

Power MOSFET

■ GENERAL DESCRIPTION

The XP152A11E5MR is a P-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 : $R_{ds(on)} = 0.25\Omega @ V_{gs} = -10V$
: $R_{ds(on)} = 0.45\Omega @ V_{gs} = -4.5V$

Ultra High-Speed Switching

Gate Protect Diode Built-in

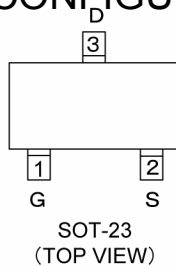
Driving Voltage : -4.5V

P-Channel Power MOSFET

DMOS Structure

Small Package : SOT-23

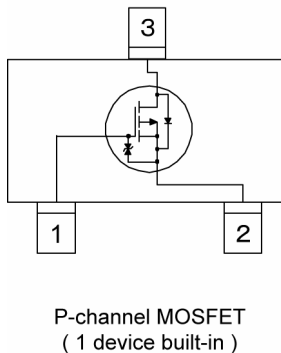
■ PIN CONFIGURATION



■ PIN ASSIGNMENT

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

■ EQUIVALENT CIRCUIT



■ 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	-0.7	A
Drain Current (Pulse)	I_{dp}	-2.8	A
Reverse Drain Current	I_{dr}	-0.7	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	I _{dss}	V _{ds} = -30V, V _{gs} = 0V	-	-	-10	μA
Gate-Source Leak Current	I _{gss}	V _{gs} = ±20V, V _{ds} = 0V	-	-	±10	μA
Gate-Source Cut-Off Voltage	V _{gs(off)}	I _d = -1mA, V _{ds} = -10V	-1.0	-	-3.0	V
Drain-Source On-State Resistance *1	R _{ds(on)}	I _d = -0.4A, V _{gs} = -10V	-	0.20	0.25	Ω
		I _d = -0.4A, V _{gs} = -4.5V	-	0.35	0.45	Ω
Forward Transfer Admittance *1	Y _{fs}	I _d = -0.4A, V _{ds} = -10V	-	1	-	S
Body Drain Diode Forward Voltage	V _f	I _f = -0.7A, 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	-	160	-	pF
Output Capacitance	C _{oss}		-	120	-	pF
Feedback Capacitance	C _{rss}		-	50	-	pF

Switching Characteristics

Ta = 25°C

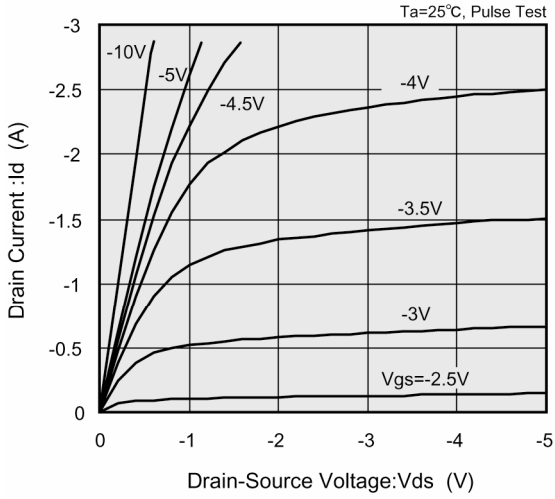
PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNITS
Turn-On Delay Time	t _{d (on)}	V _{gs} = -5V, I _d = -0.4A V _{dd} = -10V	-	10	-	ns
Rise Time	t _r		-	25	-	ns
Turn-Off Delay Time	t _{d (off)}		-	25	-	ns
Fall Time	t _f		-	40	-	ns

Thermal Characteristics

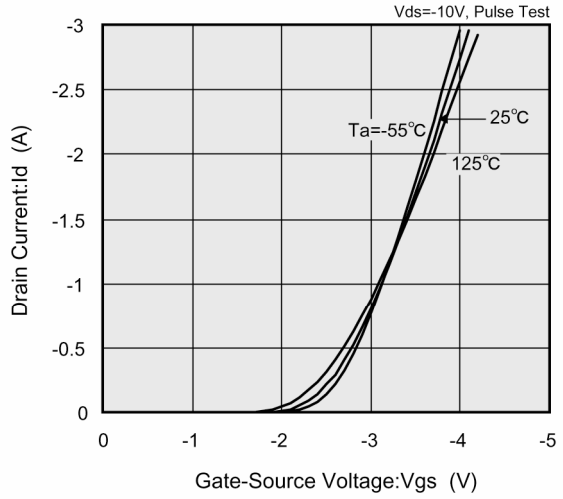
PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNITS
Thermal Resistance (Channel-Ambience)	R _{th (ch-a)}	Implement on a ceramic PCB	-	250	-	°C/W

TYPICAL PERFORMANCE CHARACTERISTICS

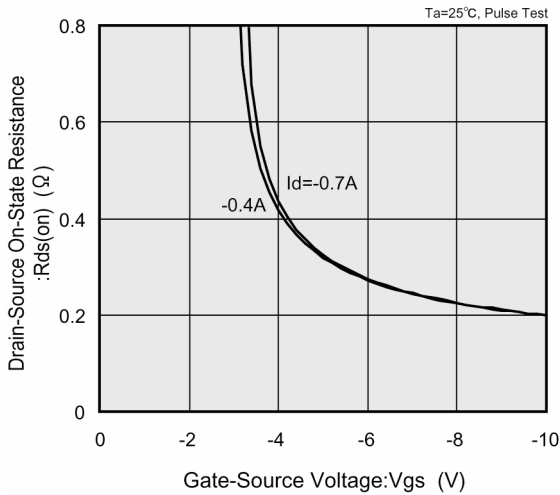
(1) Drain Current vs. Drain-Source Voltage



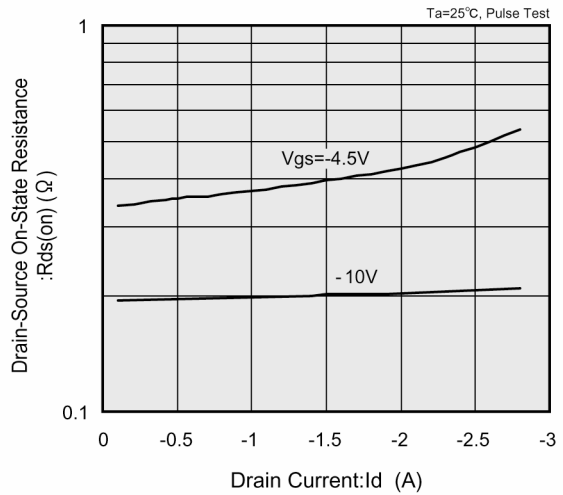
(2) Drain Current vs. Drain-Source Voltage



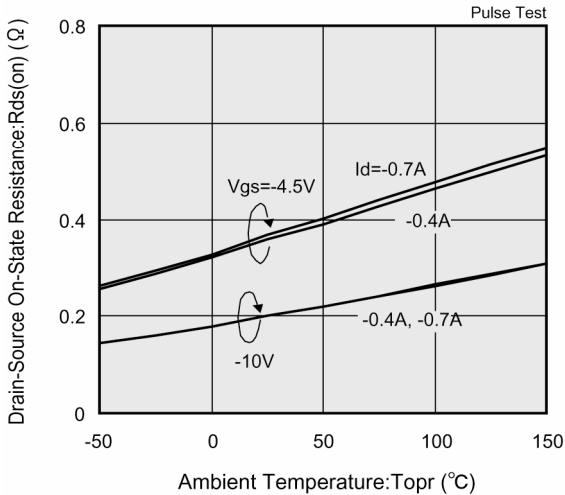
(3) Drain-Source On-State Resistance vs. Gate-Source Voltage



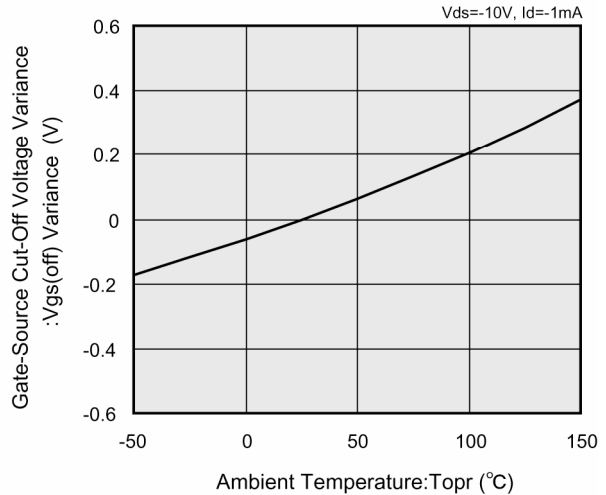
(4) Drain-Source On-State Resistance vs. Drain Current



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

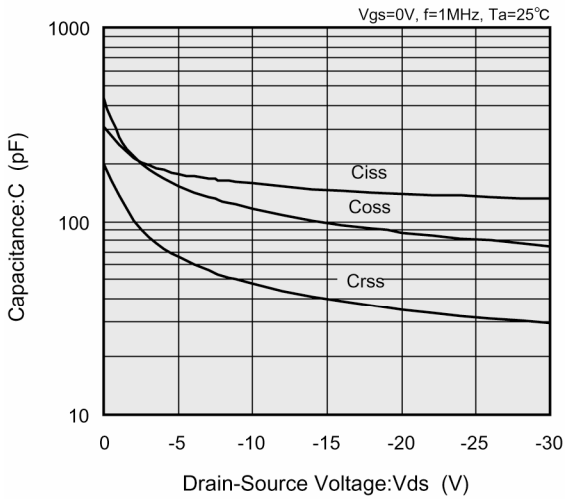


(6) Gate Source Cut-Off Voltage Variance vs. Ambient Temperature

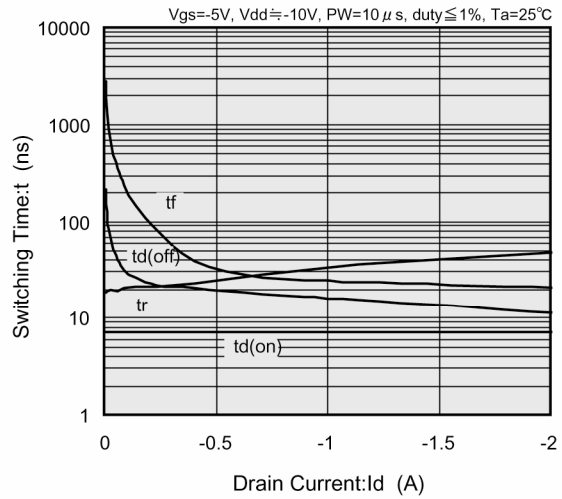


TYPICAL PERFORMANCE CHARACTERISTICS (Continued)

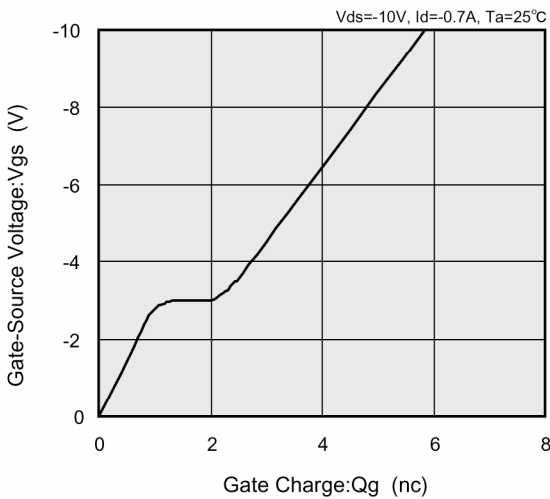
(7) Capacitance vs. Drain-Source Voltage



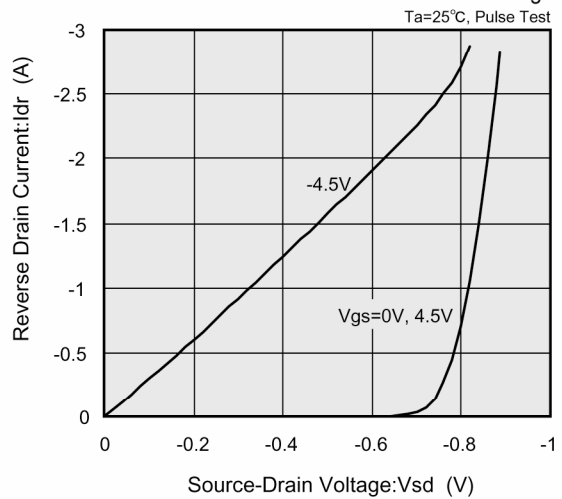
(8) Switching Time vs. Drain Current



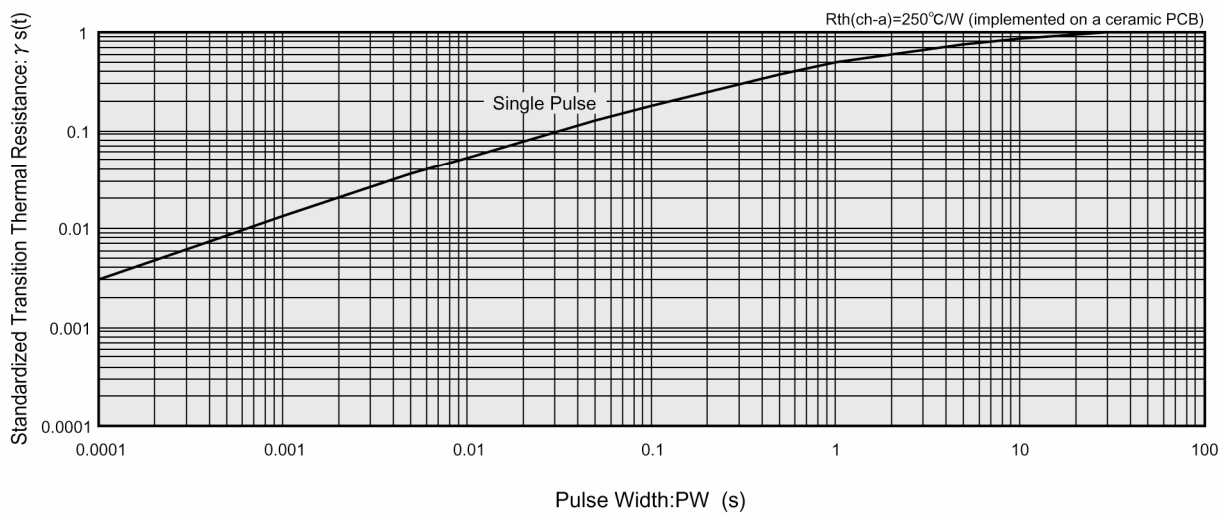
(9) Gate-Source Voltage vs. Gate Charge



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



(11) Standardized transition Thermal Resistance vs. Pulse Width



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