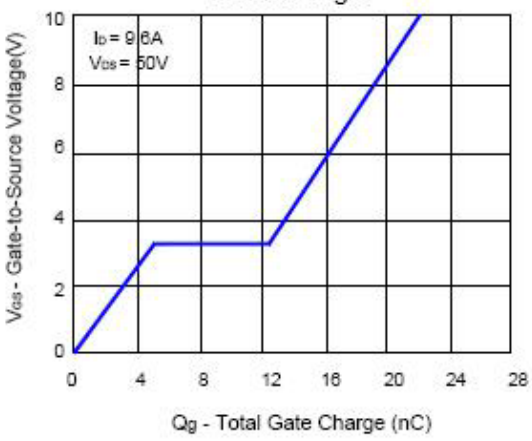

On-Resistance vs.Drain Current



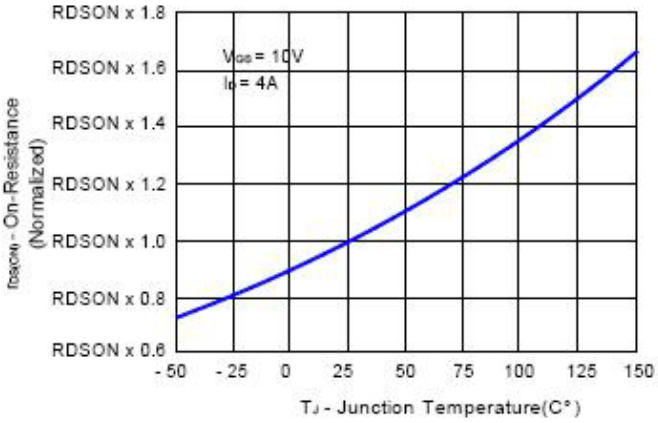

Capacitance



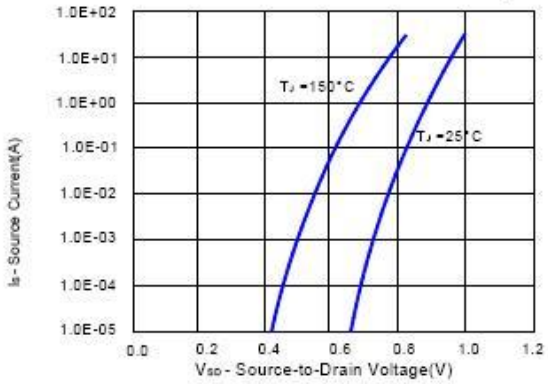

Gate Charge



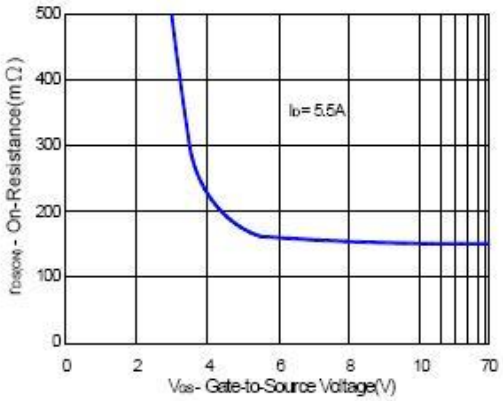

On-Resistance vs. Junction Temperature



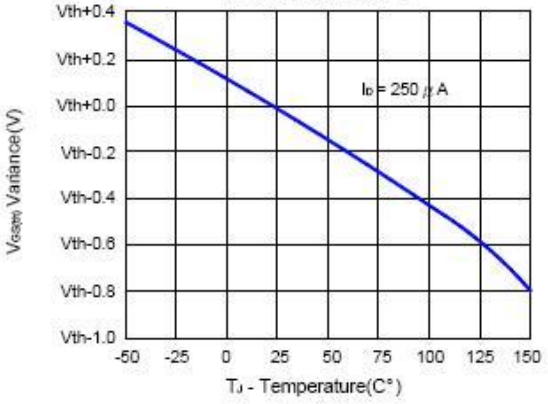
Source - Drain Diode Forward Voltage



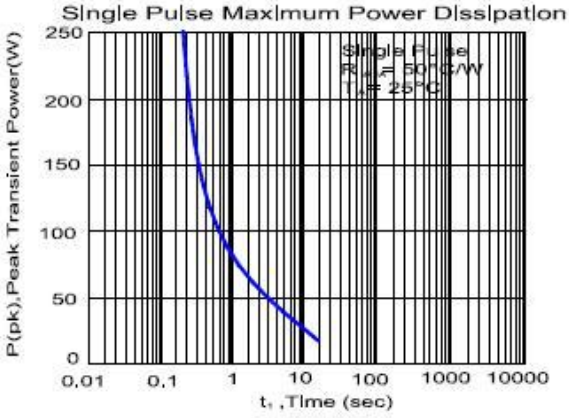

On-Resistance VS.Gate-to-Source Voltage



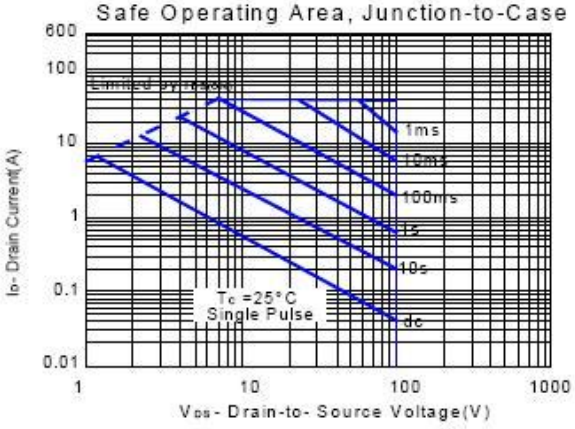

Threshold Voltage



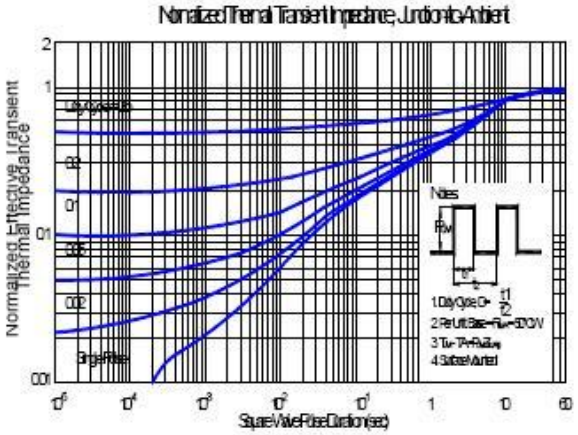

Single Pulse Maximum Power Dissipation



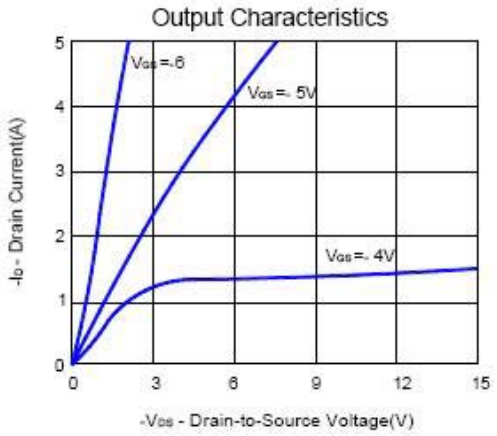

Safe Operating Area, Junction-to-Case

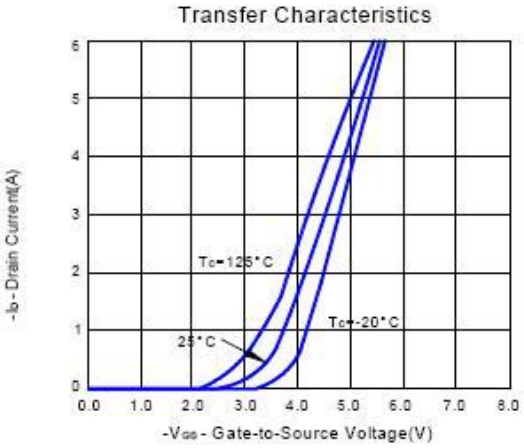


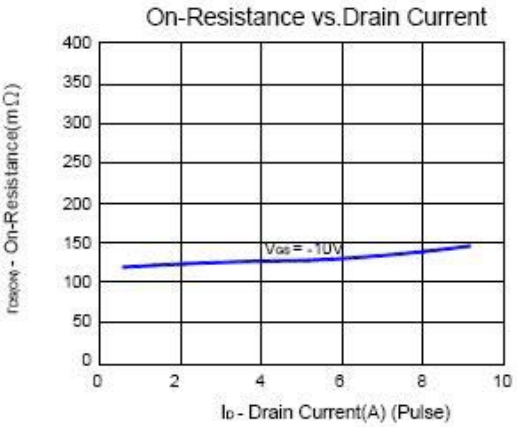

Normalized Effective Transient Thermal Impedance, Junction-to-Ambient

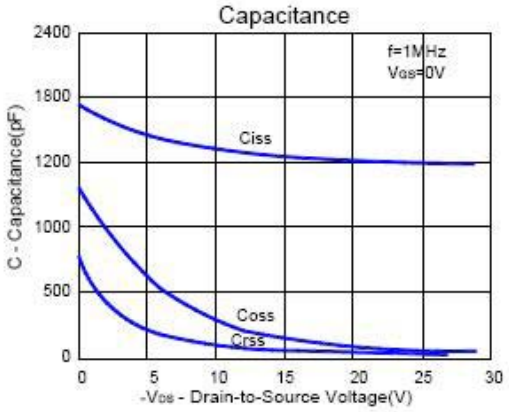


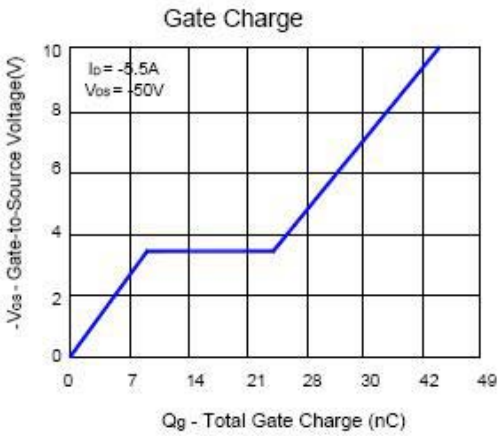
## ◆ TYPICAL CHARACTERICTICS (P-Channel)

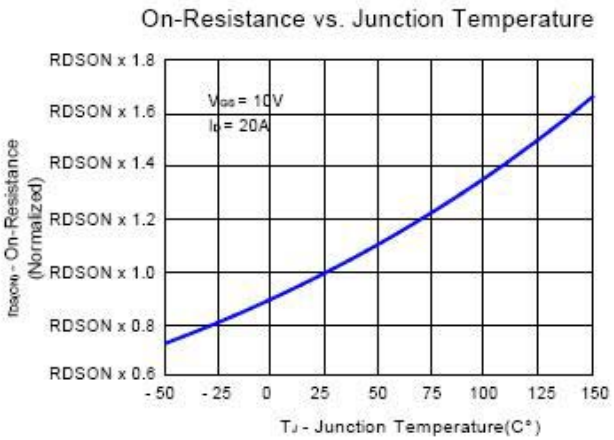


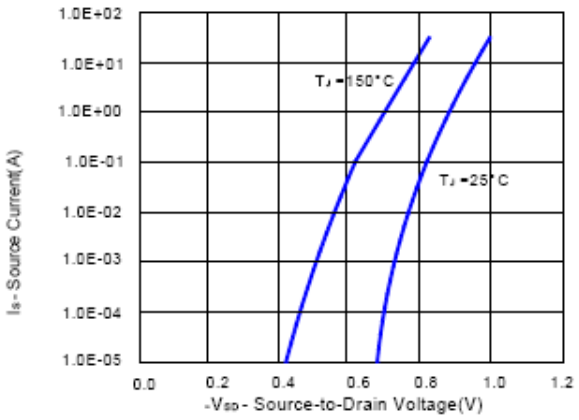



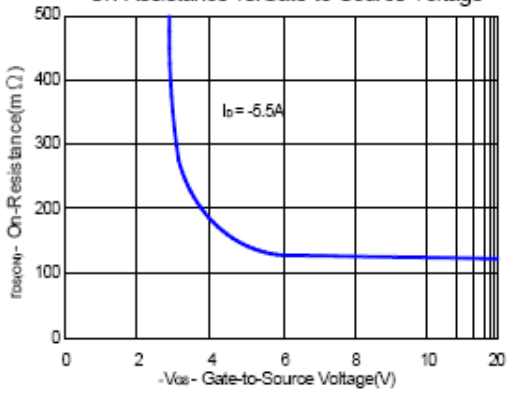



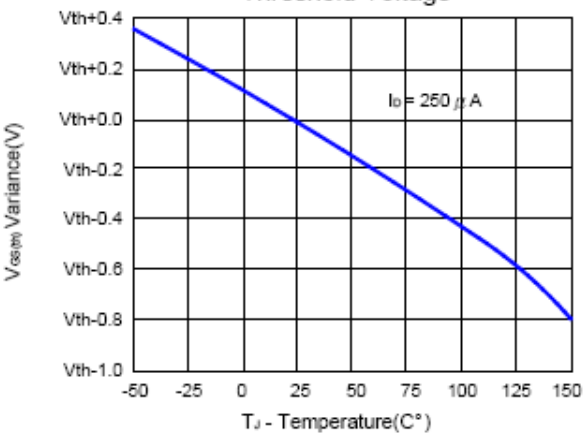
Source - Drain Diode Forward Voltage



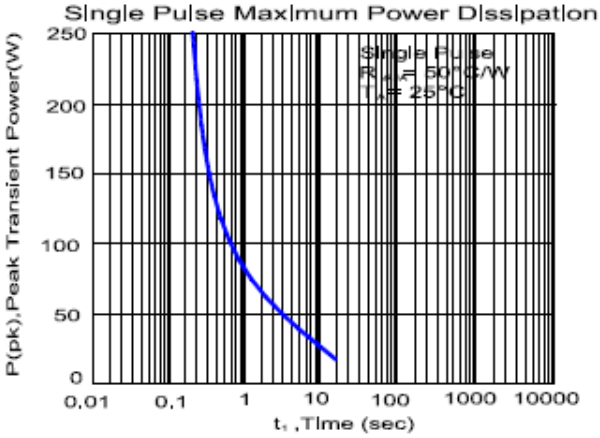

On-Resistance vs.Gate-to-Source Voltage



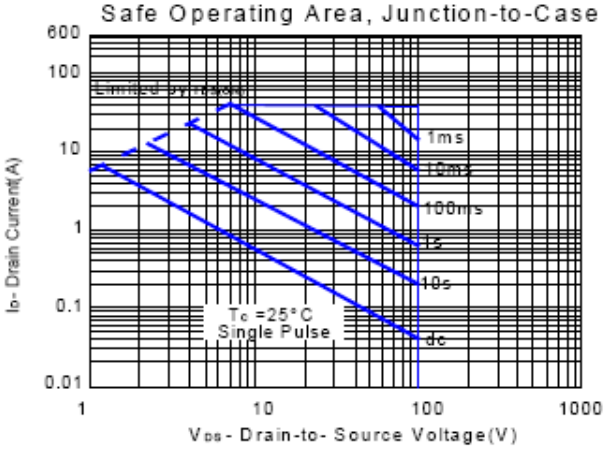

Threshold Voltage



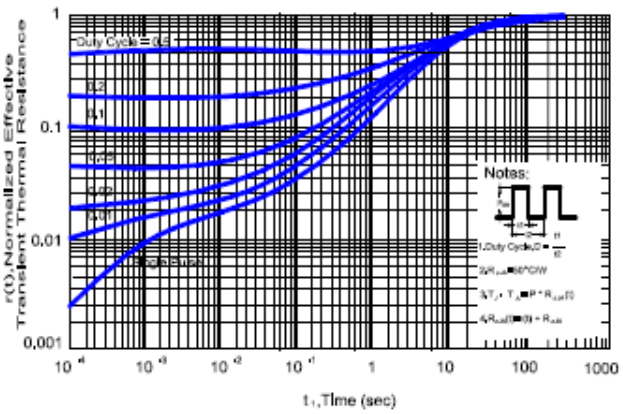

Single Pulse Maximum Power Dissipation




Safe Operating Area, Junction-to-Case

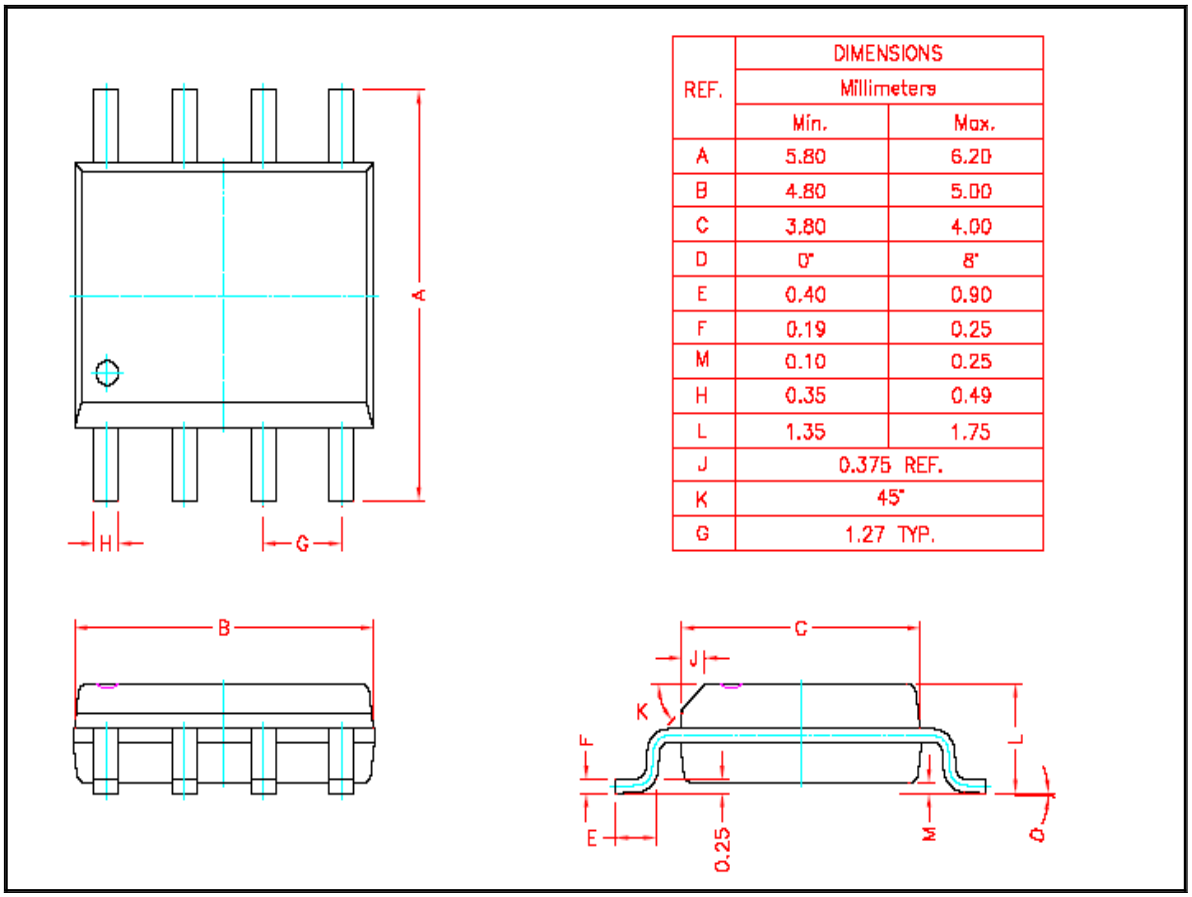



Transient Thermal Response Curve



## ◆ PHYSICAL DIMENSIONS

**8-Pin Plastic S.O.I.C.**




| REF. | DIMENSIONS | |
|---|---|---|
| | Millimeters | |
| | Min. | Max. |
| A | 5.80 | 6.20 |
| B | 4.80 | 5.00 |
| C | 3.80 | 4.00 |
| D | 0° | 8° |
| E | 0.40 | 0.90 |
| F | 0.19 | 0.25 |
| M | 0.10 | 0.25 |
| H | 0.35 | 0.49 |
| L | 1.35 | 1.75 |
| J | 0.375 REF. | |
| K | 45° | |
| G | 1.27 TYP. | |