

Power MOSFET

■ GENERAL DESCRIPTION

The XP151A12A2MR-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

■ FEATURES

Low On-State Resistance : $R_{ds(on)} = 0.1 \Omega @ V_{gs} = 4.5V$
 : $R_{ds(on)} = 0.16 \Omega @ V_{gs} = 2.5V$

Ultra High-Speed Switching

Gate Protect Diode Built-in

Driving Voltage : 2.5V

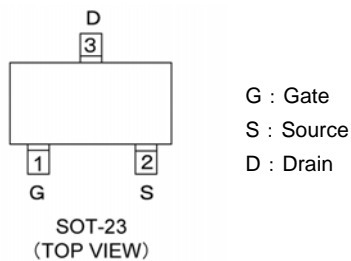
N-Channel Power MOSFET

DMOS Structure

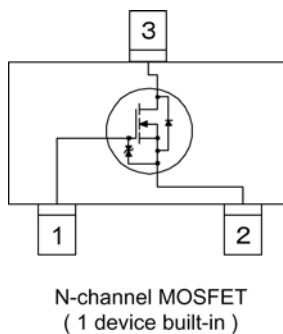
Small Package : SOT-23

Environmentally Friendly : EU RoHS Compliant, Pb Free

■ PIN CONFIGURATION



■ EQUIVALENT CIRCUIT



■ PRODUCT NAMES

Products	Detail
XP151A12A2MR	SOT-23
XP151A12A2MR-G	SOT-23(Halogen & Antimony Free)

* 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.

■ ABSOLUTE MAXIMUM RATINGS

$T_a = 25^\circ C$			
PARAMETER	SYMBOL	RATINGS	UNITS
Drain - Source Voltage	V_{dss}	20	V
Gate - Source Voltage	V_{gss}	± 12	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	$^\circ C$
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	I _{dss}	V _{ds} = 20V, V _{gs} = 0V	-	-	10	μA
Gate-Source Leak Current	I _{gss}	V _{gs} = ±12V, V _{ds} = 0V	-	-	±10	μA
Gate-Source Cut-Off Voltage	V _{gs(off)}	I _d = 1mA, V _{ds} = 10V	0.7	-	1.4	V
Drain-Source On-State Resistance *1	R _{ds(on)}	I _d = 0.5A, V _{gs} = 4.5V	-	0.075	0.1	Ω
		I _d = 0.5A, V _{gs} = 2.5V	-	0.120	0.160	Ω
Forward Transfer Admittance *1	Y _{fs}	I _d = 0.5A, V _{ds} = 10V	-	3.3	-	S
Body Drain Diode Forward Voltage	V _f	I _f = 1A, V _{gs} = 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	C _{iss}	V _{ds} = 10V, V _{gs} =0V f= 1MHz	-	180	-	pF
Output Capacitance	C _{oss}		-	120	-	pF
Feedback Capacitance	C _{rss}		-	45	-	pF

Switching Characteristics

Ta = 25°C

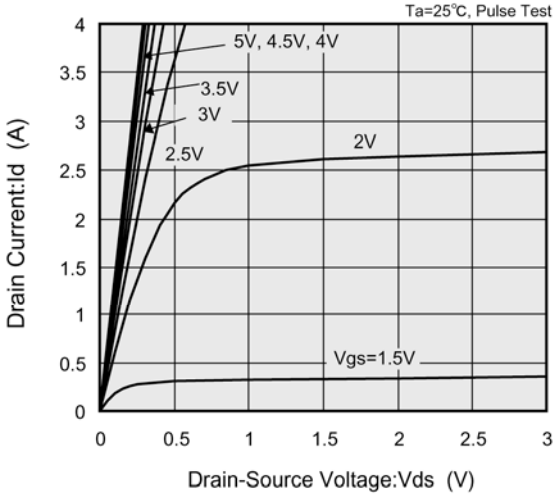
PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNITS
Turn-On Delay Time	t _{d (on)}	V _{gs} = 5V, I _d = 0.5A V _{dd} = 10V	-	10	-	ns
Rise Time	t _r		-	15	-	ns
Turn-Off Delay Time	t _{d (off)}		-	50	-	ns
Fall Time	t _f		-	45	-	ns

Thermal Characteristics

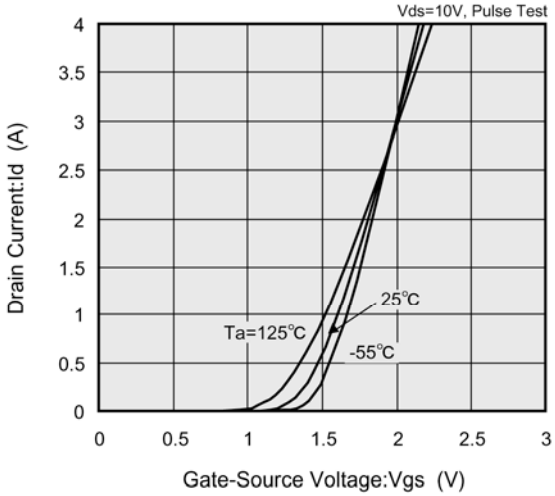
PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNITS
Thermal Resistance (Channel-Ambience)	R _{th (ch-a)}	Implement on a ceramic PCB	-	250	-	°C/W

TYPICAL PERFORMANCE CHARACTERISTICS

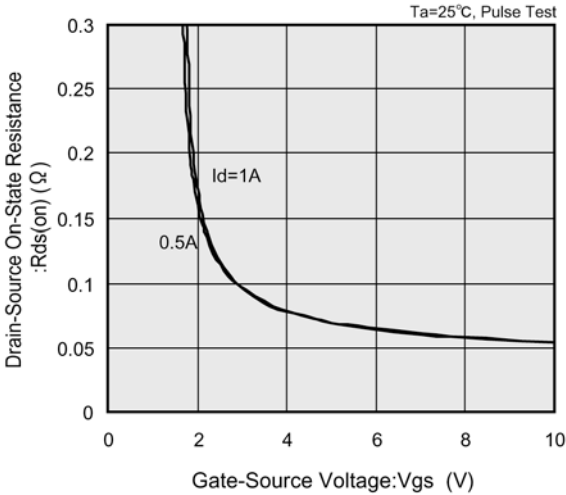
(1) Drain Current vs. Drain-Source Voltage



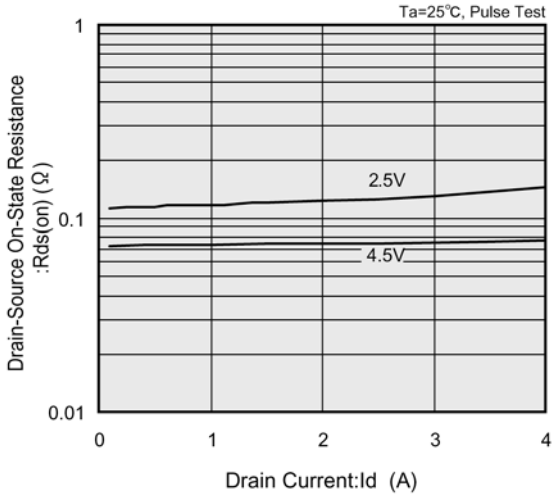
(2) Drain Current vs. Gate-Source Voltage



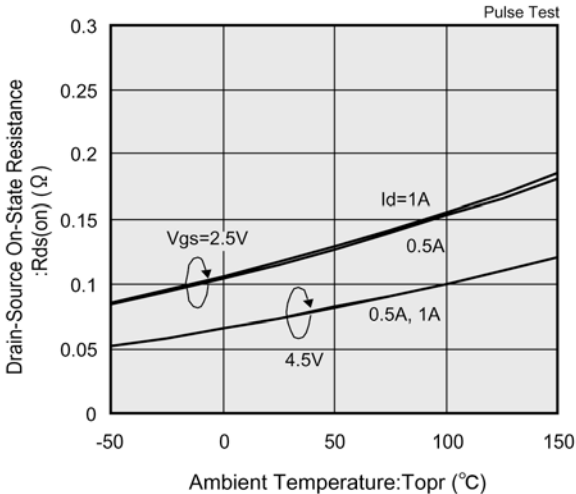
(3) Drain-Source On-State Resistance vs. Gate-Source Voltage



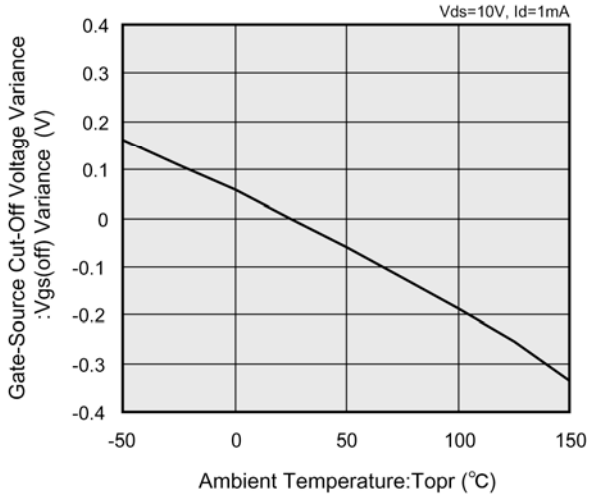
(4) Drain-Source On-State Resistance vs. Drain Current



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

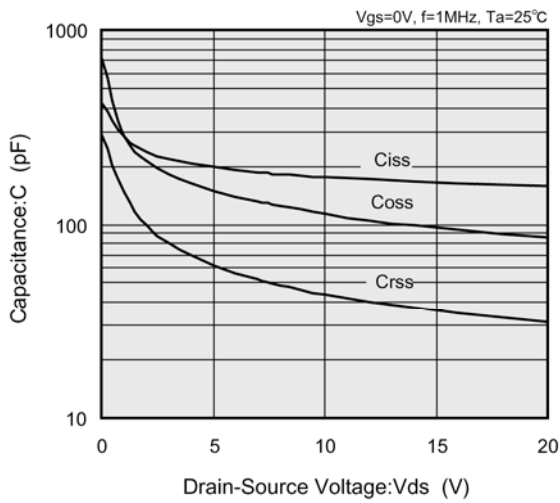


(6) Gate Source Cut-Off Voltage Variance vs. Ambient Temperature

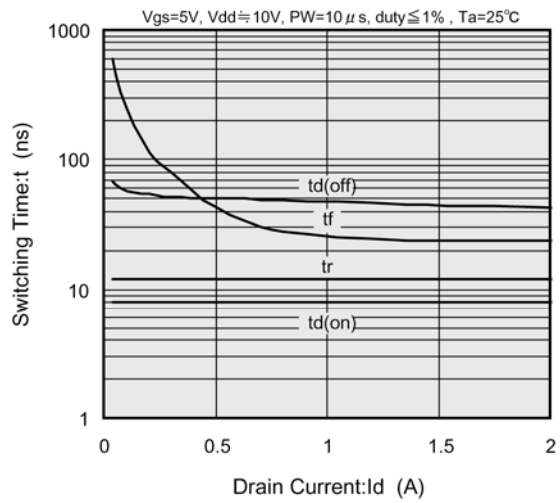


TYPICAL PERFORMANCE CHARACTERISTICS (Continued)

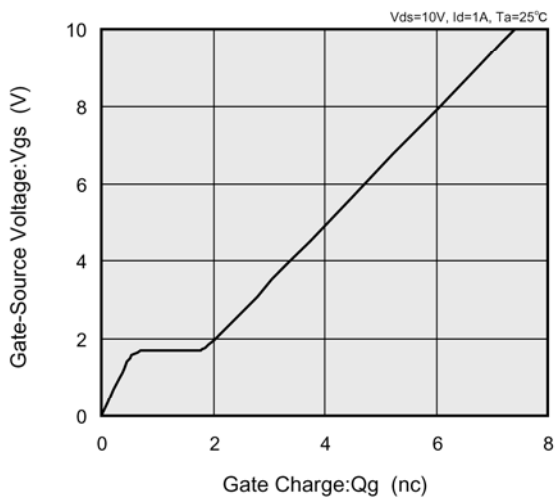
(7) Capacitance vs. Drain-Source Voltage



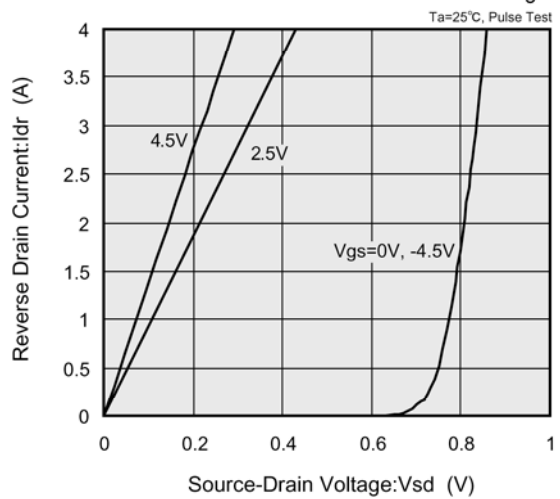
(8) Switching Time vs. Drain Current



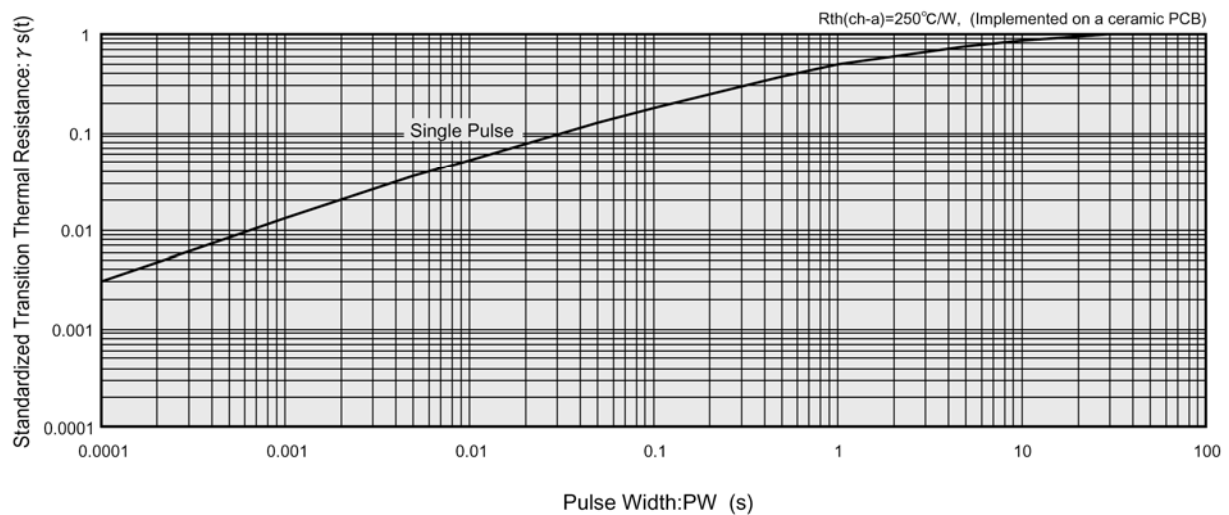
(9) Gate-Source Voltage vs. Gate Charge



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



(11) Standardized transition Thermal Resistance vs. Pulse Width



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