

XP151A12A2MR



Power MOS FET

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

General Description

The XP151A12A2MR is an 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.

Applications

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

Features

Low on-state resistance : $R_{ds(on)} = 0.1\Omega$ ($V_{gs} = 4.5V$)
: $R_{ds(on)} = 0.16\Omega$ ($V_{gs} = 2.5V$)

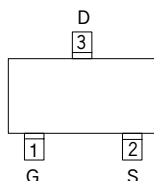
Ultra high-speed switching

Gate Protect Diode Built-in

Operational Voltage : 2.5V

High density mounting : SOT-23

Pin Configuration



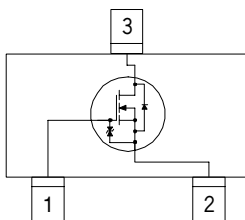
SOT-23
(TOP VIEW)

Pin Assignment

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

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Equivalent Circuit



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

Absolute Maximum Ratings

Ta=25°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
Continuous Channel Power Dissipation (note)	P _d	0.5	W
Channel Temperature	T _{ch}	150	°C
Storage Temperature	T _{stg}	-55 ~ 150	°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	I _{dss}	V _{ds} = 20V , V _{gs} = 0V			10	μA
Gate-Source Leakage 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 (note)	R _{ds (on)}	I _d = 0.5A , V _{gs} = 4.5V		0.075	0.1	Ω
		I _d = 0.5A , V _{gs} = 2.5V		0.12	0.16	Ω
Forward Transfer Admittance (note)	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

(note) : 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 = 1 MHz		180		pF
Output Capacitance	C _{oss}			120		pF
Feedback Capacitance	C _{rss}			45		pF

Switching Characteristics

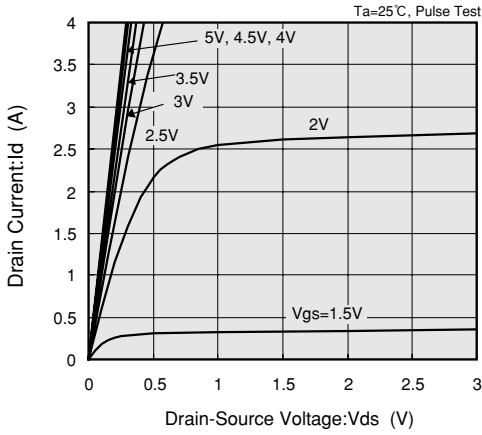
Ta=25°C						
PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Turn-on Delay Time	t _{d (on)}	V _{gs} = 5V , I _d = 0.5A V _{dd} = 10V		10		ns
Rise Time	t _r			15		ns
Turn-off Delay Time	t _{d (off)}			50		ns
Fall Time	t _f			45		ns

Thermal Characteristics

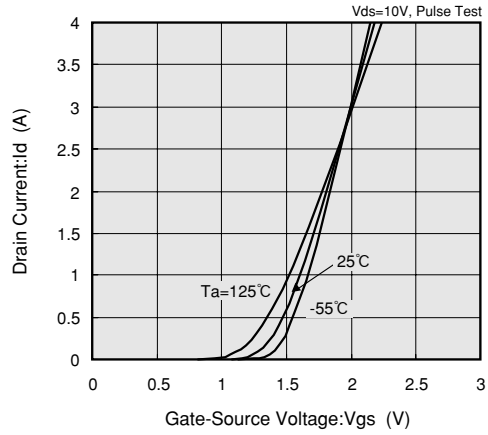
PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Thermal Resistance (channel-ambience)	R _{th (ch-a)}	Implement on a ceramic PCB		250		°C / W

Typical Performance Characteristics

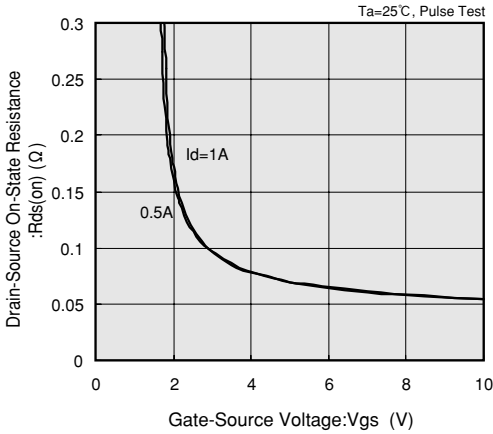
DRAIN CURRENT vs. DRAIN-SOURCE VOLTAGE



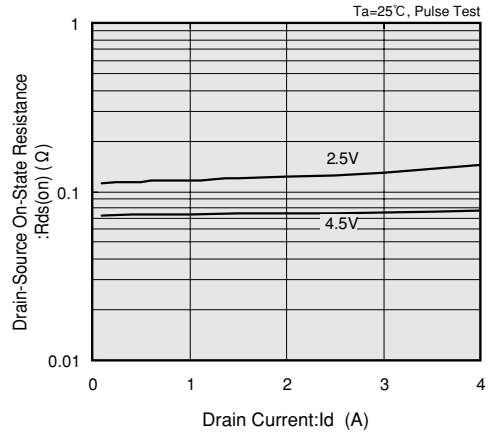
DRAIN CURRENT vs. GATE-SOURCE VOLTAGE



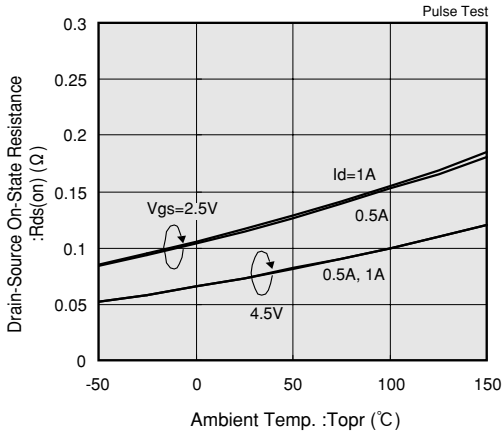
DRAIN-SOURCE ON-STATE RESISTANCE vs. GATE-SOURCE VOLTAGE



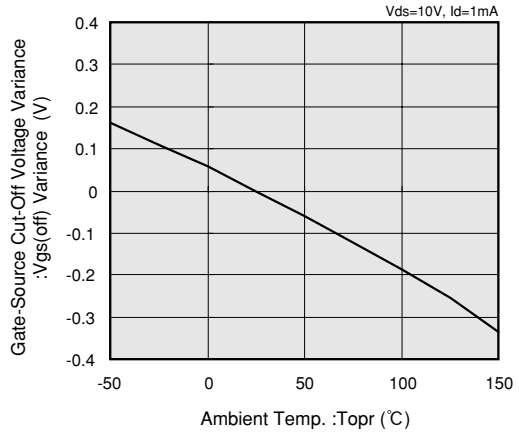
DRAIN-SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



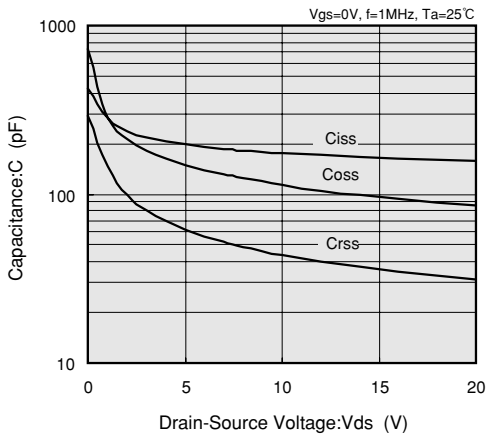
DRAIN-SOURCE ON-STATE RESISTANCE vs. AMBIENT TEMPERATURE



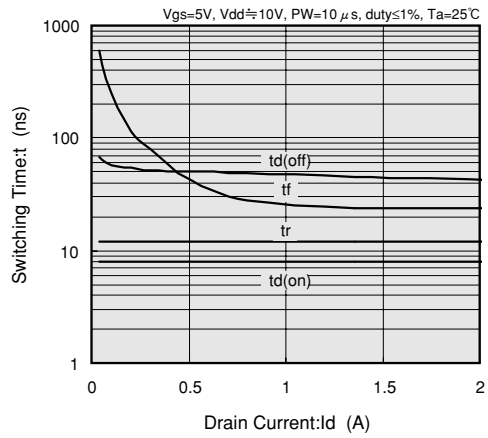
GATE-SOURCE CUT-OFF VOLTAGE VARIANCE vs. AMBIENT TEMPERATURE



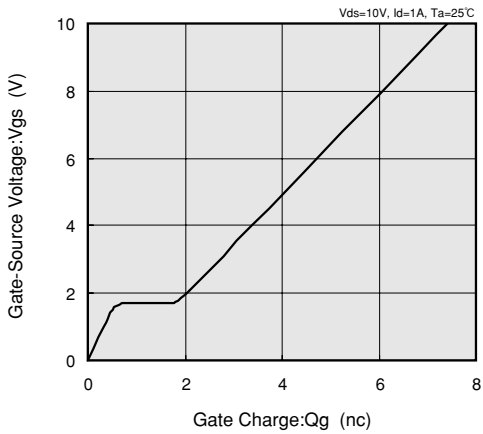
CAPACITANCE vs. DRAIN-SOURCE VOLTAGE



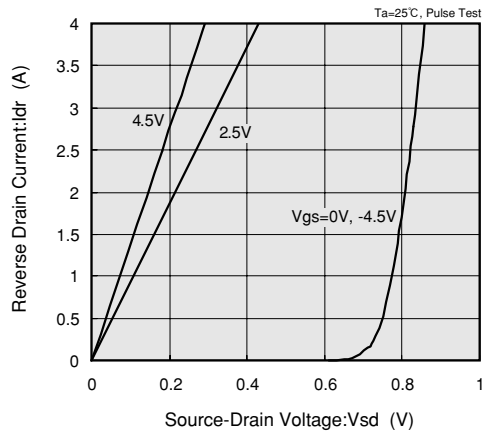
SWITCHING TIME vs. DRAIN CURRENT



GATE-SOURCE VOLTAGE vs. GATE CHARGE



REVERSE DRAIN CURRENT vs. SOURCE-DRAIN VOLTAGE



STANDARDIZED TRANSITION THERMAL RESISTANCE vs. PULSE WIDTH

