

## Power MOSFET

### ■ GENERAL DESCRIPTION

The XP152A12C0MR-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** :  $R_{ds(on)} = 0.3\Omega @ V_{gs} = -4.5V$   
:  $R_{ds(on)} = 0.5\Omega @ V_{gs} = -2.5V$

**Ultra High-Speed Switching**

**Gate Protect Diode Built-in**

**Driving Voltage** : -2.5V

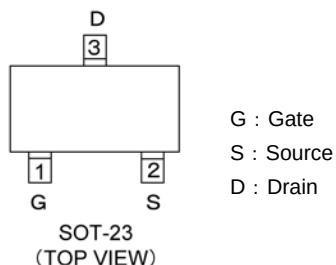
**P-Channel Power MOSFET**

**DMOS Structure**

**Small Package** : SOT-23

**Environmentally Friendly** : EU RoHS Compliant, Pb Free

### ■ PIN CONFIGURATION



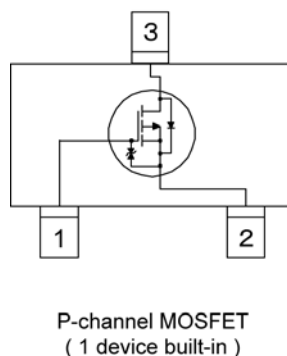
### ■ PIN ASSIGNMENT

| Products       | Detail                          |
|----------------|---------------------------------|
| XP152A12C0MR-G | SOT-23(Halogen & Antimony Free) |
| XP152A12C0MR   | SOT-23                          |

\* The "G" suffix indicates that the products are Halogen and Antimony free as well as being fully RoHS compliant.

\* The device orientation is fixed in its embossed tape pocket.

### ■ EQUIVALENT CIRCUIT



### ■ ABSOLUTE MAXIMUM RATINGS

$T_a = 25^\circ C$

| PARAMETER                   | SYMBOL    | RATINGS  | UNITS      |
|-----------------------------|-----------|----------|------------|
| Drain - Source Voltage      | $V_{ds}$  | -20      | V          |
| Gate - Source Voltage       | $V_{gs}$  | $\pm 12$ | 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      | $^\circ C$ |
| Storage Temperature Range   | $T_{stg}$ | -55~150  | $^\circ C$ |

\* 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= -20V, Vgs= 0V    | -    | -    | -10  | μA    |
| Gate-Source Leak Current            | Igss     | Vgs= ±12V, Vds= 0V    | -    | -    | ±10  | μA    |
| Gate-Source Cut-Off Voltage         | Vgs(off) | Id= -1mA, Vds= -10V   | -0.5 | -    | -1.2 | V     |
| Drain-Source On-State Resistance *1 | Rds(on)  | Id= -0.4A, Vgs= -4.5V | -    | 0.23 | 0.30 | Ω     |
|                                     |          | Id= -0.4A, Vgs= -2.5V | -    | 0.37 | 0.50 | Ω     |
| Forward Transfer Admittance *1      | Yfs      | Id= -0.4A, Vds= -10V  | -    | 1.5  | -    | 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<br>f= 1MHz | -    | 180  | -    | pF    |
| Output Capacitance   | Coss   |                              | -    | 120  | -    | pF    |
| Feedback Capacitance | Crss   |                              | -    | 60   | -    | pF    |

### Switching Characteristics

Ta = 25°C

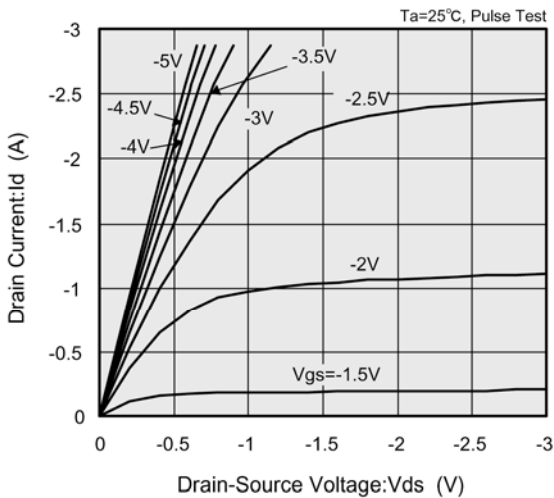
| PARAMETER           | SYMBOL   | CONDITIONS                       | MIN. | TYP. | MAX. | UNITS |
|---------------------|----------|----------------------------------|------|------|------|-------|
| Turn-On Delay Time  | td (on)  | Vgs= -5V, Id= -0.4A<br>Vdd= -10V | -    | 5    | -    | ns    |
| Rise Time           | tr       |                                  | -    | 20   | -    | ns    |
| Turn-Off Delay Time | td (off) |                                  | -    | 55   | -    | ns    |
| Fall Time           | tf       |                                  | -    | 70   | -    | ns    |

### Thermal Characteristics

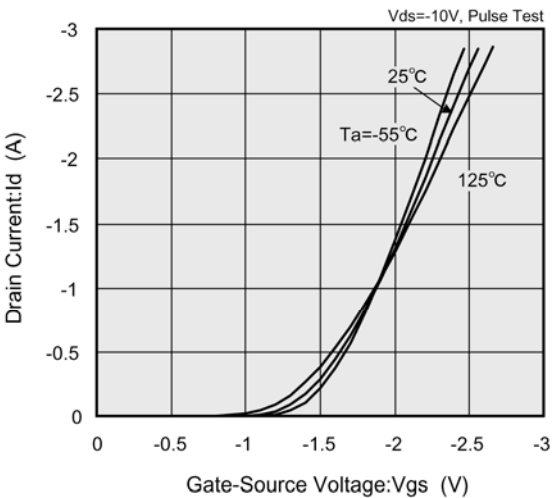
| PARAMETER                             | SYMBOL     | CONDITIONS                 | MIN. | TYP. | MAX. | UNITS |
|---------------------------------------|------------|----------------------------|------|------|------|-------|
| Thermal Resistance (Channel-Ambience) | Rth (ch-a) | Implement on a ceramic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

■ TYPICAL PERFORMANCE CHARACTERISTICS

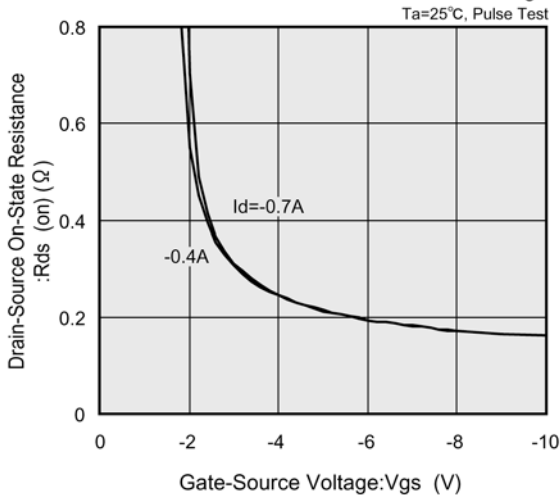
(1) Drain Current vs. Drain-Source Voltage



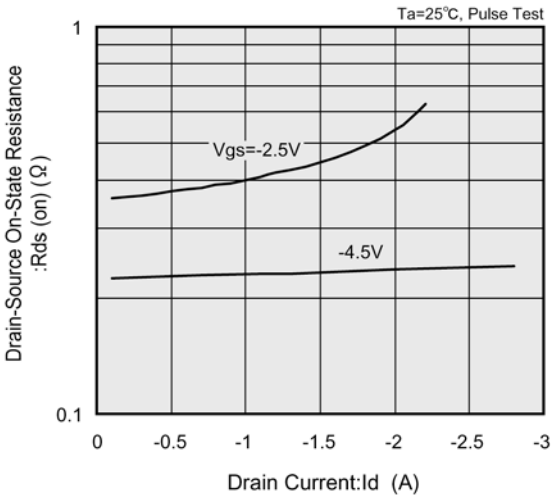
(2) Drain Current vs. Gate-Source Voltage



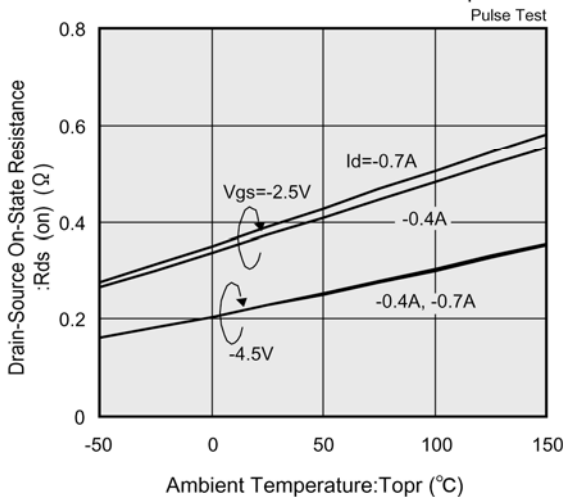
(3) Drain-Source On-State Resistance vs. Gate-Source Voltage



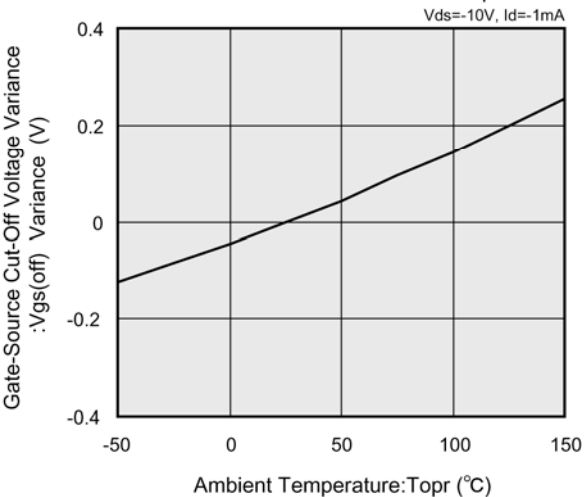
(4) Drain-Source On-State Resistance vs. Drain Current



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

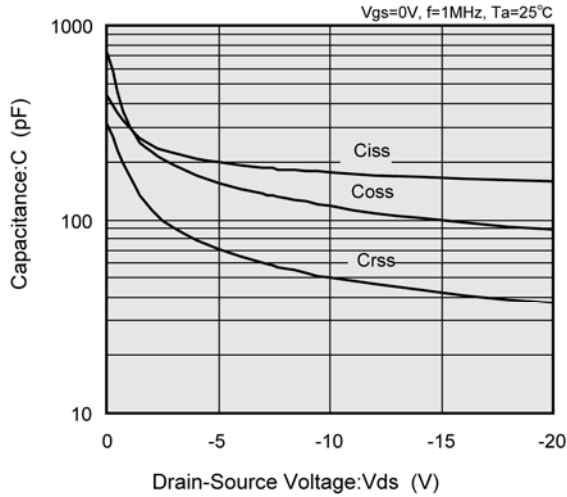


(6) Gate Source Cut-Off Voltage Variance vs. Ambient Temperature

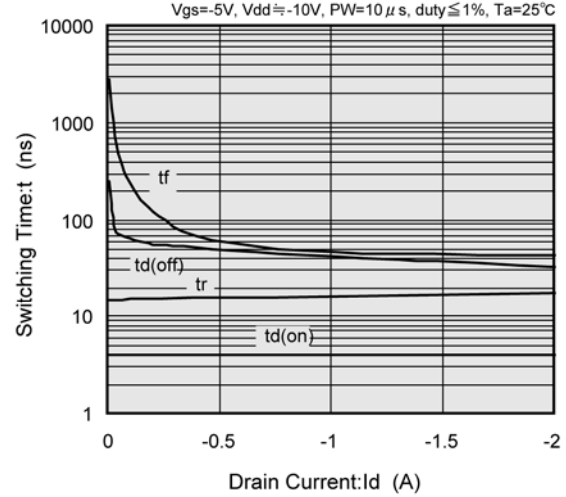


## TYPICAL PERFORMANCE CHARACTERISTICS (Continued)

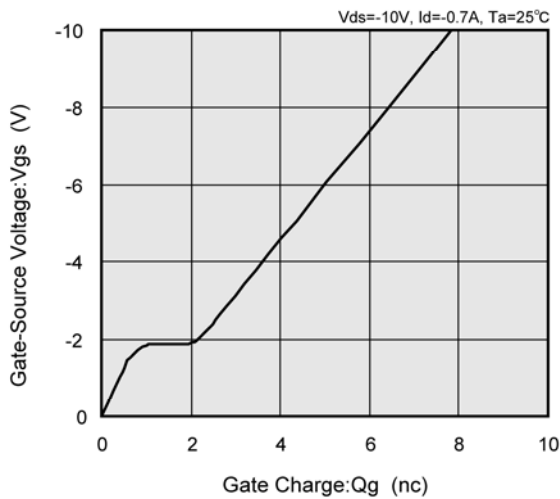
(7) Capacitance vs. Drain-Source Voltage



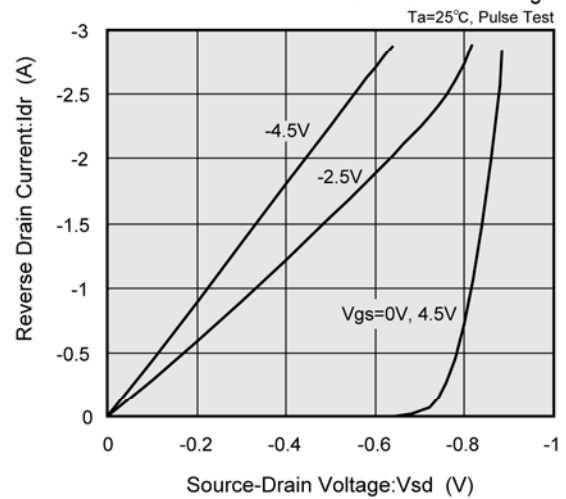
(8) Switching Time vs. Drain Current



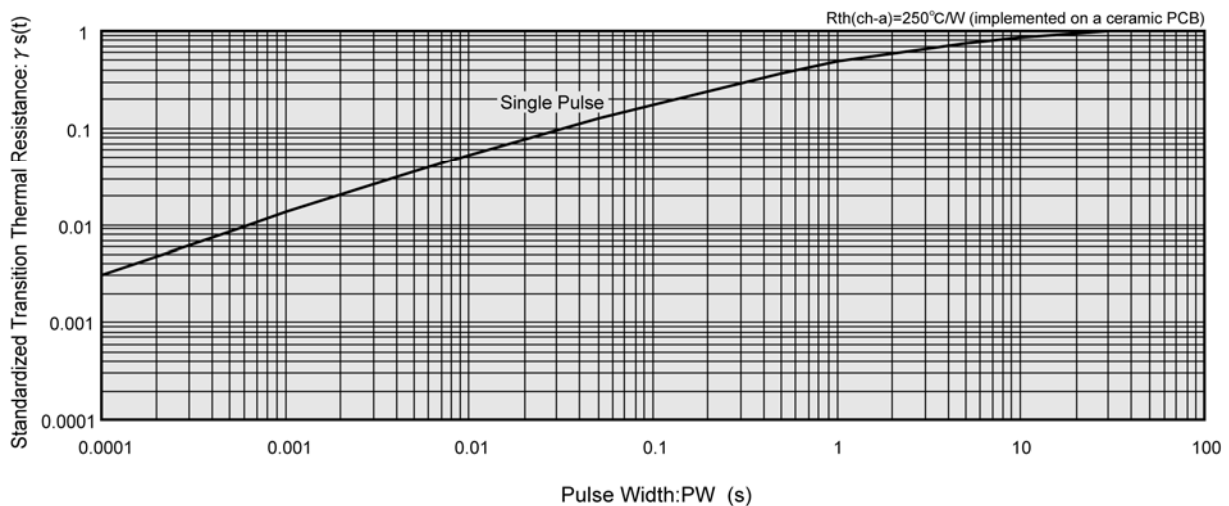
(9) Gate-Source Voltage vs. Gate Charge



(10) Reverse Drain Current vs. Source-Drain Voltage



(11) Standardized Transition Thermal Resistance vs. Pulse Width



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