

Power MOSFET

■ GENERAL DESCRIPTION

The XP152A11E5MR-G is a P-channel Power MOSFET with low on-state resistance and ultra high-speed switching characteristics.

Because high-speed switching is possible, the IC can be efficiently set thereby saving energy.

In order to counter static, a gate protect diode is built-in.

The small SOT-23 package makes high density mounting possible.

■ APPLICATIONS

- Notebook PCs
- Cellular and portable phones
- On-board power supplies
- Li-ion battery systems

■ FEATURES

Low On-State Resistance : $R_{ds(on)} = 0.25\Omega @ V_{gs} = -10V$
 : $R_{ds(on)} = 0.45\Omega @ V_{gs} = -4.5V$

Ultra High-Speed Switching

Gate Protect Diode Built-in

Driving Voltage : -4.5V

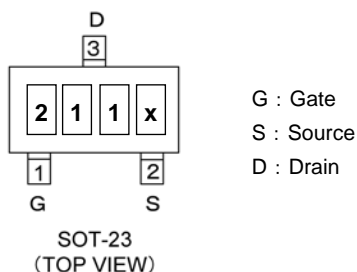
P-Channel Power MOSFET

DMOS Structure

Small Package : SOT-23

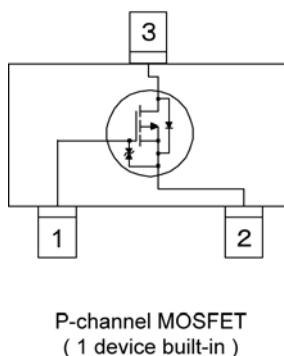
Environmentally Friendly : EU RoHS Compliant, Pb Free

■ PIN CONFIGURATION/MARKING



* x represents production lot number.

■ EQUIVALENT CIRCUIT



■ PRODUCT NAMES

| PRODUCTS | PACKAGE | ORDER UNIT |
|-------------------------------|---------|------------|
| XP152A11E5MR | SOT-23 | 3,000/Reel |
| XP152A11E5MR-G ^(*) | SOT-23 | 3,000/Reel |

^(*) The "-G" suffix denotes Halogen and Antimony free as well as being fully RoHS compliant.

■ ABSOLUTE MAXIMUM RATINGS

$T_a = 25^\circ\text{C}$

| PARAMETER | SYMBOL | RATINGS | UNITS |
|-----------------------------|-----------|----------|------------------|
| Drain - Source Voltage | V_{dss} | -30 | V |
| Gate - Source Voltage | V_{gss} | ± 20 | V |
| Drain Current (DC) | I_d | -0.7 | A |
| Drain Current (Pulse) | I_{dp} | -2.8 | A |
| Reverse Drain Current | I_{dr} | -0.7 | A |
| Channel Power Dissipation * | P_d | 0.5 | W |
| Channel Temperature | T_{ch} | 150 | $^\circ\text{C}$ |
| Storage Temperature | T_{stg} | -55~150 | $^\circ\text{C}$ |

* When implemented on a ceramic PCB

ELECTRICAL CHARACTERISTICS

DC Characteristics

Ta = 25°C

| PARAMETER | SYMBOL | CONDITIONS | MIN. | TYP. | MAX. | UNITS |
|-------------------------------------|----------|-----------------------|------|------|------|-------|
| Drain Cut-Off Current | Idss | Vds= -30V, Vgs= 0V | - | - | -10 | μA |
| Gate-Source Leak Current | Igss | Vgs= ±20V, Vds= 0V | - | - | ±10 | μA |
| Gate-Source Cut-Off Voltage | Vgs(off) | Id= -1mA, Vds= -10V | -1.0 | - | -3.0 | V |
| Drain-Source On-State Resistance *1 | Rds(on) | Id= -0.4A, Vgs= -10V | - | 0.20 | 0.25 | Ω |
| | | Id= -0.4A, Vgs= -4.5V | - | 0.35 | 0.45 | Ω |
| Forward Transfer Admittance *1 | Yfs | Id= -0.4A, Vds= -10V | - | 1 | - | S |
| Body Drain Diode Forward Voltage | Vf | If= -0.7A, Vgs= 0V | - | -0.8 | -1.1 | V |

*1 Effective during pulse test.

Dynamic Characteristics

Ta = 25°C

| PARAMETER | SYMBOL | CONDITIONS | MIN. | TYP. | MAX. | UNITS |
|----------------------|--------|------------------------------|------|------|------|-------|
| Input Capacitance | Ciss | Vds= -10V, Vgs=0V f= 1MHz | - | 160 | - | pF |
| Output Capacitance | Coss | | - | 120 | - | pF |
| Feedback Capacitance | Crss | | - | 50 | - | pF |

Switching Characteristics

Ta = 25°C

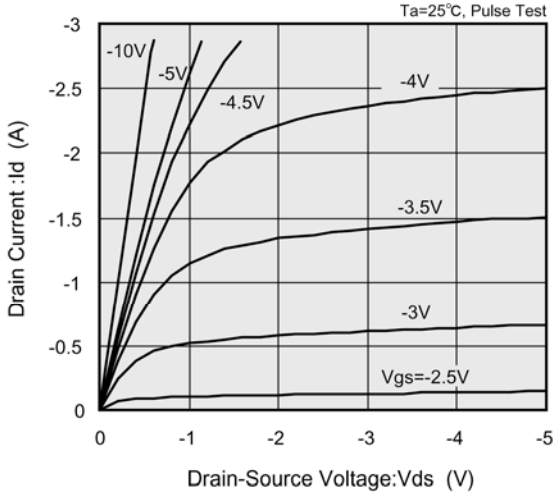
| PARAMETER | SYMBOL | CONDITIONS | MIN. | TYP. | MAX. | UNITS |
|---------------------|----------|----------------------------------|------|------|------|-------|
| Turn-On Delay Time | td (on) | Vgs= -5V, Id= -0.4A Vdd= -10V | - | 10 | - | ns |
| Rise Time | tr | | - | 25 | - | ns |
| Turn-Off Delay Time | td (off) | | - | 25 | - | ns |
| Fall Time | tf | | - | 40 | - | ns |

Thermal Characteristics

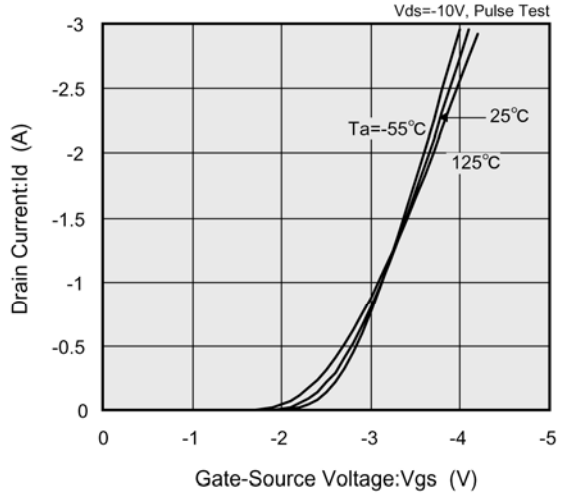
| PARAMETER | SYMBOL | CONDITIONS | MIN. | TYP. | MAX. | UNITS |
|---------------------------------------|------------|----------------------------|------|------|------|-------|
| Thermal Resistance (Channel-Ambience) | Rth (ch-a) | Implement on a ceramic PCB | - | 250 | - | °C/W |

TYPICAL PERFORMANCE CHARACTERISTICS

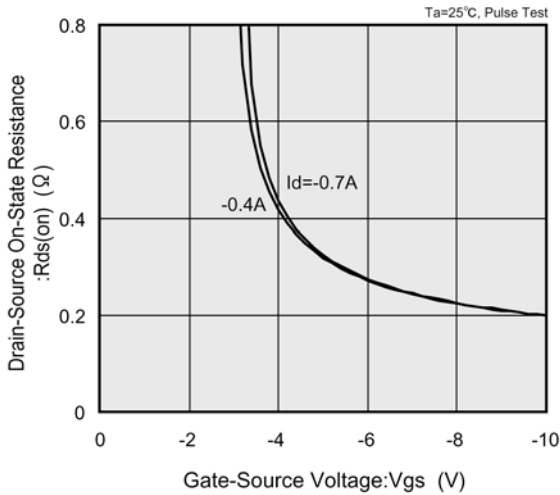
(1) Drain Current vs. Drain-Source Voltage



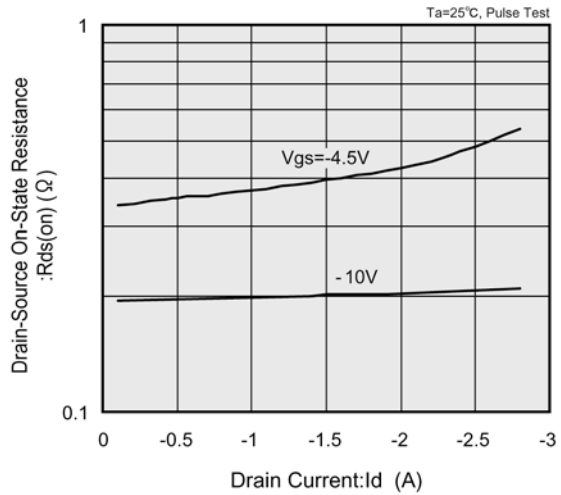
(2) Drain Current vs. Drain-Source Voltage



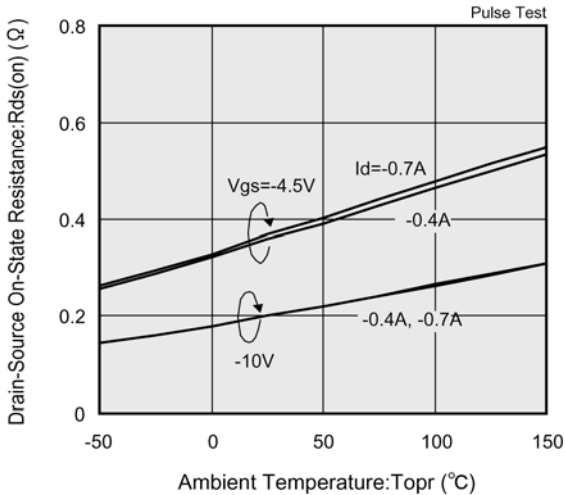
(3) Drain-Source On-State Resistance vs. Gate-Source Voltage



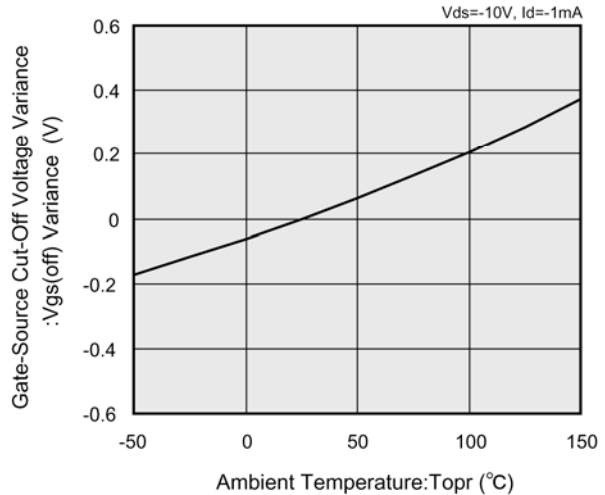
(4) Drain-Source On-State Resistance vs. Drain Current



(5) Drain-Source On-State Resistance vs. Ambient Temperature

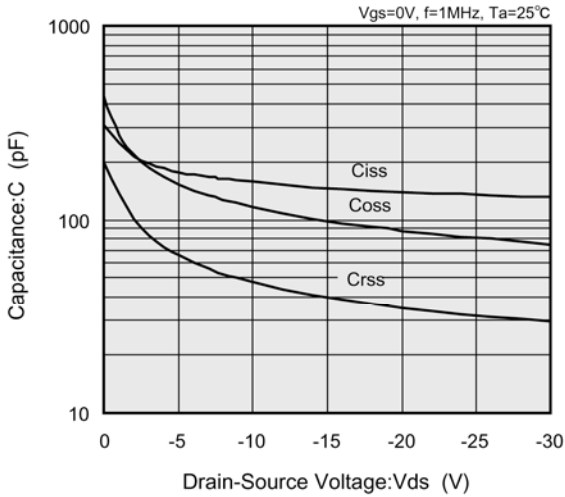


(6) Gate Source Cut-Off Voltage Variance vs. Ambient Temperature

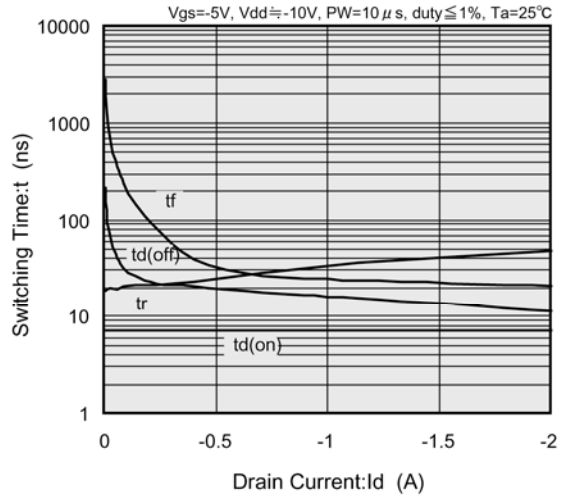


TYPICAL PERFORMANCE CHARACTERISTICS (Continued)

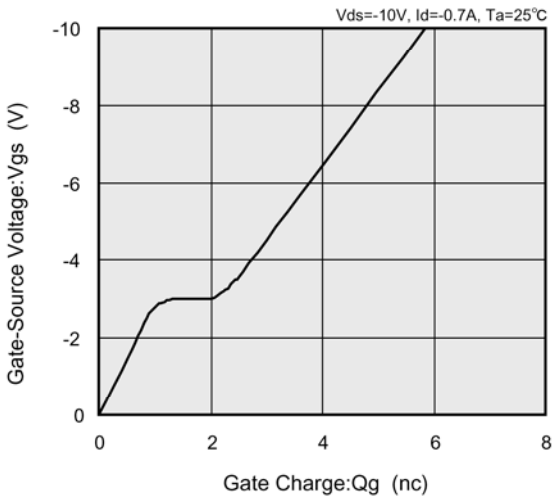
(7) Capacitance vs. Drain-Source Voltage



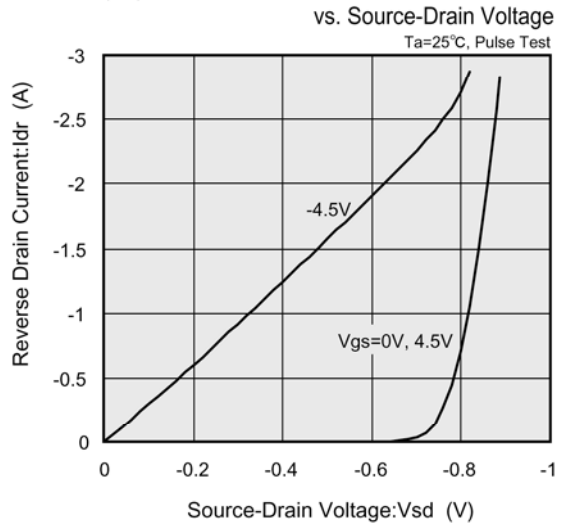
(8) Switching Time vs. Drain Current



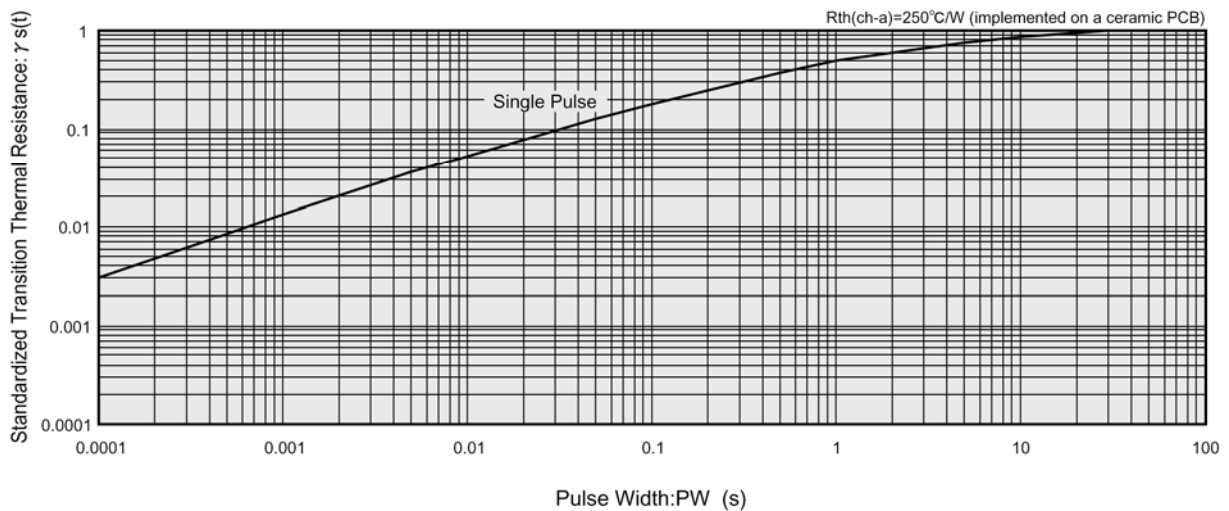
(9) Gate-Source Voltage vs. Gate Charge



(10) Reverse Drain Current



(11) Standardized transition Thermal Resistance vs. Pulse Width



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