

- ★ 100% EAS Guaranteed
- ★ Green Device Available
- ★ Super Low Gate Charge
- ★ Excellent CdV/dt effect decline
- ★ Advanced high cell density Trench technology

Product Summary



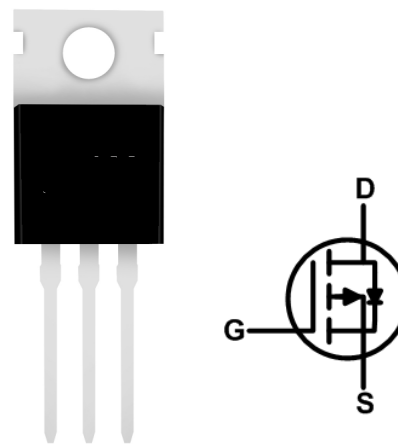
| BVDSS | RDSON | ID |
|-------|-------|------|
| -60V | 25mΩ | -45A |

Description

The IRF4905 is the high cell density trenched P-ch MOSFETs, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications.

The IRF4905 meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

TO220 Pin Configuration



Absolute Maximum Ratings

| Symbol | Parameter | Rating | Units |
|---------------------------------------|--|------------|-------|
| V _{DS} | Drain-Source Voltage | -60 | V |
| V _{GS} | Gate-Source Voltage | ±20 | V |
| I _D @T _C =25°C | Continuous Drain Current, -V _{GS} @ -10V ¹ | -45 | A |
| I _D @T _C =100°C | Continuous Drain Current, -V _{GS} @ -10V ¹ | -34 | A |
| I _{DM} | Pulsed Drain Current ² | -90 | A |
| EAS | Single Pulse Avalanche Energy ³ | 113 | mJ |
| I _{AS} | Avalanche Current | 47.6 | A |
| P _D @T _C =25°C | Total Power Dissipation ⁴ | 86.8 | W |
| T _{STG} | Storage Temperature Range | -55 to 150 | °C |
| T _J | Operating Junction Temperature Range | -55 to 150 | °C |

Thermal Data

| Symbol | Parameter | Typ. | Max. | Unit |
|------------------|--|------|------|------|
| R _{θJA} | Thermal Resistance Junction-Ambient ¹ | --- | 62 | °C/W |
| R _{θJC} | Thermal Resistance Junction-Case ¹ | --- | 1.44 | °C/W |

Electrical Characteristics (T_J=25 °C, unless otherwise noted)

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|-------------------------------------|--|---|------|--------|------|-------|
| BV _{DSS} | Drain-Source Breakdown Voltage | V _{GS} =0V, I _D =-250uA | -60 | --- | --- | V |
| ΔBV _{DSS} /ΔT _J | BV _{DSS} Temperature Coefficient | Reference to 25°C, I _D =-1mA | --- | -0.035 | --- | V/°C |
| R _{DS(ON)} | Static Drain-Source On-Resistance ² | V _{GS} =-10V, I _D =-18A | --- | --- | 25 | mΩ |
| | | V _{GS} =-4.5V, I _D =-12A | --- | --- | 33 | |
| V _{GS(th)} | Gate Threshold Voltage | V _{GS} =V _{DS} , I _D =-250uA | -1.0 | --- | -2.5 | V |
| ΔV _{GS(th)} | V _{GS(th)} Temperature Coefficient | | --- | 4.28 | --- | mV/°C |
| I _{DSS} | Drain-Source Leakage Current | V _{DS} =-48V, V _{GS} =0V, T _J =25°C | --- | --- | 1 | uA |
| | | V _{DS} =-48V, V _{GS} =0V, T _J =55°C | --- | --- | 5 | |
| I _{GSS} | Gate-Source Leakage Current | V _{GS} =±20V, V _{DS} =0V | --- | --- | ±100 | nA |
| g _{fs} | Forward Transconductance | V _{DS} =-10V, I _D =-18A | --- | 23 | --- | S |
| R _g | Gate Resistance | V _{DS} =0V, V _{GS} =0V, f=1MHz | --- | 7 | 14 | Ω |
| Q _g | Total Gate Charge (-4.5V) | V _{DS} =-20V, V _{GS} =-4.5V, I _D =-12A | --- | 25 | --- | nC |
| Q _{gs} | Gate-Source Charge | | --- | 6.7 | --- | |
| Q _{gd} | Gate-Drain Charge | | --- | 5.5 | --- | |
| T _{d(on)} | Turn-On Delay Time | V _{DD} =-15V, V _{GS} =-10V, R _G =3.3Ω, I _D =-1A | --- | 38 | --- | ns |
| T _r | Rise Time | | --- | 23.6 | --- | |
| T _{d(off)} | Turn-Off Delay Time | | --- | 100 | --- | |
| T _f | Fall Time | | --- | 6.8 | --- | |
| C _{iss} | Input Capacitance | V _{DS} =-15V, V _{GS} =0V, f=1MHz | --- | 3635 | --- | pF |
| C _{oss} | Output Capacitance | | --- | 224 | --- | |
| C _{rss} | Reverse Transfer Capacitance | | --- | 141 | --- | |

Diode Characteristics

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|-----------------|--|--|------|------|------|------|
| I _S | Continuous Source Current ^{1,5} | V _G =V _D =0V, Force Current | --- | --- | -45 | A |
| I _{SM} | Pulsed Source Current ^{2,5} | | --- | --- | -90 | A |
| V _{SD} | Diode Forward Voltage ² | V _{GS} =0V, I _S =-1A, T _J =25°C | --- | --- | -1 | V |

Note :

- The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.
- The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%
- The EAS data shows Max. rating. The test condition is V_{DD}=-25V, V_{GS}=-10V, L=0.1mH, I_{AS}=-47.6A
- The power dissipation is limited by 150°C junction temperature
- The data is theoretically the same as I_D and I_{DM}, in real applications, should be limited by total power dissipation.

Typical Characteristics

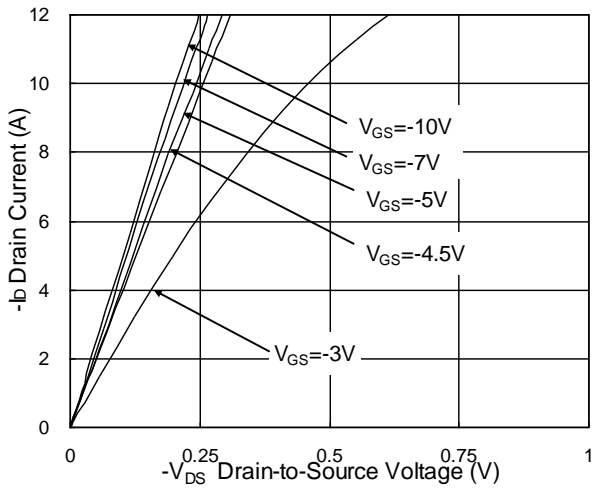


Fig.1 Typical Output Characteristics

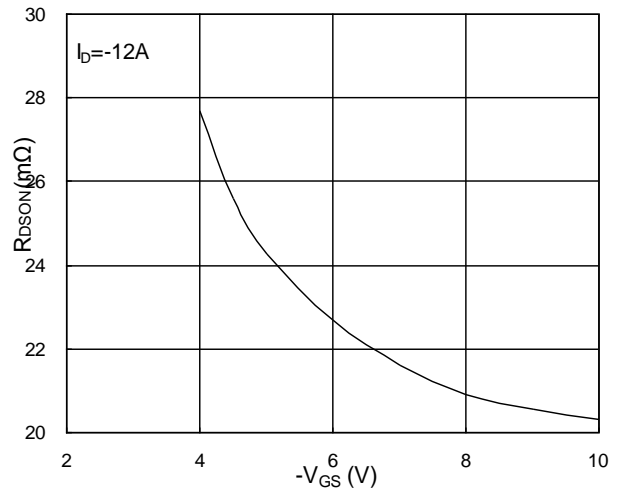


Fig.2 On-Resistance v.s Gate-Source

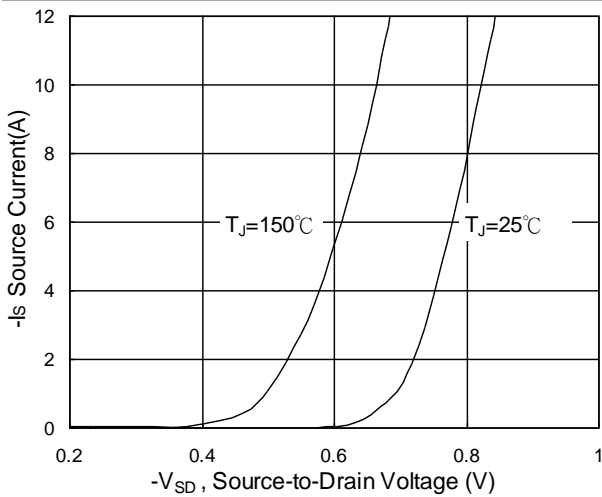


Fig.3 Forward Characteristics Of Reverse

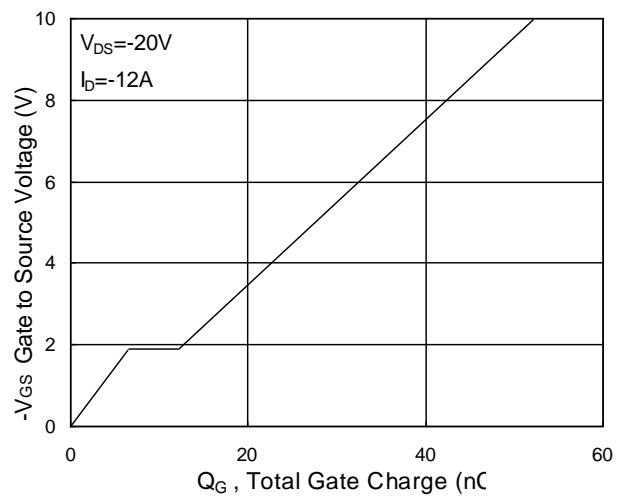


Fig.4 Gate-Charge Characteristics

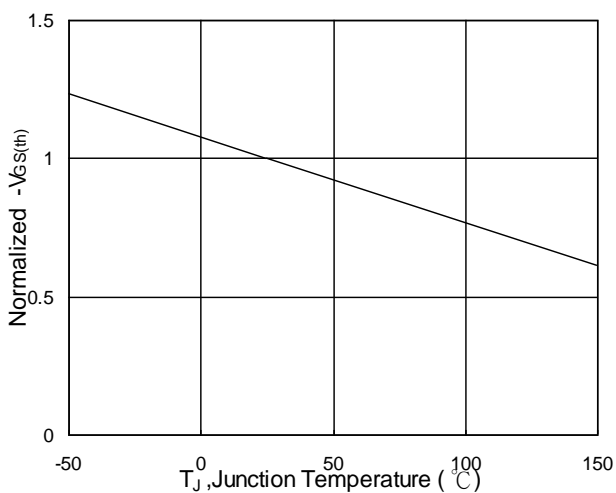


Fig.5 Normalized $V_{GS(th)}$ v.s T_J

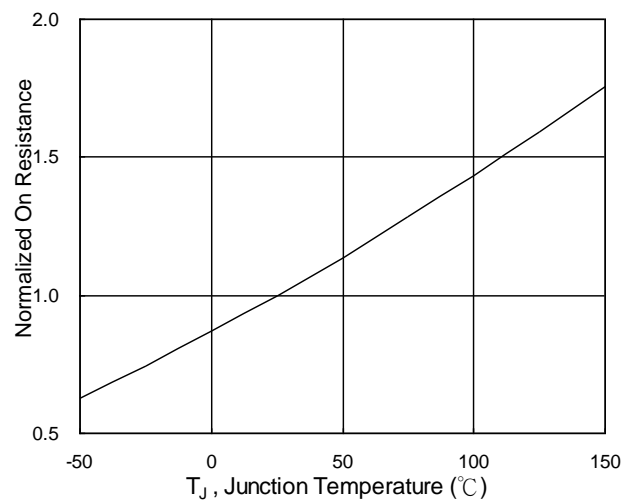


Fig.6 Normalized $R_{DS(on)}$ v.s T_J

P-Ch 60V Fast Switching MOSFETs

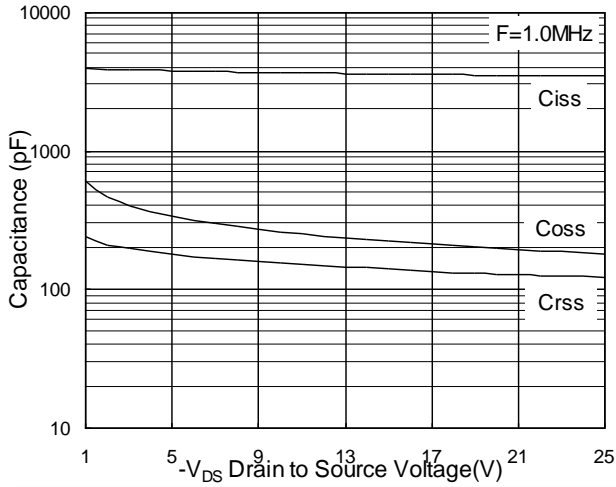


Fig.7 Capacitance

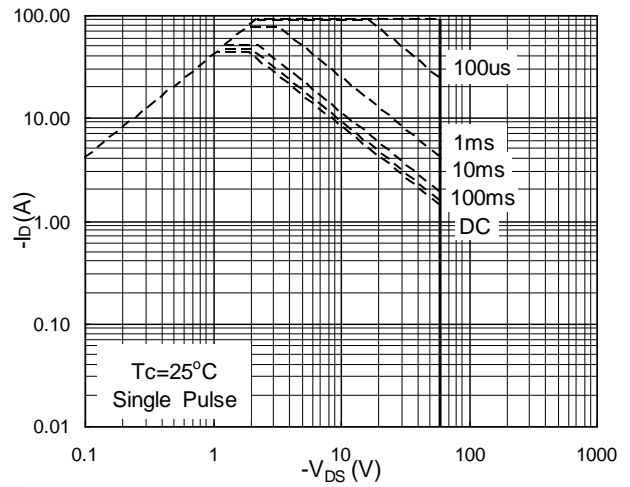


Fig.8 Safe Operating Area

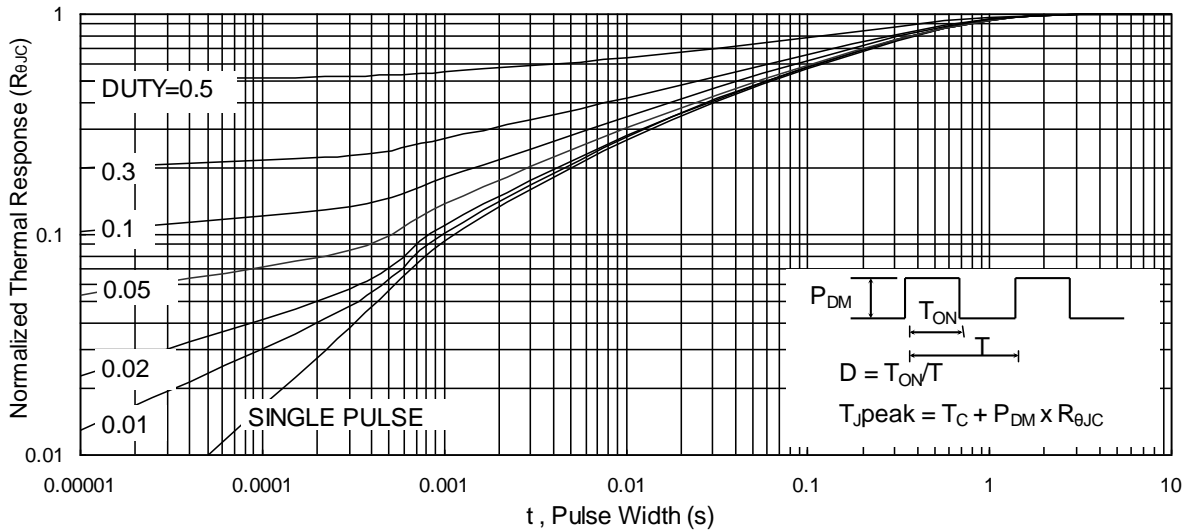


Fig.9 Normalized Maximum Transient Thermal Impedance

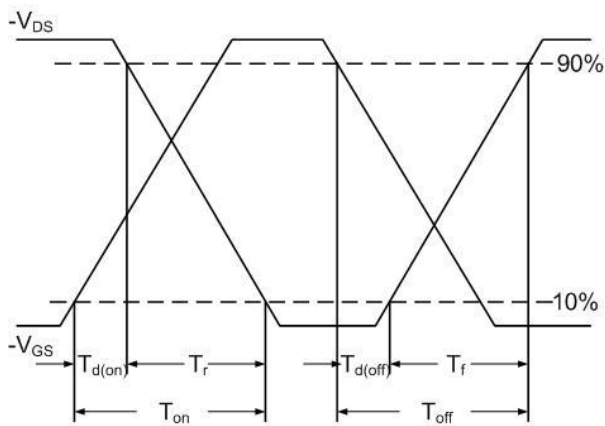


Fig.10 Switching Time Waveform

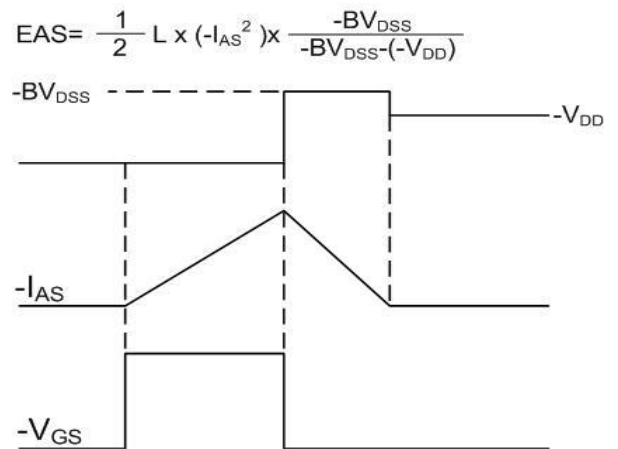


Fig.11 Unclamped Inductive Waveform