

Power MOSFET

■ GENERAL DESCRIPTION

The XP151A13A0MR-G is an N-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.

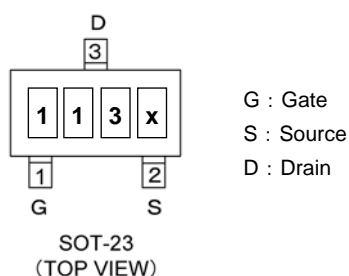
In order to counter static, a gate protect diode is built-in.

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

■ APPLICATIONS

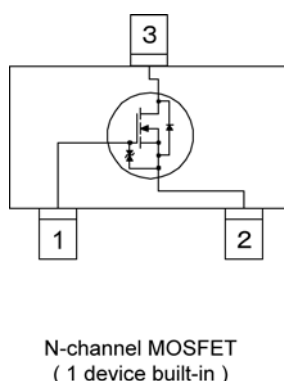
- Notebook PCs
- Cellular and portable phones
- On-board power supplies
- Li-ion battery systems

■ PIN CONFIGURATION/MARKING



* x represents production lot number.

■ EQUIVALENT CIRCUIT



■ FEATURES

Low On-State Resistance : $R_{ds(on)} = 0.1 \Omega @ V_{gs} = 4.5V$
 : $R_{ds(on)} = 0.14 \Omega @ V_{gs} = 2.5V$
 : $R_{ds(on)} = 0.25 \Omega @ V_{gs} = 1.5V$

Ultra High-Speed Switching

Gate Protect Diode Built-in

Driving Voltage : 1.5V

N-Channel Power MOSFET

DMOS Structure

Small Package : SOT-23

Environmentally Friendly : EU RoHS Compliant, Pb Free

■ PRODUCT NAMES

| PRODUCTS | PACKAGE | ORDER UNIT |
|-------------------------------|---------|------------|
| XP151A13A0MR | SOT-23 | 3,000/Reel |
| XP151A13A0MR-G ^(*) | SOT-23 | 3,000/Reel |

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

■ ABSOLUTE MAXIMUM RATINGS

Ta = 25°C

| PARAMETER | SYMBOL | RATINGS | UNITS |
|-----------------------------|------------------|---------|-------|
| Drain - Source Voltage | V _{dss} | 20 | V |
| Gate - Source Voltage | V _{gss} | ±8 | V |
| Drain Current (DC) | I _d | 1 | A |
| Drain Current (Pulse) | I _{dp} | 4 | A |
| Reverse Drain Current | I _{dr} | 1 | A |
| Channel Power Dissipation * | P _d | 0.5 | W |
| Channel Temperature | T _{ch} | 150 | °C |
| Storage Temperature | T _{stg} | -55~150 | °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= ±8V, 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= 0.5A, Vgs= 4.5V | - | 0.075 | 0.100 | Ω |
| | | Id= 0.5A, Vgs= 2.5V | - | 0.10 | 0.14 | Ω |
| | | Id= 0.1A, Vgs= 1.5V | - | 0.17 | 0.25 | Ω |
| Forward Transfer Admittance *1 | Yfs | Id= 0.5A, Vds= 10V | - | 4.2 | - | S |
| Body Drain Diode Forward Voltage | Vf | If= 1A, 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 | - | 220 | - | pF |
| Output Capacitance | Coss | | - | 120 | - | pF |
| Feedback Capacitance | Crss | | - | 45 | - | pF |

Switching Characteristics

Ta = 25°C

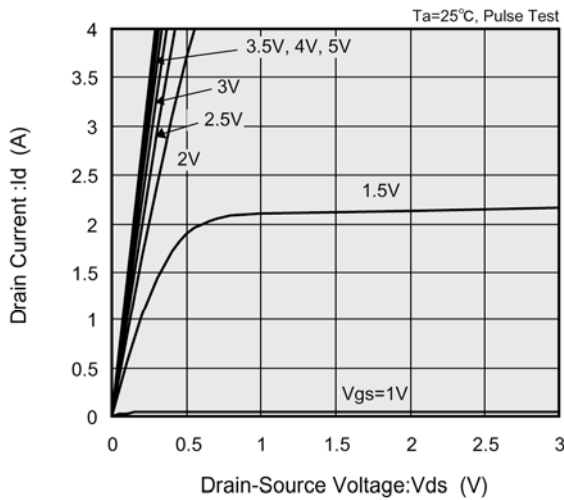
| PARAMETER | SYMBOL | CONDITIONS | MIN. | TYP. | MAX. | UNITS |
|---------------------|----------|-------------------------------|------|------|------|-------|
| Turn-On Delay Time | td (on) | Vgs= 5V, Id= 0.5A Vdd= 10V | - | 10 | - | ns |
| Rise Time | tr | | - | 15 | - | ns |
| Turn-Off Delay Time | td (off) | | - | 75 | - | ns |
| Fall Time | tf | | - | 65 | - | ns |

Thermal Characteristics

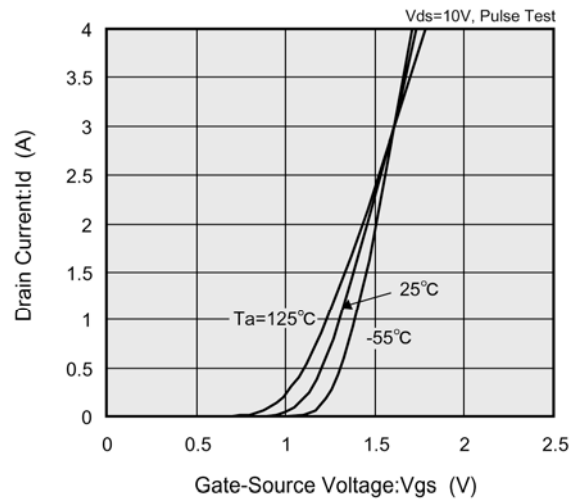
| PARAMETER | SYMBOL | CONDITIONS | MIN. | TYP. | MAX. | UNITS |
|---------------------------------------|------------|----------------------------|------|------|------|-------|
| Thermal Resistance (Channel-Ambience) | Rth (ch-a) | Implement on a ceramic PCB | - | 250 | - | °C/W |

■ TYPICAL PERFORMANCE CHARACTERISTICS

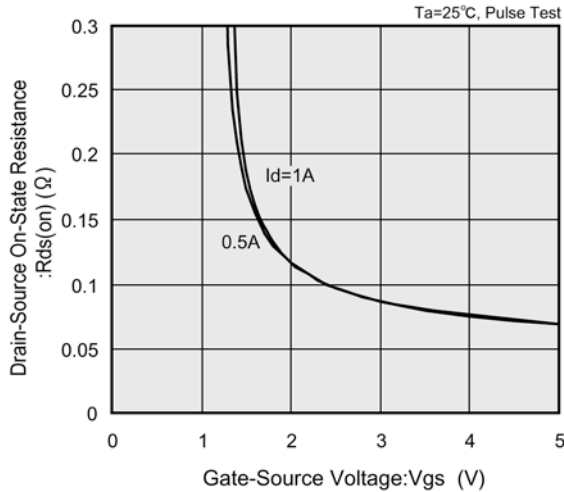
(1) Drain Current vs. Drain-Source Voltage



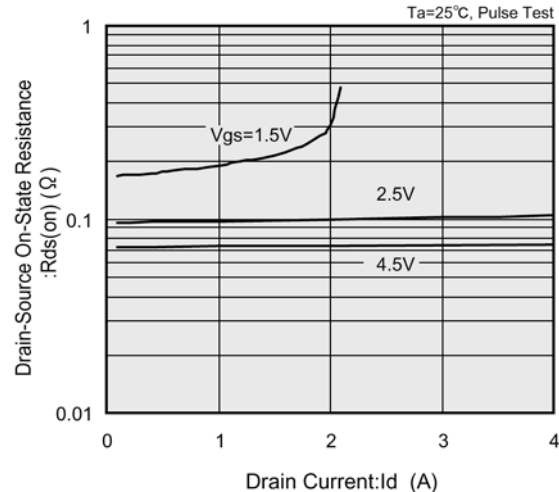
(2) Drain Current vs. Gate-Source Voltage



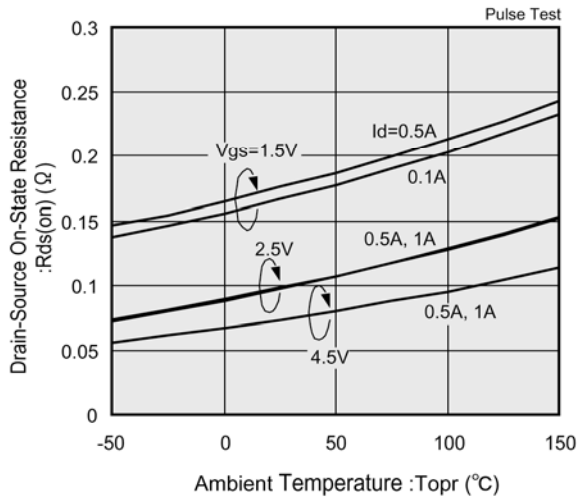
(3) Drain-Source On-State Resistance vs. Gate-Source Voltage



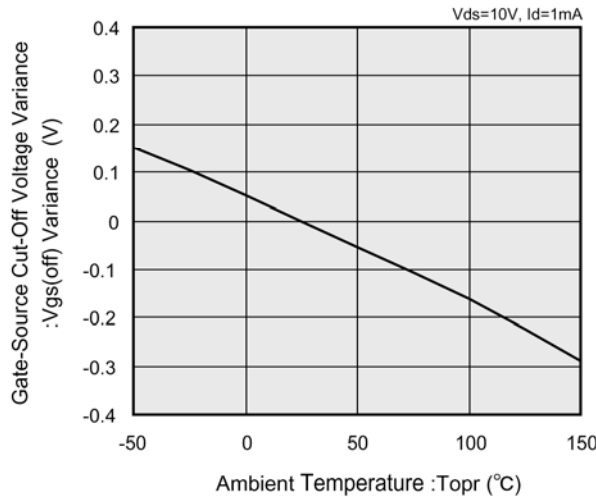
(4) Drain-Source On-State Resistance vs. Drain Current



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

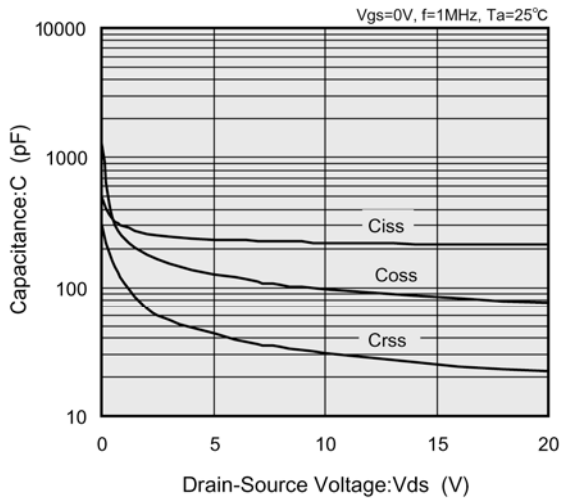


(6) Gate-Source Cut-Off Voltage Variance vs. Ambient Temperature

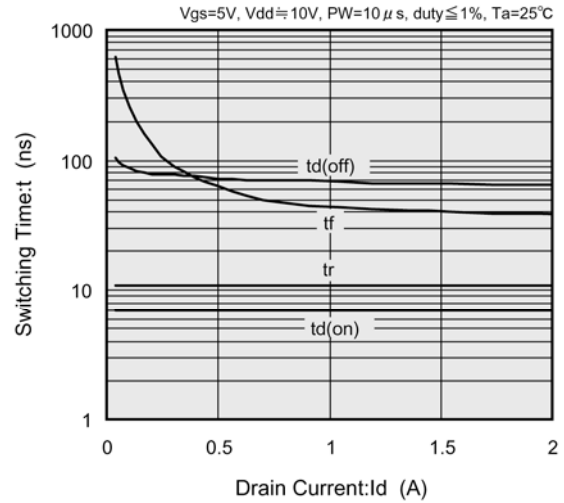


TYPICAL PERFORMANCE CHARACTERISTICS (Continued)

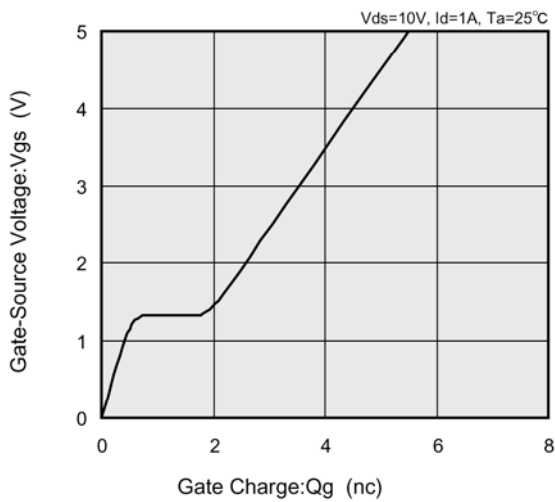
(7) Capacitance vs. Drain-Source Voltage



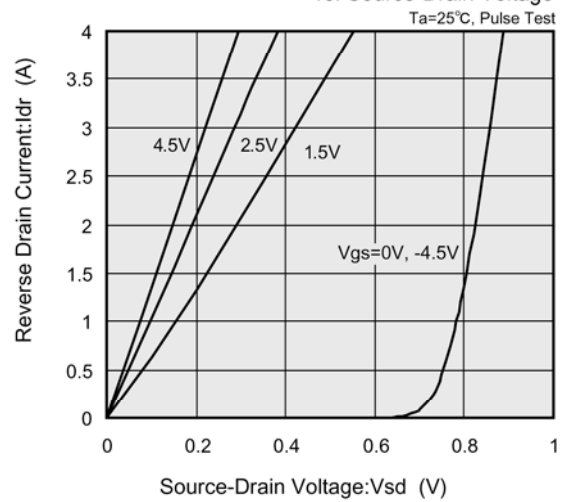
(8) Switching Time vs. Drain Current



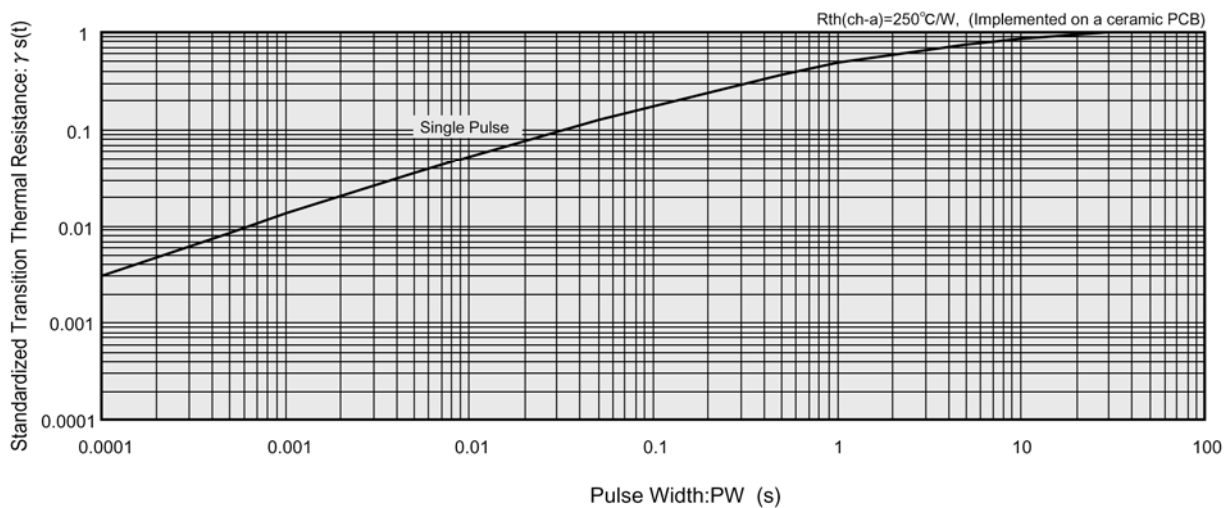
(9) Gate-Source Voltage vs. Gate Charge



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



(11) Standardized transition Thermal Resistance vs. Pulse Width



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