# Dual P-channel Enhancement Mode Power MOSFET

## Features

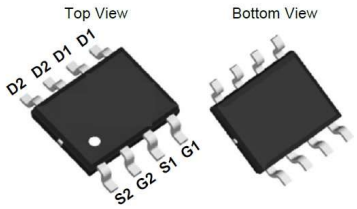
- VDS= -20V, ID= -13 A
  RDS(ON) < 15mΩ @ VGS = -10V
  RDS(ON) < 20mΩ @ VGS = -4.5V

## General Features

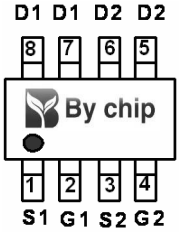
- Advanced Trench Technology
- Provide Excellent RDS(ON) and Low Gate Charge
- Lead Free and Green Available

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

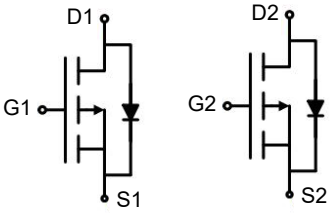
RoHS




SOP-8（Dual）




Pin Assignment




Schematic diagram

### Maximum ratings, at $T_A$ =25°C, unless otherwise specified

| Symbol | Parameter | | Rating | Unit |
|---|---|---|---|---|
| $V_{(BR)DSS}$ | Drain-Source breakdown voltage | | -20 | V |
| $V_{GS}$ | Gate-Source voltage | | ±12 | V |
| $I_S$ | Diode continuous forward current | $T_A$ =25°C | -2.6 | A |
| $I_D$ | Continuous drain current@VGS=-4.5V | $T_A$ =25°C | -13 | A |
| | | $T_A$ =70°C | -10 | A |
| $I_{DM}$ | Pulse drain current tested ① | $T_A$ =25°C | -52 | A |
| EAS | Avalanche energy, single pulsed ② | | 42 | mJ |
| $P_D$ | Maximum power dissipation | $T_A$ =25°C | 3.1 | W |
| $T_{STG}$,$T_J$ | Storage and operating temperature range | | -55 to 150 | °C |

### Thermal Characteristics

| Symbol | Parameter | Typical | Max | Unit |
|---|---|---|---|---|
| $R_{\theta JL}$ | Thermal Resistance-Junction to Lead | | 29 | °C/W |
| $R_{\theta JA}$ | Thermal Resistance-Junction to Ambient | | 48 | °C/W |

## Electrical Characteristics

| Symbol | Parameter | Condition | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| **Static Electrical Characteristics @ $T_j$ = 25°C (unless otherwise stated)** | | | | | | |
| $V_{(BR)DSS}$ | Drain-Source Breakdown Voltage | $V_{GS}$=0V, $I_D$=-250μA | -20 | -- | -- | V |
| $I_{DSS}$ | Zero Gate Voltage Drain Current | $V_{DS}$=-20V,$V_{GS}$=0V | -- | -- | -1 | μA |
| | Zero Gate Voltage Drain Current(Tj=125℃) | $V_{DS}$=-20V,$V_{GS}$=0V | -- | -- | -100 | μA |
| $I_{GSS}$ | Gate-Body Leakage Current | $V_{GS}$=±12V,$V_{DS}$=0V | -- | -- | ±100 | nA |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS}$=$V_{GS}$,$I_D$=-250μA | -0.3 | | -2.0 | V |
| $R_{DS(on)}$ | Drain-Source On-State Resistance ③ | $V_{GS}$=-4.5V, $I_D$=-10A | -- | | 15 | mΩ |
| $R_{DS(on)}$ | Drain-Source On-State Resistance ③ | $V_{GS}$=-2.5V, $I_D$=-10A | -- | | 20 | mΩ |
| $R_{DS(on)}$ | Drain-Source On-State Resistance ③ | $V_{GS}$=-1.8V, $I_D$=-8A | -- | | 32 | mΩ |
| **Dynamic Electrical Characteristics @ $T_j$ = 25°C (unless otherwise stated)** | | | | | | |
| Ciss | Input Capacitance | $V_{DS}$=-10V,$V_{GS}$=0V, f=1MHz | | | 4655 | pF |
| Coss | Output Capacitance | | | | 465 | pF |
| Crss | Reverse Transfer Capacitance | | | | 335 | pF |
| Rg | Gate Resistance | f=1MHz | 0.2 | | 5 | Ω |
| Qg | Total Gate Charge | $V_{DS}$=-10V,$I_D$=-10A, $V_{GS}$=-4.5V | -- | | 39 | nC |
| Qgs | Gate-Source Charge | | -- | | 8.1 | nC |
| Qgd | Gate-Drain Charge | | -- | | 7.8 | nC |
| **Switching Characteristics** | | | | | | |
| Td(on) | Turn-on Delay Time | $V_{DD}$=-10V, $I_D$=-10A, $R_G$=2.7Ω, $V_{GS}$=-10V | -- | 7.6 | -- | ns |
| Tr | Turn-on Rise Time | | -- | 44 | -- | ns |
| Td(off) | Turn-Off Delay Time | | -- | 75 | -- | ns |
| Tf | Turn-Off Fall Time | | -- | 27 | -- | ns |
| **Source- Drain Diode Characteristics@ $T_j$ = 25°C (unless otherwise stated)** | | | | | | |
| $V_{SD}$ | Forward on voltage | $I_{SD}$=-10A,$V_{GS}$=0V | -- | -0.8 | -1.2 | V |
| Trr | Reverse Recovery Time | $T_j$=25℃,$I_{sd}$=-10A, $V_{GS}$=0V di/dt=-100A/μs | -- | 14 | 28 | ns |
| Qrr | Reverse Recovery Charge | | -- | 4.7 | 9.4 | nC |

NOTE:

① Repetitive rating; pulse width limited by max junction temperature.

② Limited by TJmax, starting TJ = 25°C, L = 0.5mH, RG = 25Ω, IAS = -13A, VGS =-10V. Part not recommended for use above this value

③ Pulse width ≤ 380μs; duty cycle≤ 2%.

## Typical Characteristics

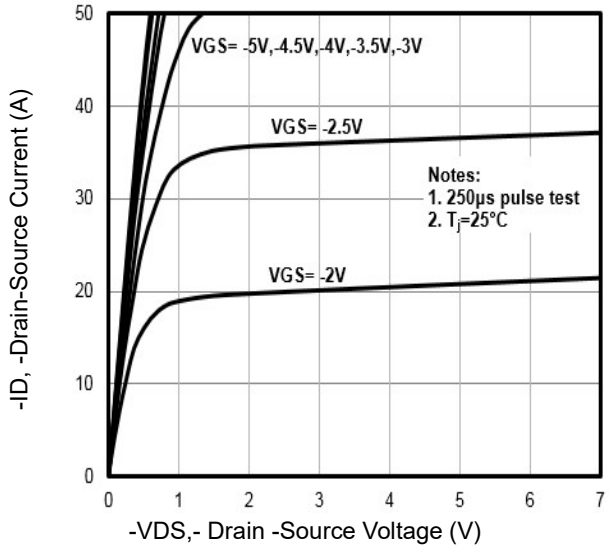



**Fig1.** Typical Output Characteristics

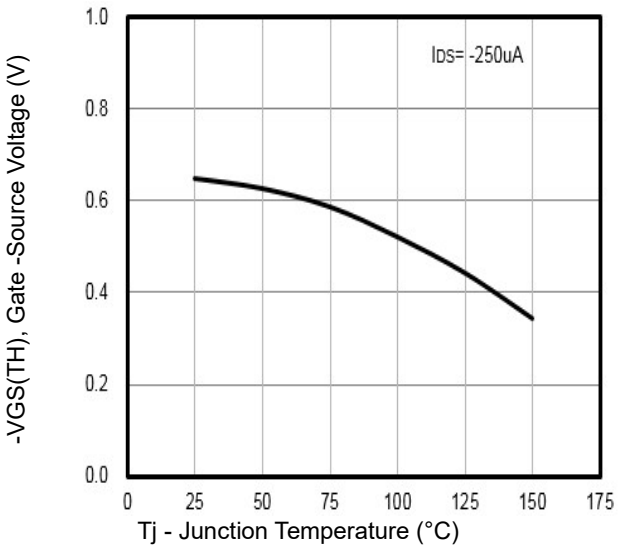



**Fig2.** $-V_{GS(TH)}$ Gate -Source Voltage Vs.Tj

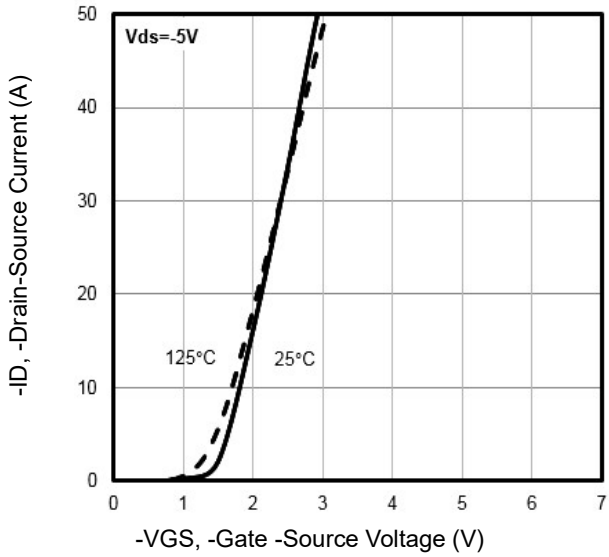



**Fig3.** Typical Transfer Characteristics

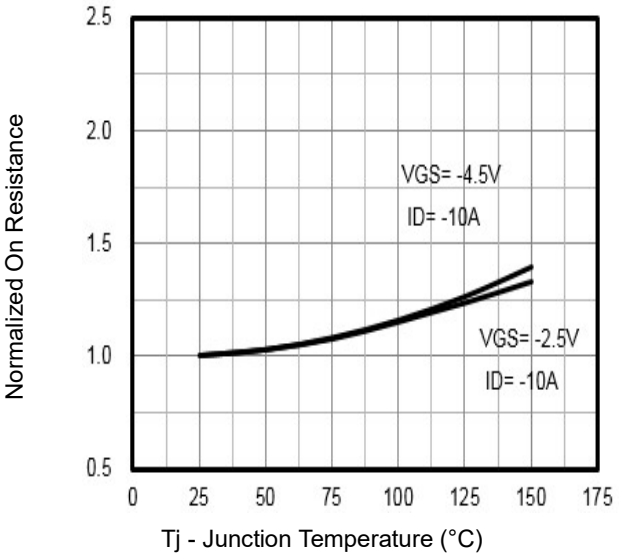



**Fig4.** Normalized On-Resistance Vs. Tj

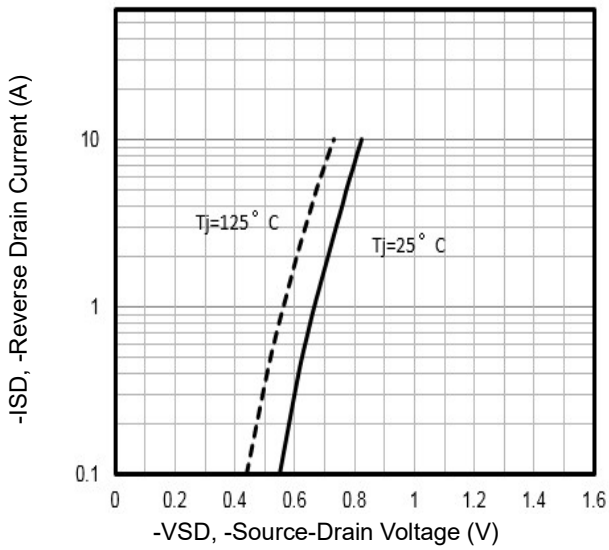



**Fig5.** Typical Source-Drain Diode Forward Voltage

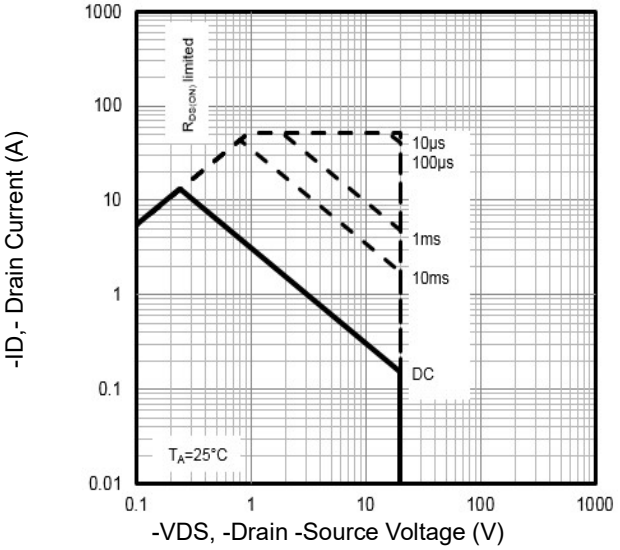



**Fig6.** Maximum Safe Operating Area

## Typical Characteristics

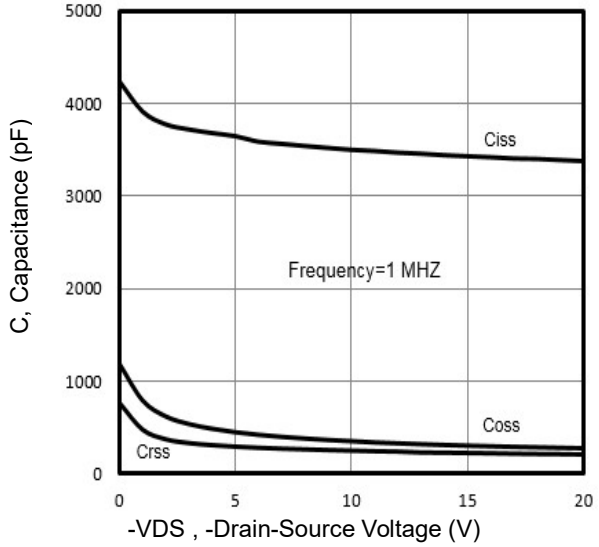



**Fig7.** Typical Capacitance Vs.Drain-Source Voltage

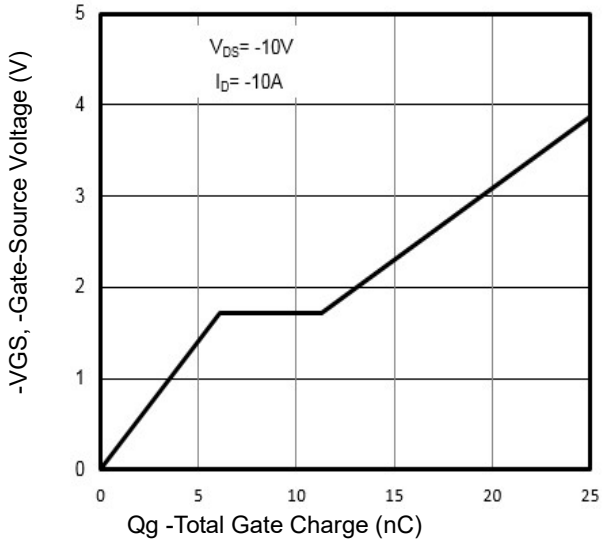



**Fig8.** Typical Gate Charge Vs.Gate-Source Voltage

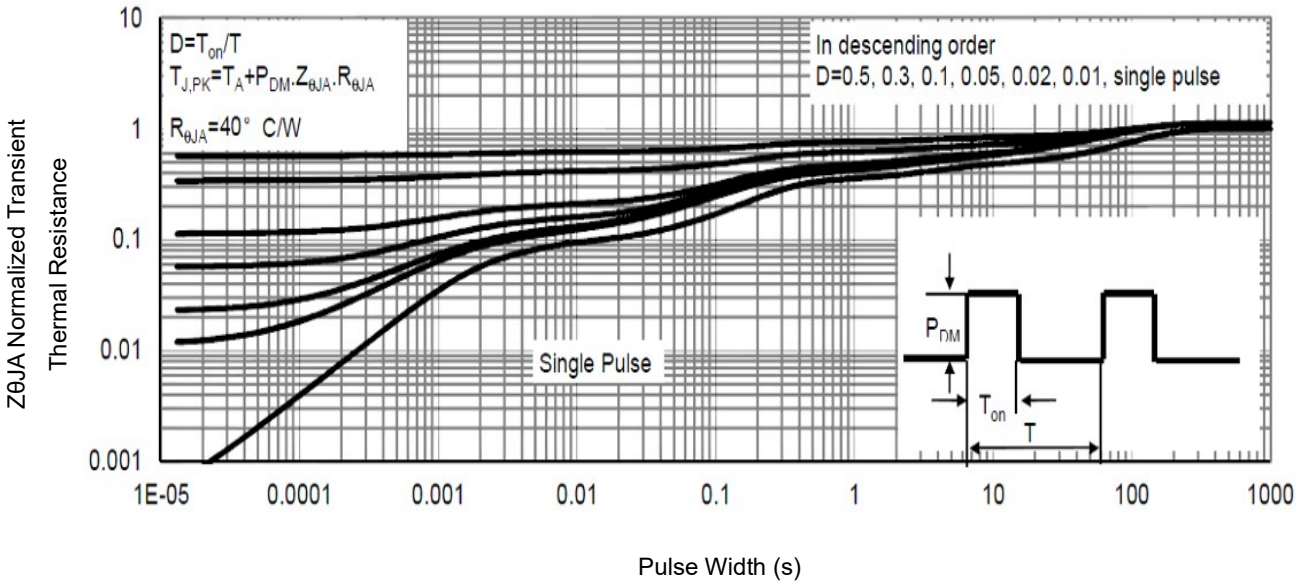



**Fig9.** Normalized Maximum Transient Thermal Impedance

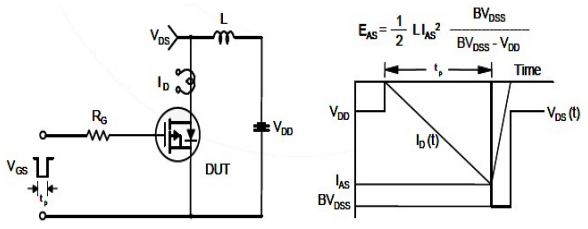



**Fig10.** Unclamped Inductive Test Circuit and Waveforms

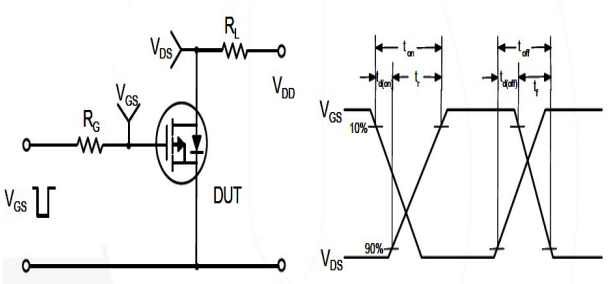



**Fig11.** Switching Time Test Circuit and waveforms