

- ◆ N-Channel Power MOS FET
- ◆ DMOS Structure
- ◆ Low On-State Resistance :  $0.1\Omega$  (max)
- ◆ Ultra High-Speed Switching
- ◆ Gate Protect Diode Built-in
- ◆ SOT - 23 Package

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

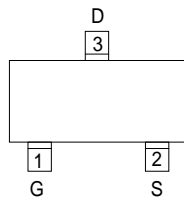
### ■ General Description

The XP151A12A2MR is a N-Channel Power MOS FET 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.

### ■ 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**
- Operational Voltage** : 2.5V
- High density mounting** : SOT - 23

### ■ Pin Configuration

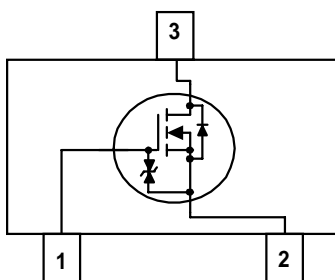


SOT - 23 Top View

### ■ Pin Assignment

PIN NUMBER	PIN NAME	FUNCTION
1	G	Gate
2	S	Source
3	D	Drain

### ■ Equivalent Circuit



N - Channel MOS FET  
( 1 device built-in )

### ■ Absolute Maximum Ratings

$T_a = 25^\circ\text{C}$			
PARAMETER	SYMBOL	RATINGS	UNITS
Drain - Source Voltage	$V_{dss}$	20	V
Gate - Source Voltage	$V_{gss}$	$\pm 12$	V
Drain Current (DC)	$I_d$	1	A
Drain Current (Pulse)	$I_{dp}$	4	A
Reverse Drain Current	$I_{dr}$	1	A
Continuous Channel Power Dissipation (note)	$P_d$	0.5	W
Channel Temperature	$T_{ch}$	150	$^\circ\text{C}$
Storage Temperature	$T_{stg}$	-55 to 150	$^\circ\text{C}$

( note ) : 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 = 20 , Vgs = 0V			10	μA
Gate-Source Leakage Current	Igss	Vgs = ± 12 , Vds = 0V			± 10	μA
Gate-Source Cut-off Voltage	Vgs (off)	Id = 1mA , Vds = 10V	0.7		1.4	V
Drain-Source On-state Resistance ( note )	Rds ( on )	Id = 0.5A , Vgs = 4.5V		0.075	0.1	Ω
		Id = 0.5A , Vgs = 2.5V		0.12	0.16	Ω
Forward Transfer Admittance ( note )	Yfs	Id = 0.5A , Vds = 10V		3.3		S
Body Drain Diode Forward Voltage	Vf	If = 1A , Vgs = 0V		0.8	1.1	V

( note ) : Effective during pulse test.

### Dynamic characteristics

Ta=25°C

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Input Capacitance	Ciss	Vds = 10V , Vgs = 0V f = 1 MHz		180		pF
Output Capacitance	Coss			120		pF
Feedback Capacitance	Crss			45		pF

### Switching characteristics

Ta=25°C

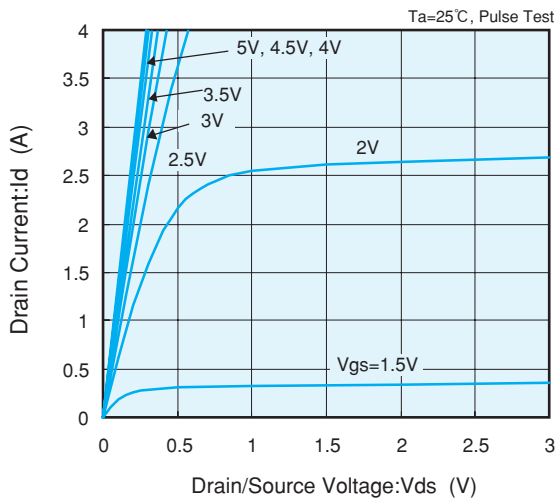
PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Turn-on Delay Time	td ( on )	Vgs = 5V , Id = 0.5A Vdd = 10V		10		ns
Rise Time	tr			15		ns
Turn-off Delay Time	td ( off )			50		ns
Fall Time	tf			45		ns

### Thermal characteristics

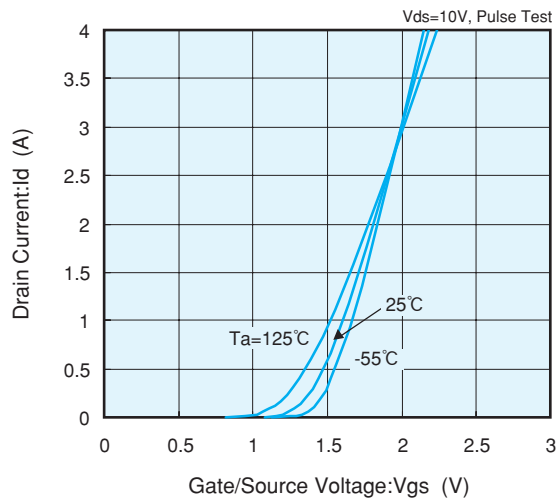
PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Thermal Resistance ( channel - surroundings )	Rth ( ch - a )	Implement on a ceramic PCB		250		°C / W

### XP151A12A2MR Electrical Characteristics

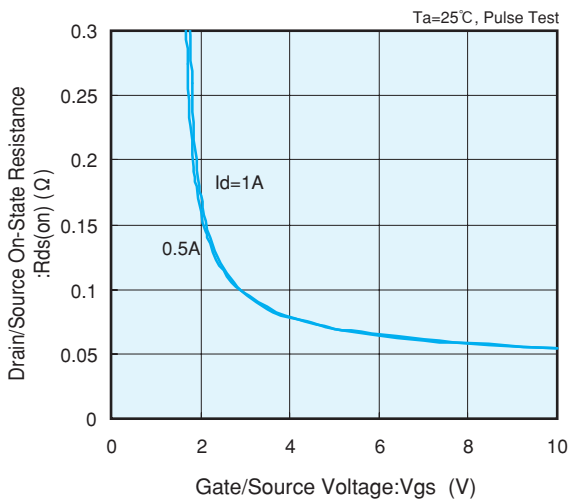
Drain Current vs. Drain/Source Voltage



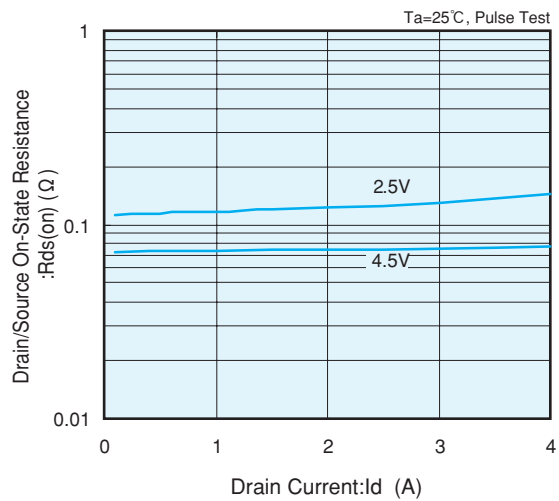
Drain Current vs. Gate/Source Voltage



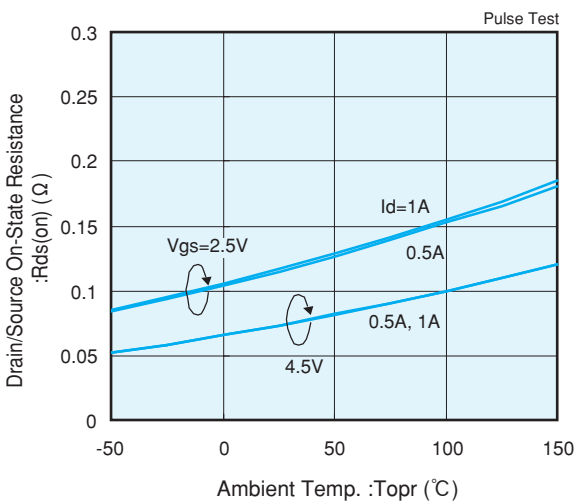
Drain/Source On-State Resistance vs. Gate/Source Voltage



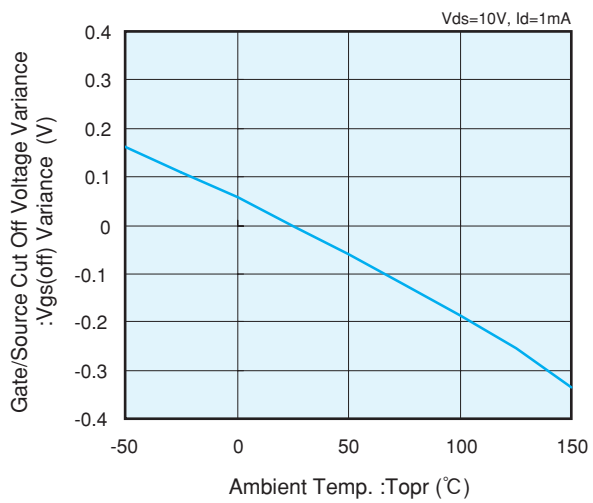
Drain/Source On-State Resistance vs. Drain Current



Drain/Source On-State Resistance vs. Ambient Temp.



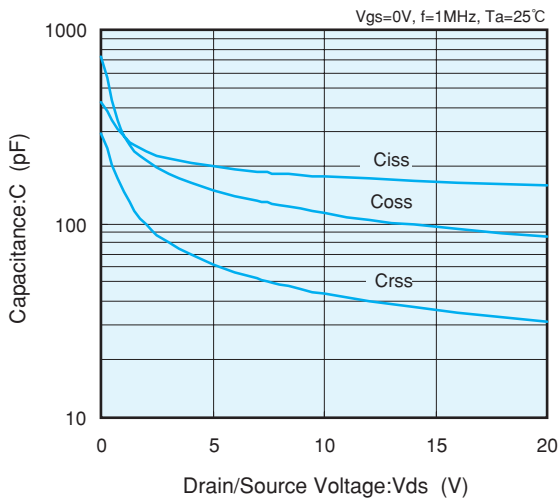
Gate/Source Cut Off Voltage Variance vs. Ambient Temp.



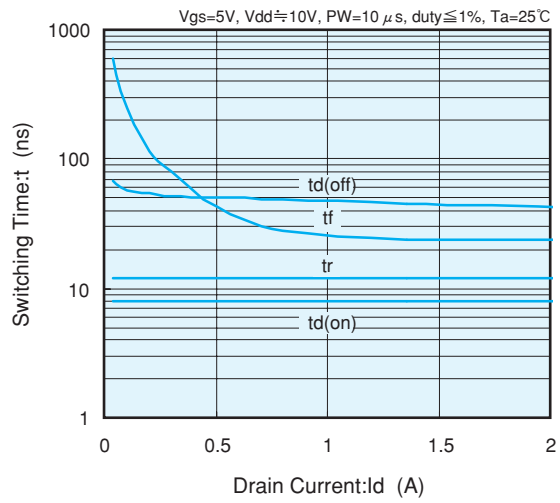
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## ■ XP151A12A2MR Electrical Characteristics

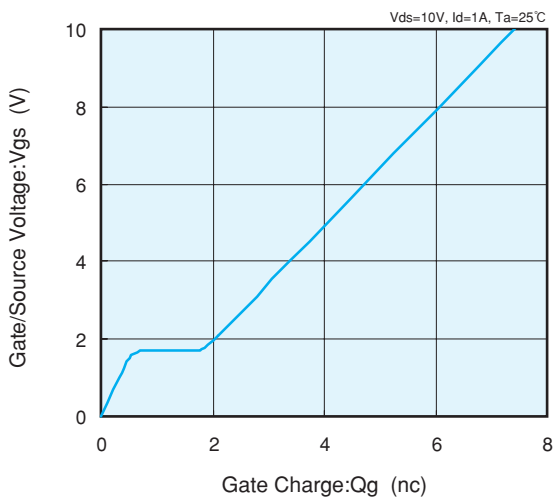
Capacitance vs. Drain/Source Voltage



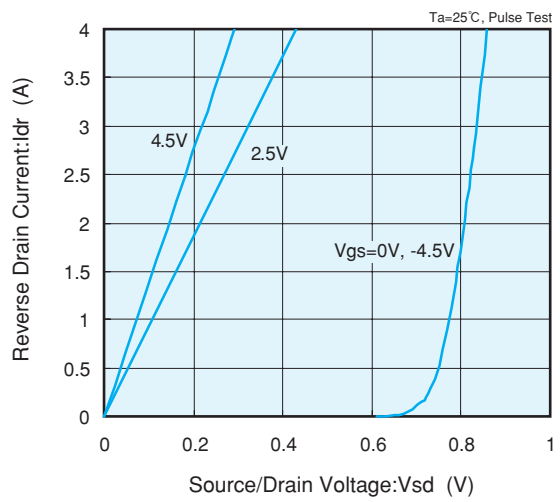
Switching Time vs. Drain Current



Gate/Source Voltage vs. Gate Charge



Reverse Drain Current vs. Source/Drain Voltage



Standardized Transition Thermal Resistance vs. Pulse Width

