

Power MOSFET

■ GENERAL DESCRIPTION

The XP151A11B0MR 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 : $R_{ds(on)} = 0.12 \Omega @ V_{gs} = 10V$
: $R_{ds(on)} = 0.17 \Omega @ V_{gs} = 4.5V$

Ultra High-Speed Switching

Gate Protect Diode Built-in

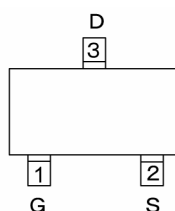
Driving Voltage : 4.5V

N-Channel Power MOSFET

DMOS Structure

Small Packabe : SOT-23

■ PIN CONFIGURATION

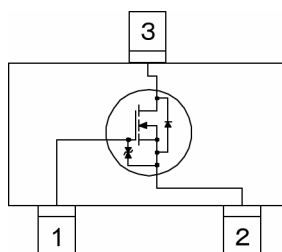


SOT-23
(TOP VIEW)

■ PIN ASSIGNMENT

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

■ EQUIVALENT CIRCUIT



N-channel MOSFET
(1 device built-in)

■ ABSOLUTE MAXIMUM RATINGS

$T_a = 25^\circ\text{C}$

PARAMETER	SYMBOL	RATINGS	UNITS
Drain - Source Voltage	V_{dss}	30	V
Gate - Source Voltage	V_{gss}	± 20	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	$^\circ\text{C}$
Storage Temperature Range	T_{stg}	-55~150	$^\circ\text{C}$

* 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= 30V, Vgs= 0V	-	-	10	μA
Gate-Source Leak Current	Igss	Vgs= ±20V, Vds= 0V	-	-	±10	μA
Gate-Source Cut-Off Voltage	Vgs(off)	Id= 1mA, Vds= 10V	1.0	-	3.0	V
Drain-Source On-State Resistance *1	Rds(on)	Id= 0.5A, Vgs= 10V	-	0.09	0.12	Ω
		Id= 0.5A, Vgs= 4.5V	-	0.13	0.17	Ω
Forward Transfer Admittance *1	Yfs	Id= 0.5A, Vds= 10V	-	2.4	-	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	-	150	-	pF
Output Capacitance	Coss		-	90	-	pF
Feedback Capacitance	Crss		-	30	-	pF

Switching Characteristics

Ta = 25°C

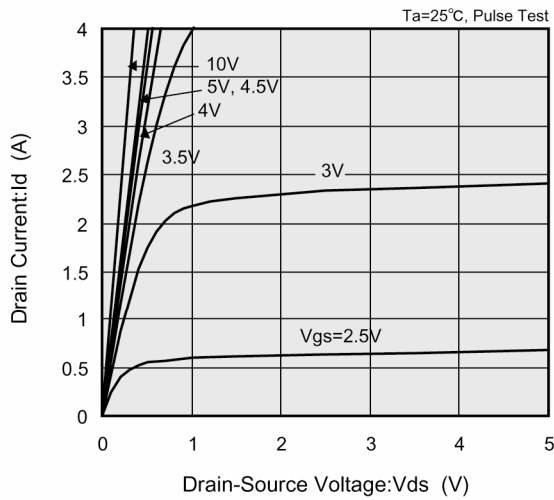
PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNITS
Turn-On Delay Time	td (on)	Vgs= 5V, Id= 0.5A Vdd= 10V	-	10	-	ns
Rise Time	tr		-	15	-	ns
Turn-Off Delay Time	td (off)		-	25	-	ns
Fall Time	tf		-	45	-	ns

Thermal Characteristics

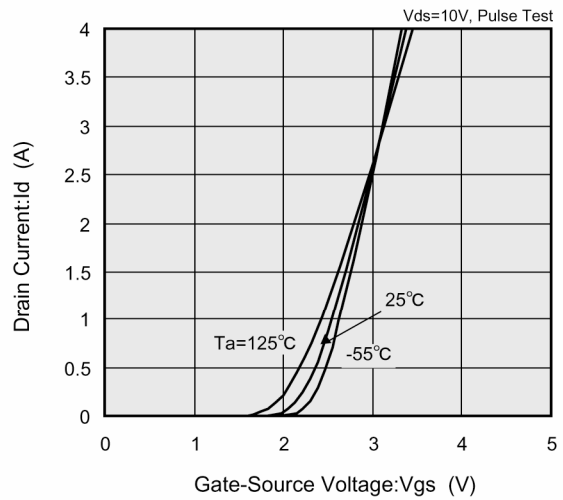
PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNITS
Thermal Resistance (Channel-Ambience)	Rth (ch-a)	Implement on a ceramic PCB	-	250	-	°C/W

TYPICAL PERFORMANCE CHARACTERISTICS

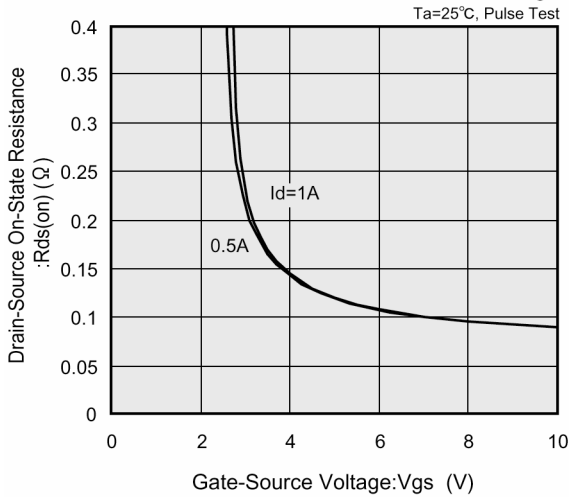
(1) Drain Current vs. Drain-Source Voltage



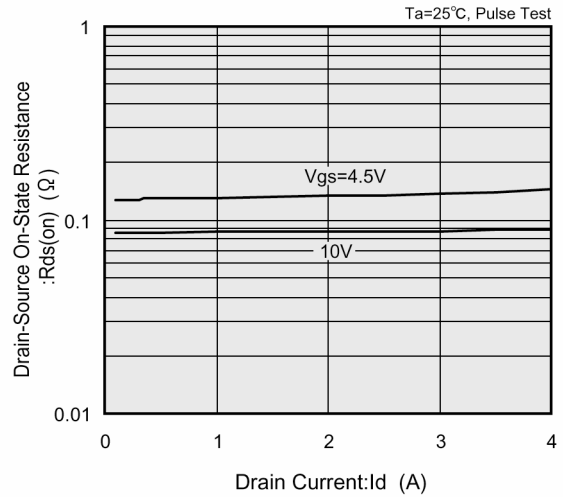
(2) Drain Current vs. Gate-Source Voltage



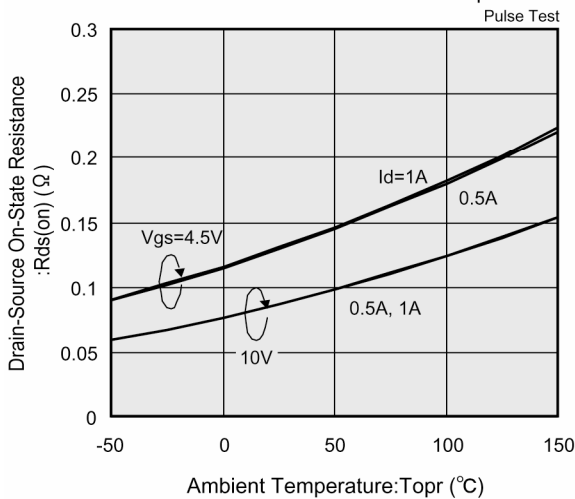
(3) Drain-Source On-State Resistance vs. Gate-Source Voltage



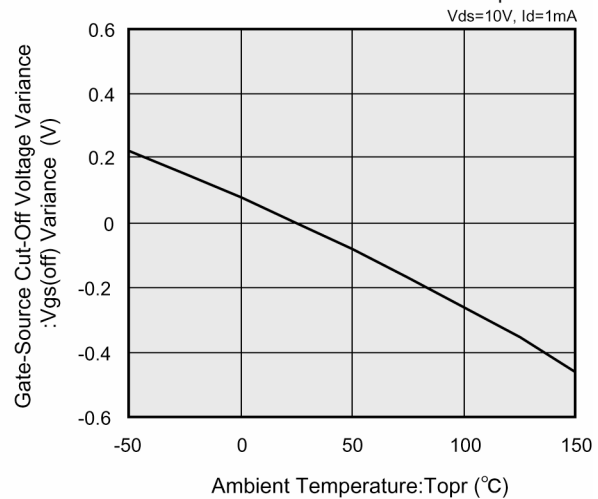
(4) Drain-Source On-State Resistance vs. Drain Current



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

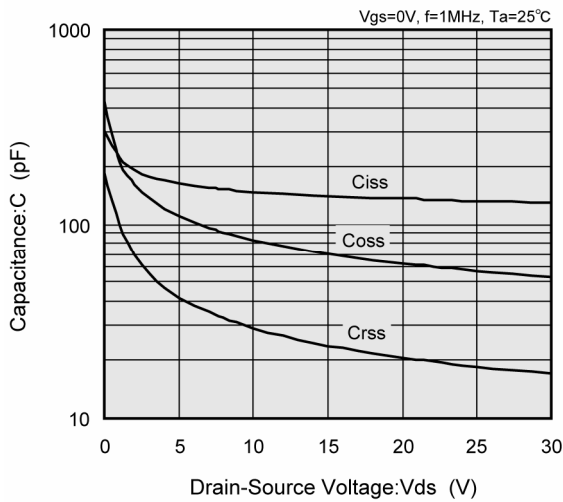


(6) Gate Source Cut-Off Voltage Variance vs. Ambient Temperature

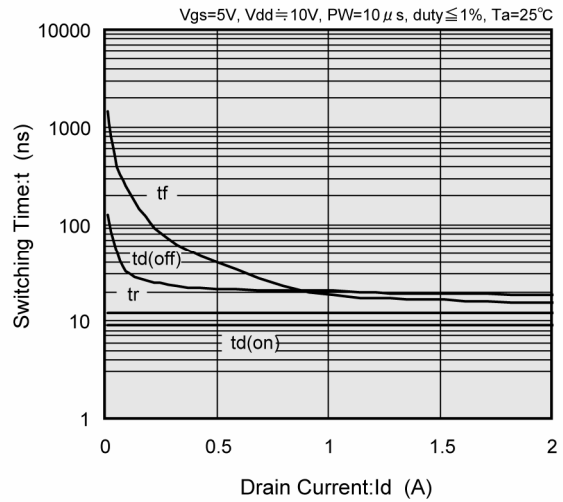


TYPICAL PERFORMANCE CHARACTERISTICS (Continued)

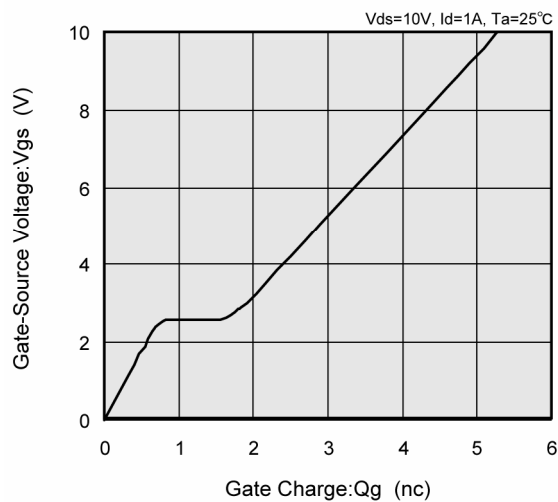
(7) Capacitance vs. Drain-Source Voltage



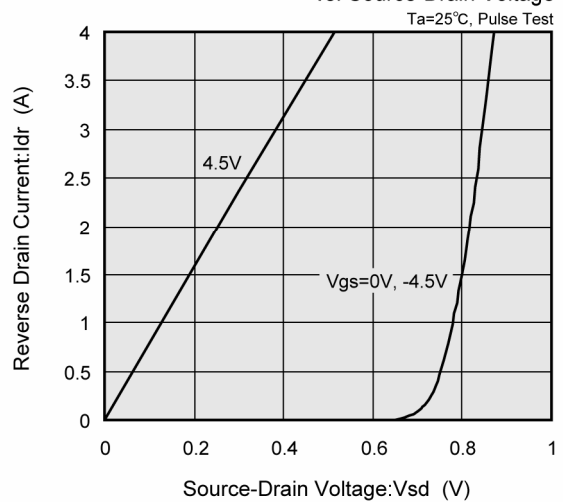
(8) Switching Time vs. Drain Current



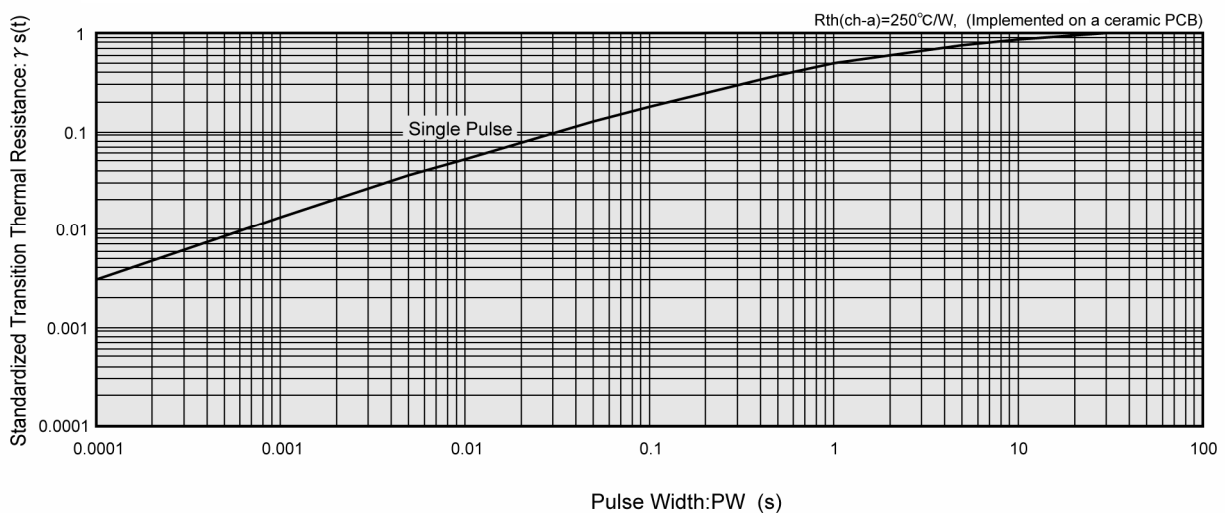
(9) Gate-Source Voltage vs. Gate Charge



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



(11) Standardized transition Thermal Resistance vs. Pulse Width



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