

Power MOSFET

■ GENERAL DESCRIPTION

The XP161A1265PR 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. A gate protect diode is built-in to prevent static damage. The small SOT-89 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 : $R_{ds(on)}=0.055\Omega @ V_{gs}=4.5V$
: $R_{ds(on)}=0.095\Omega @ V_{gs}=2.5V$

Ultra High-Speed Switching

Gate Protect Diode Built-in

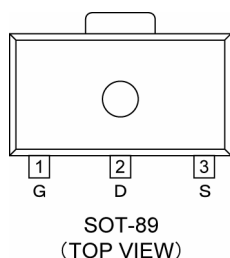
Driving Voltage : 2.5V

N-Channel Power MOSFET

DMOS Structure

Small Package : SOT-89

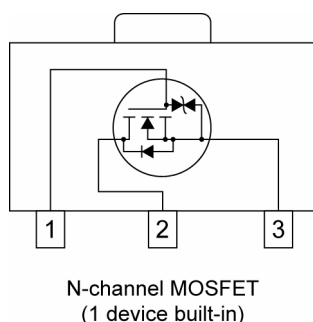
■ PIN CONFIGURATION



■ PIN ASSIGNMENT

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

■ EQUIVALENT CIRCUIT



■ 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}	± 12	V
Drain Current (DC)	I_d	4	A
Drain Current (Pulse)	I_{dp}	16	A
Reverse Drain Current	I_{dr}	4	A
Channel Power Dissipation *	P_d	2	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} =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 = 2A, V _{gs} = 4.5V	-	0.042	0.055	Ω
		I _d = 2A, V _{gs} = 2.5V	-	0.070	0.095	Ω
Forward Transfer Admittance*1	Y _{fs}	I _d = 2A, V _{ds} = 10V	-	8	-	S
Body Drain Diode Forward Voltage	V _f	I _f = 4A, V _{gs} = 0V	-	0.85	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	-	320	-	pF
Output Capacitance	C _{oss}		-	190	-	pF
Feedback Capacitance	C _{rss}		-	80	-	pF

Switching Characteristics

Ta = 25°C

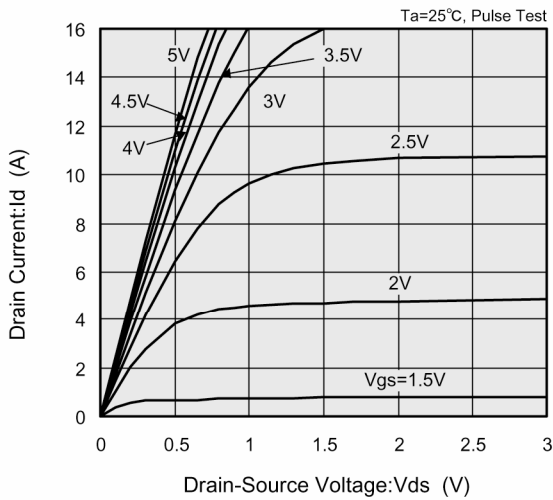
PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNITS
Turn-On Delay Time	t _{d (on)}	V _{gs} = 5V, I _d =2A V _{dd} = 10V	-	10	-	ns
Rise Time	t _r		-	15	-	ns
Turn-Off Delay Time	t _{d (off)}		-	55	-	ns
Fall Time	t _f		-	40	-	ns

Thermal Characteristics

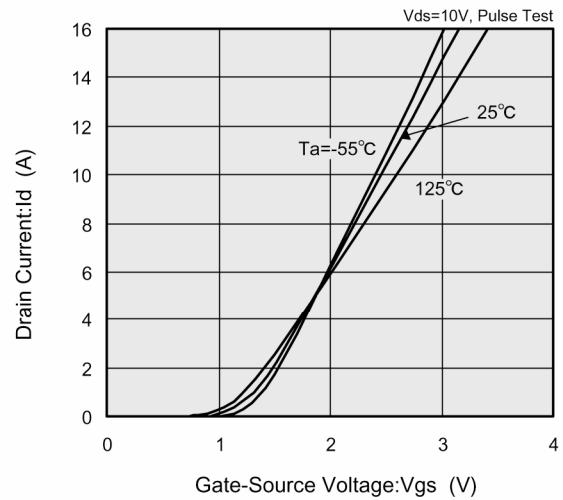
PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNITS
Thermal Resistance (Channel-Ambience)	R _{th (ch-a)}	Implement on a ceramic PCB	-	62.5	-	°C/W

TYPICAL PERFORMANCE CHARACTERISTICS

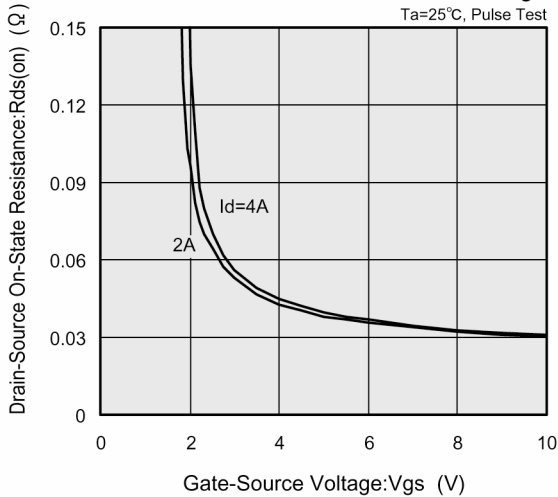
(1) Drain Current vs. Drain-Source Voltage



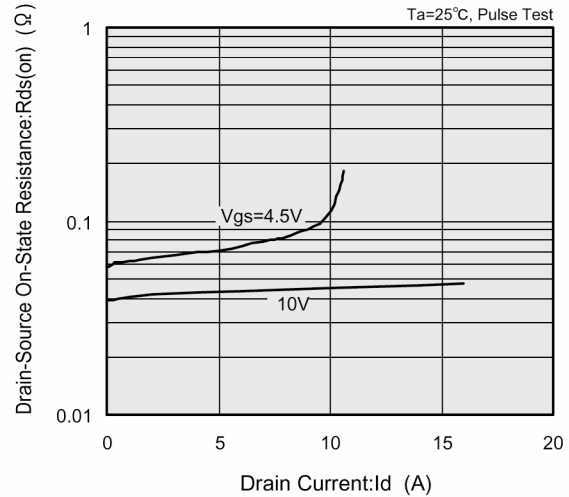
(2) Drain Current vs. Gate-Source Voltage



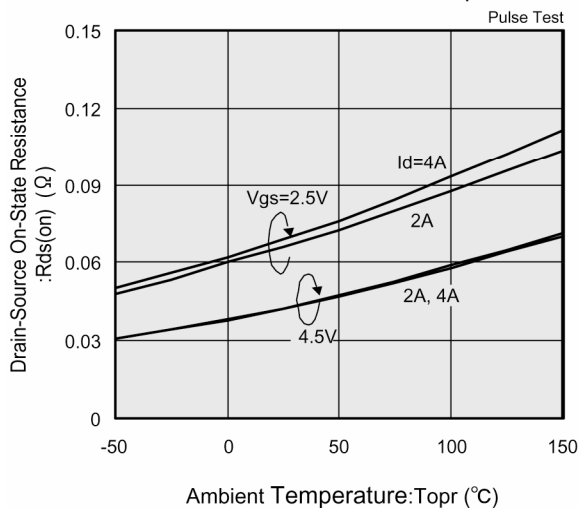
(3) Drain-Source On-State Resistance vs. Gate-Source Voltage



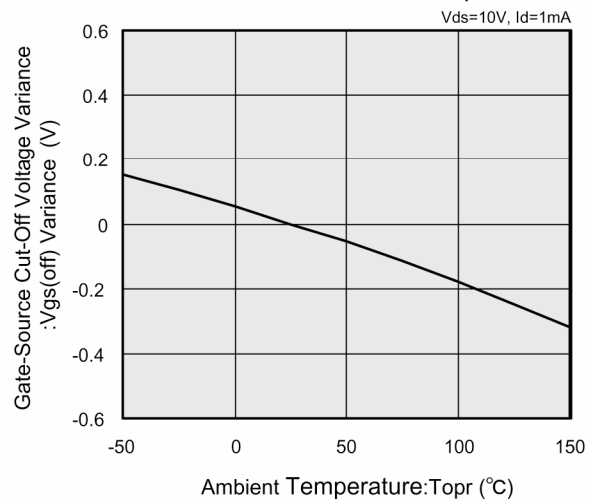
(4) Drain-Source On-State Resistance vs. Drain Current



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

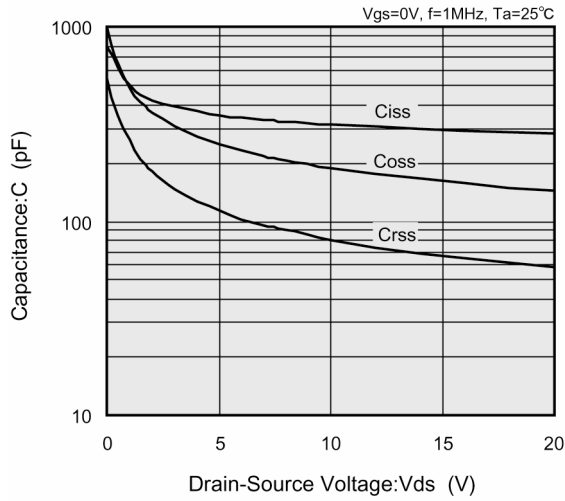


(6) Gate-Source Cut-Off Voltage Variance vs. Ambient Temperature

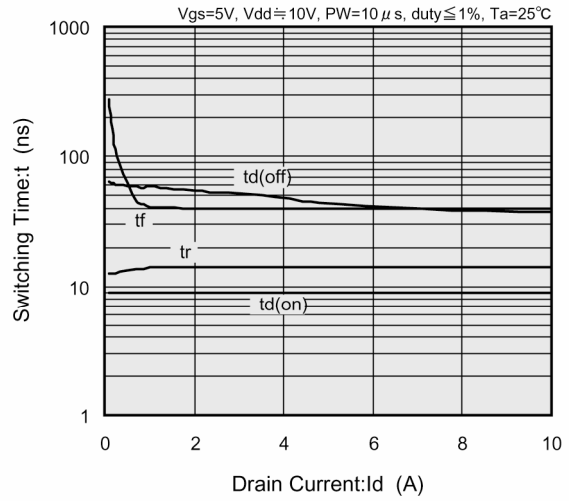


TYPICAL PERFORMANCE CHARACTERISTICS (Continued)

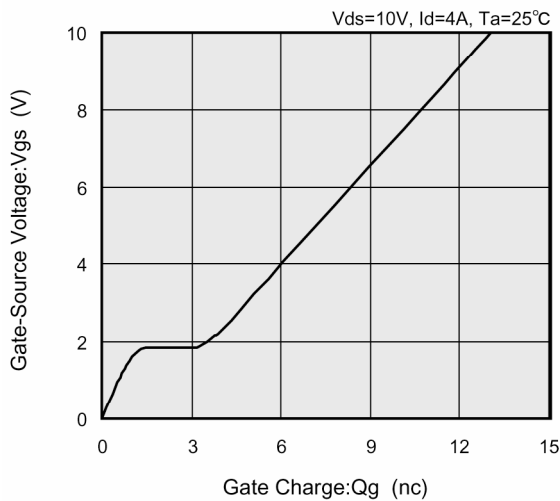
(7) Capacitance vs. Drain-Source Voltage



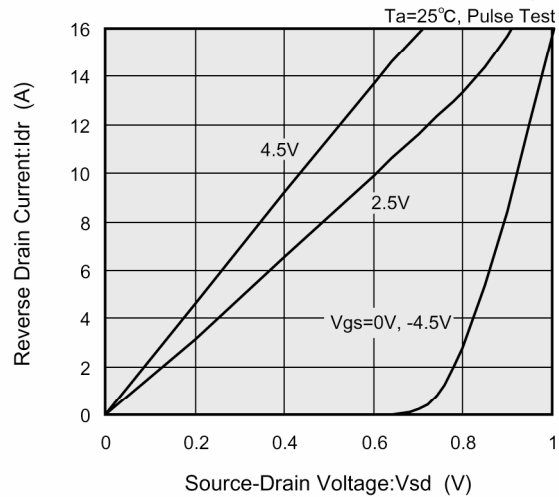
(8) Switching Time vs. Drain Current



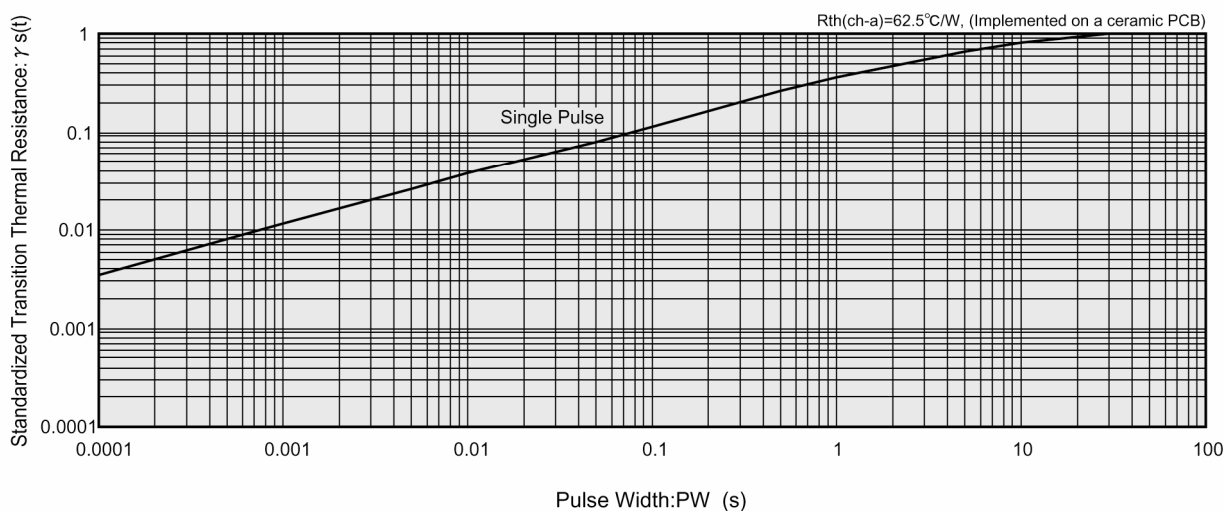
(9) Gate-Source Voltage vs. Gate Charge



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



(11) Standardized transition Thermal Resistance vs. Pulse Width



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