# P-channel Enhancement Mode Power MOSFET

## Features

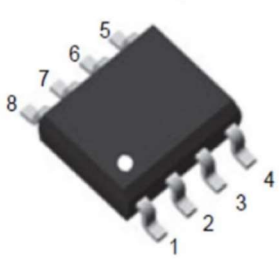
- VDS= -40V, ID= -13A
  RDS(ON) < 12mΩ @ VGS = -10V
  RDS(ON) < 14mΩ @ VGS = -4.5V

## General Features

- Advanced Trench Technology
- Provide Excellent RDS(ON) and Low Gate Charge
- Lead Free and Green Available

*100% UIS TESTED!*
*100% ΔVds TESTED!*

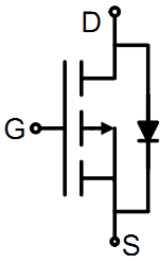
RoHS




SOP-8




pin assignment




Schematic diagram

## Absolute Maximum Ratings ($T_A$=25℃unless otherwise noted)

| Parameter | Symbol | Limit | Unit |
|---|---|---|---|
| Drain-Source Voltage | $V_{DS}$ | -40 | V |
| Gate-Source Voltage | $V_{GS}$ | ±20 | V |
| Drain Current-Continuous | $I_D$ | -13 | A |
| Drain Current-Continuous($T_C$=100℃) | $I_D$ (100℃) | -9 | A |
| Pulsed Drain Current | $I_{DM}$ | 50 | A |
| Maximum Power Dissipation | $P_D$ | 2.5 | W |
| Operating Junction and Storage Temperature Range | $T_J$,$T_{STG}$ | -55 To 150 | ℃ |

## Thermal Characteristic

| | | | |
|---|---|---|---|
| Thermal Resistance ,Junction-to-Ambient(Note 2) | $R_{\theta JA}$ | 50 | ℃/W |

## Electrical Characteristics ($T_A$=25℃unless otherwise noted)

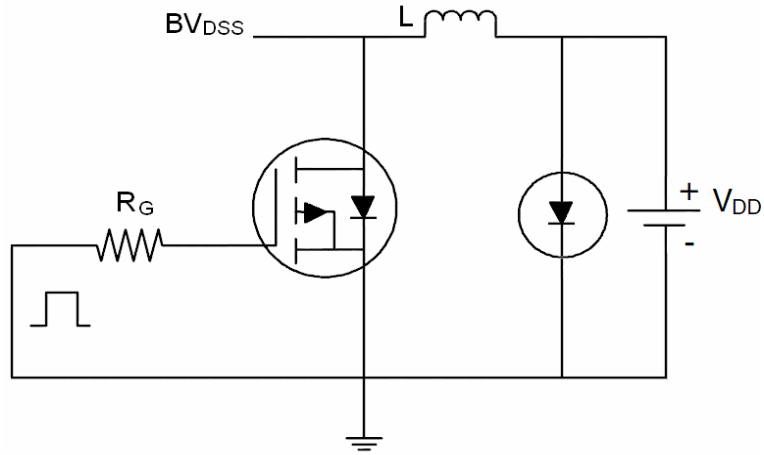
| Parameter | Symbol | Condition | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **Off Characteristics** | | | | | | |
| Drain-Source Breakdown Voltage | $BV_{DSS}$ | $V_{GS}$=0V $I_D$=-250μA | -40 | - | - | V |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$=-40V,$V_{GS}$=0V | - | - | 1 | μA |
| Gate-Body Leakage Current | $I_{GSS}$ | $V_{GS}$=±20V,$V_{DS}$=0V | - | - | ±100 | nA |
| **On Characteristics (Note 3)** | | | | | | |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$=$V_{GS}$,$I_D$=-250μA | -1.0 | | -3.0 | V |
| Drain-Source On-State Resistance | $R_{DS(ON)}$ | $V_{GS}$=-10V, $I_D$=-12A | - | | 12 | mΩ |
| Forward Transconductance | $g_{FS}$ | $V_{DS}$=-15V,$I_D$=-10A | 35 | - | - | S |
| **Dynamic Characteristics (Note4)** | | | | | | |
| Input Capacitance | $C_{lss}$ | $V_{DS}$=-20V,$V_{GS}$=0V, F=1.0MHz | - | 2800 | - | PF |
| Output Capacitance | $C_{oss}$ | | - | 320 | - | PF |
| Reverse Transfer Capacitance | $C_{rss}$ | | - | 220 | - | PF |
| **Switching Characteristics (Note 4)** | | | | | | |
| Turn-on Delay Time | $t_{d(on)}$ | $V_{DD}$=-20V, ,$R_L$=2Ω $V_{GS}$=-10V,$R_{GEN}$=6Ω | - | 11 | - | nS |
| Turn-on Rise Time | $t_r$ | | - | 75 | - | nS |
| Turn-Off Delay Time | $t_{d(off)}$ | | - | 89 | - | nS |
| Turn-Off Fall Time | $t_f$ | | - | 35 | - | nS |
| Total Gate Charge | $Q_g$ | $V_{DS}$=-20V,$I_D$=-12A, $V_{GS}$=-10V | - | 40 | - | nC |
| Gate-Source Charge | $Q_{gs}$ | | - | 6 | - | nC |
| Gate-Drain Charge | $Q_{gd}$ | | - | 12 | - | nC |
| **Drain-Source Diode Characteristics** | | | | | | |
| Diode Forward Voltage (Note 3) | $V_{SD}$ | $V_{GS}$=0V,$I_S$=-12A | - | - | 1.2 | V |
| Diode Forward Current (Note 2) | $I_S$ | | - | - | -13 | A |

## Notes:

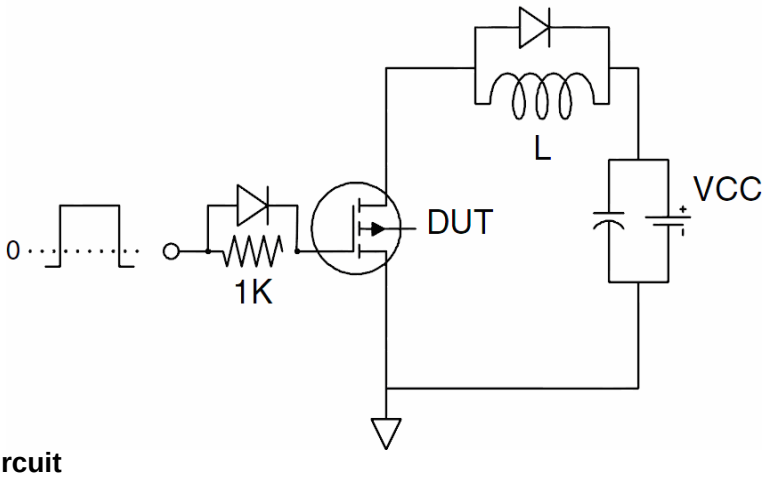
**1.** Repetitive Rating: Pulse width limited by maximum junction temperature.
**2.** Surface Mounted on FR4 Board, t ≤ 10 sec.
**3.** Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
**4.** Guaranteed by design, not subject to production

## Test Circuit

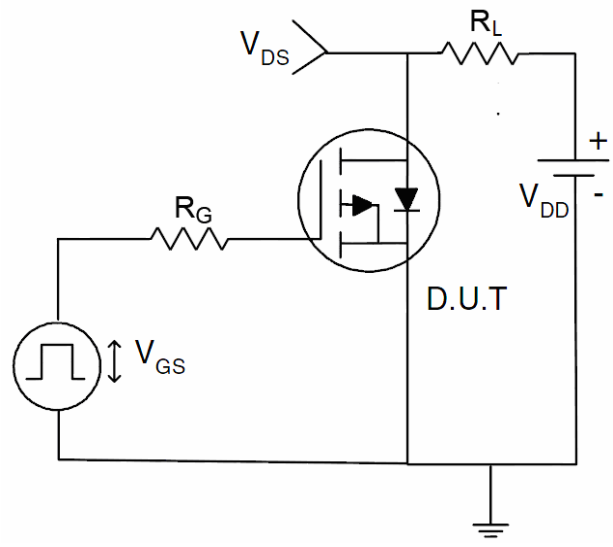
### 1) $E_{AS}$ Test Circuit




### 2) Gate Charge Test Circuit




### 3) Switch Time Test Circuit



## Typical Electrical and Thermal Characteristics (Curves)

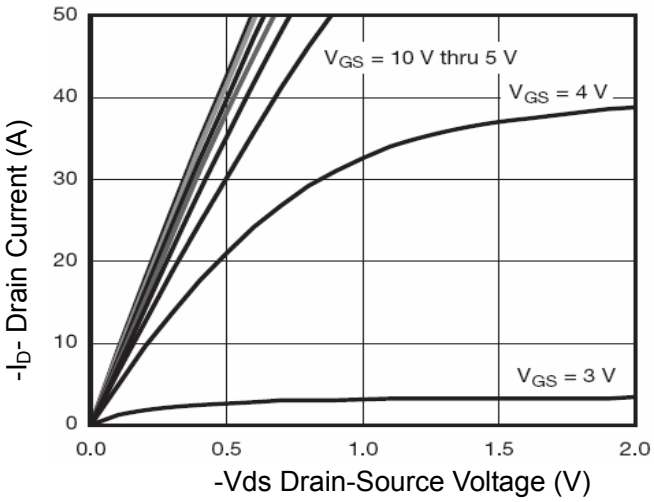



**Figure 1 Output Characteristics**

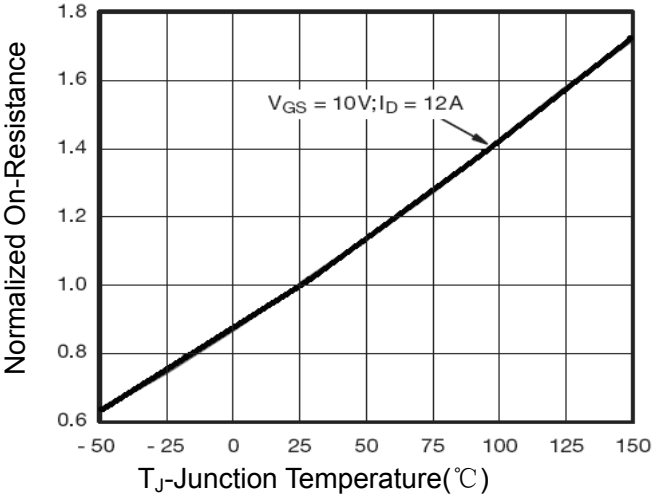



**Figure 4 Rdson-Junction Temperature**

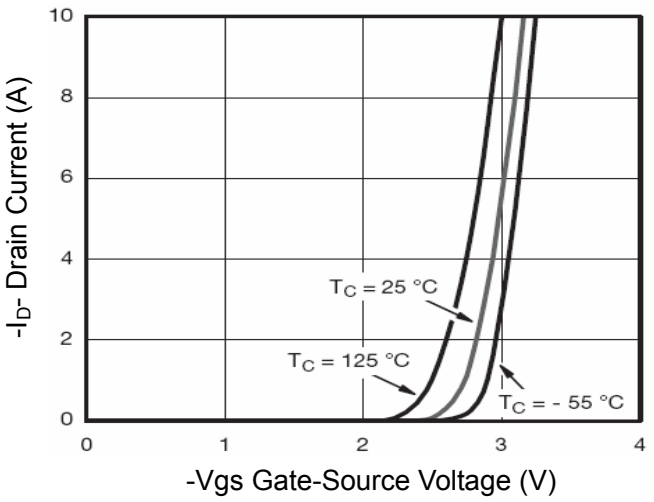



**Figure 2 Transfer Characteristics**

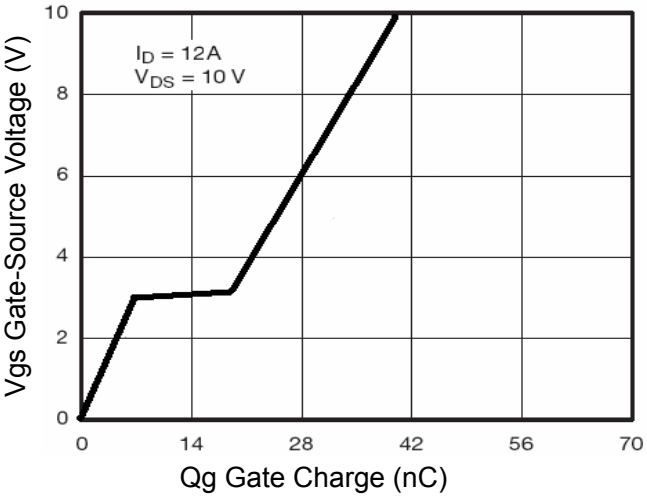



**Figure 5 Gate Charge**

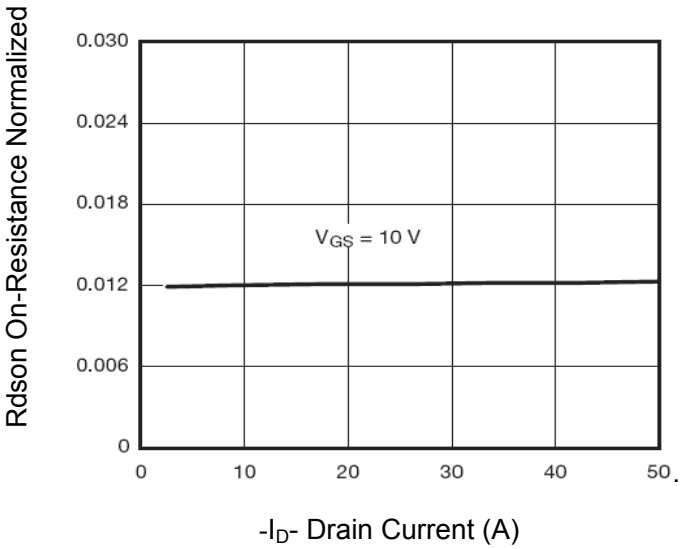



**Figure 3 Rdson- Drain Current**

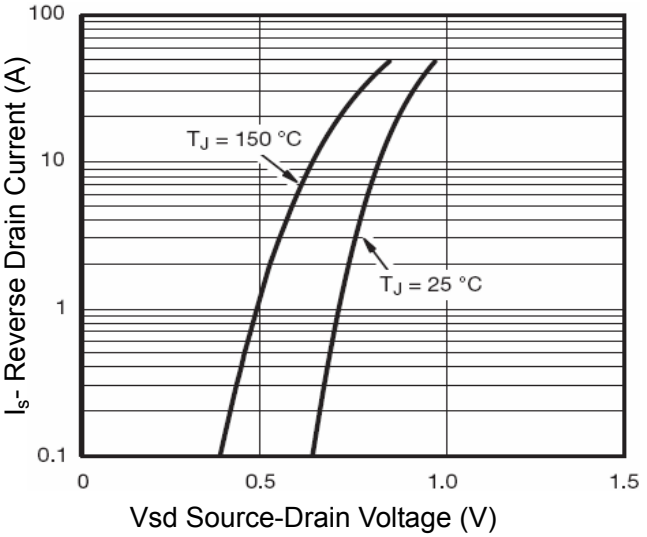



**Figure 6 Source- Drain Diode Forward**

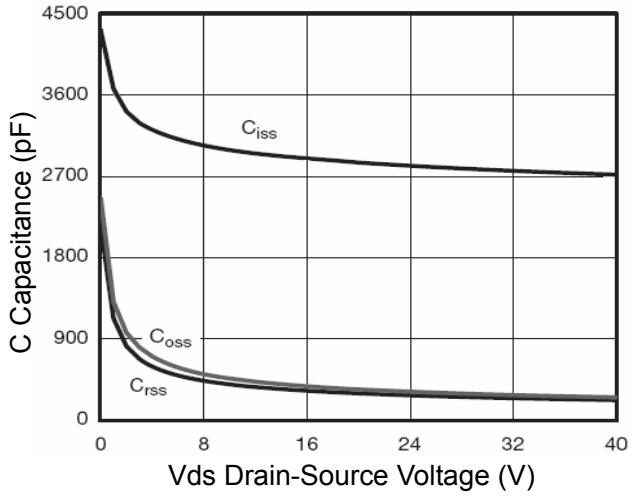



**Figure 7 Capacitance vs Vds**

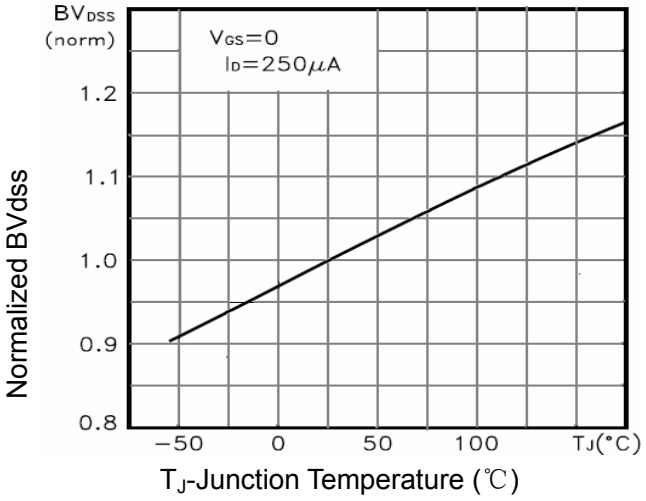



**Figure 9 $BV_{DSS}$ vs Junction Temperature**

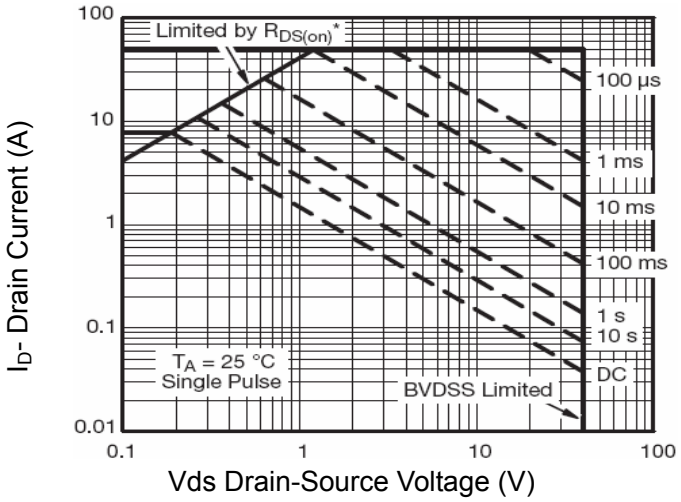



**Figure 8 Safe Operation Area**

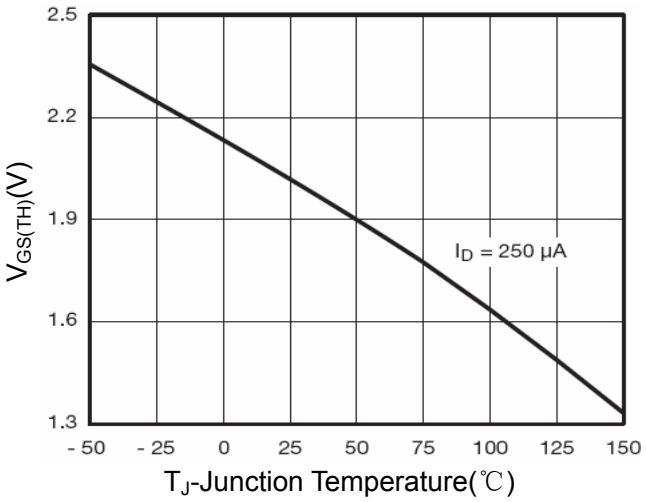



**Figure 10 $V_{GS(th)}$ vs Junction Temperature**

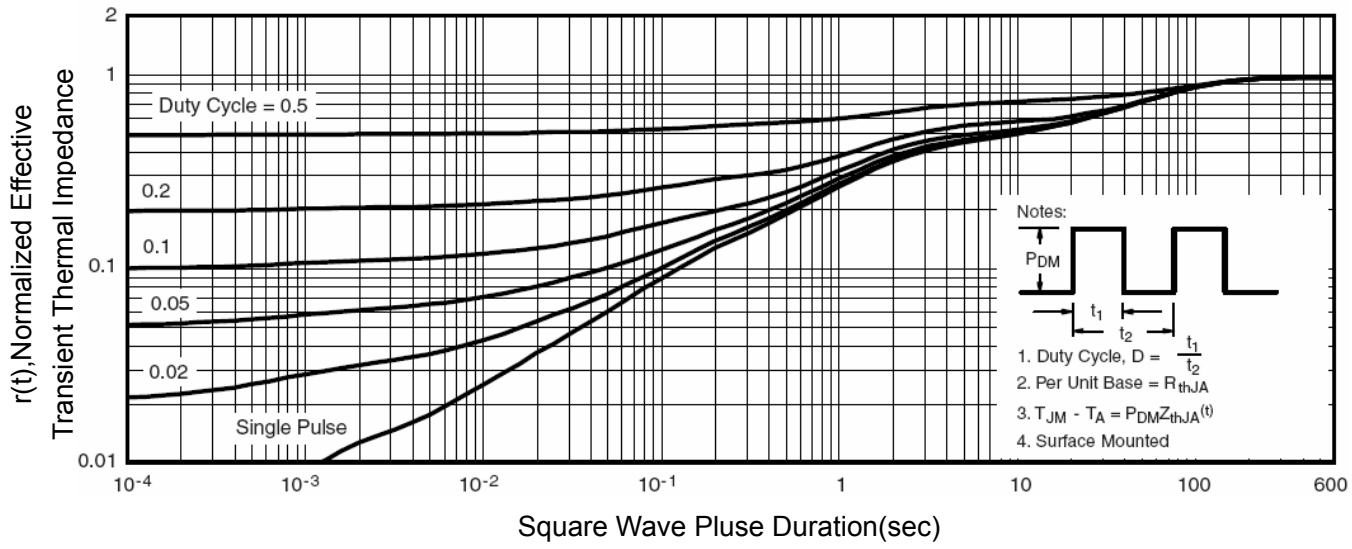



**Figure 11 Normalized Maximum Transient Thermal Impedance**