

## Power MOSFET

## ■ GENERAL DESCRIPTION

The XP161A11A1PR-G 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

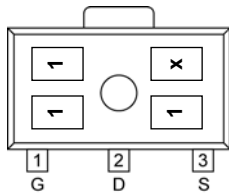
- Notebook PCs
- Cellular and portable phones
- On-board power supplies
- Li-ion battery systems

## ■ FEATURES

**Low On-State Resistance** :  $R_{ds(on)}=0.065\Omega @ V_{gs}=10V$   
:  $R_{ds(on)}=0.105\Omega @ V_{gs}=4.5V$

**Ultra High-Speed Switching**  
**Gate Protect Diode Built-in**  
**Driving Voltage** : 4.5V  
**N-Channel Power MOSFET**  
**DMOS Structure**  
**Small Package** : SOT-89  
**Environmentally Friendly** : EU RoHS Compliant, Pb Free

## ■ PIN CONFIGURATION/MARKING

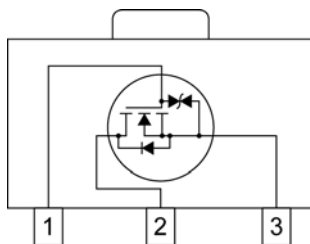


G : Gate  
S : Source  
D : Drain

SOT-89  
(TOP VIEW)

\* x represents production lot number.

## ■ EQUIVALENT CIRCUIT



N-channel MOSFET  
(1 device built-in)

## ■ PRODUCT NAME

PRODUCTS	PACKAGE	ORDER UNIT
XP161A11A1PR	SOT-89	1,000/Reel
XP161A11A1PR-G <sup>(*)</sup>	SOT-89	1,000/Reel

<sup>(\*)</sup> The "-G" suffix denotes Halogen and Antimony free as well as being fully RoHS compliant.

## ■ ABSOLUTE MAXIMUM RATINGS

Ta = 25°C

PARAMETER	SYMBOL	RATINGS	UNITS
Drain - Source Voltage	V <sub>dss</sub>	30	V
Gate - Source Voltage	V <sub>gss</sub>	±20	V
Drain Current (DC)	I <sub>d</sub>	4	A
Drain Current (Pulse)	I <sub>dp</sub>	16	A
Reverse Drain Current	I <sub>dr</sub>	4	A
Channel Power Dissipation *	P <sub>d</sub>	2	W
Channel Temperature	T <sub>ch</sub>	150	°C
Storage Temperature	T <sub>stg</sub>	-55~150	°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	μ A
Gate-Source Leak Current	Igss	Vgs= ±20V, Vds= 0V	-	-	±10	μ A
Gate-Source Cut-Off Voltage	Vgs(off)	Id= 1mA, Vds= 10V	1.0	-	2.5	V
Drain-Source On-State Resistance*1	Rds(on)	Id= 2A, Vgs= 10V	-	0.05	0.065	Ω
		Id= 2A, Vgs= 4.5V	-	0.075	0.105	Ω
Forward Transfer Admittance *1	Yfs	Id= 2A, Vds= 10V	-	5.5	-	S
Body Drain Diode Forward Voltage	Vf	If= 4A, Vgs= 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	Ciss	Vds= 10V, Vgs=0V f= 1MHz	-	270	-	pF
Output Capacitance	Coss		-	150	-	pF
Feedback Capacitance	Crss		-	55	-	pF

### Switching Characteristics

Ta = 25°C

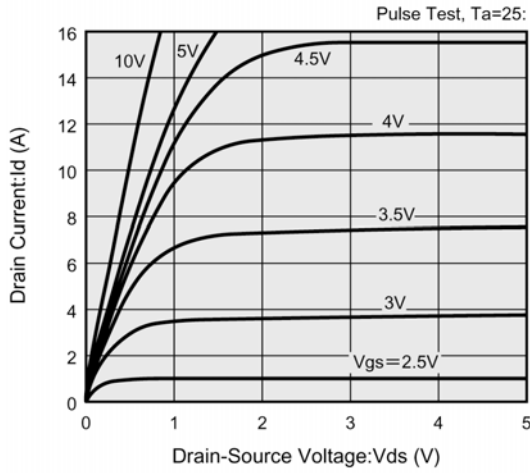
PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNITS
Turn-On Delay Time	td (on)	Vgs= 5V, Id=2A Vdd= 10V	-	10	-	ns
Rise Time	tr		-	15	-	ns
Turn-Off Delay Time	td (off)		-	35	-	ns
Fall Time	tf		-	15	-	ns

### Thermal Characteristics

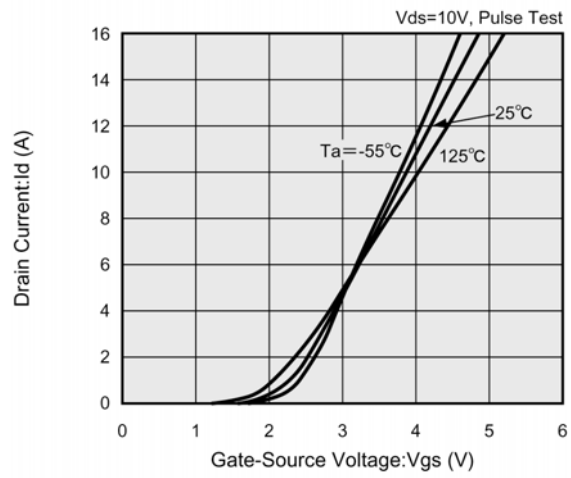
PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNITS
Thermal Resistance (Channel-Ambience)	Rth (ch-a)	Implement on a ceramic PCB	-	62.5	-	°C/W

## TYPICAL PERFORMANCE CHARACTERISTICS

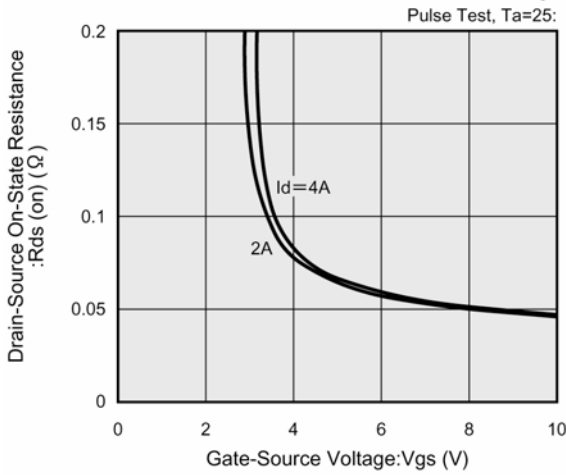
(1) Drain Current vs. Drain-Source Voltage



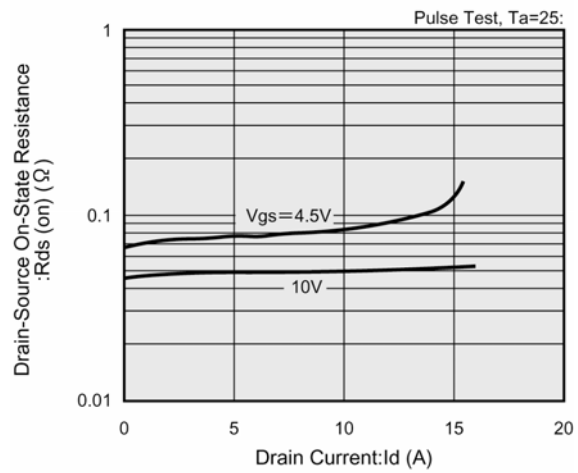
(2) Drain Current vs. Gate-Source Voltage



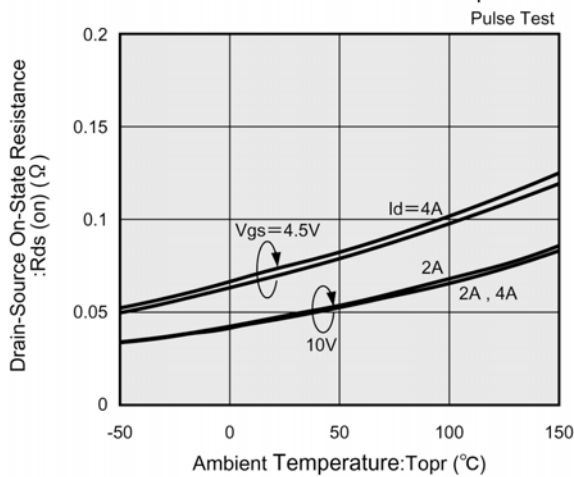
(3) Drain-Source On-State Resistance vs. Gate-Source Voltage



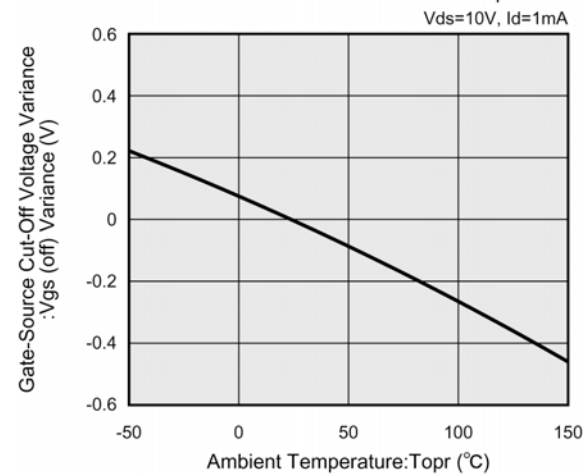
(4) Drain-Source On-State Resistance vs. Drain Current



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

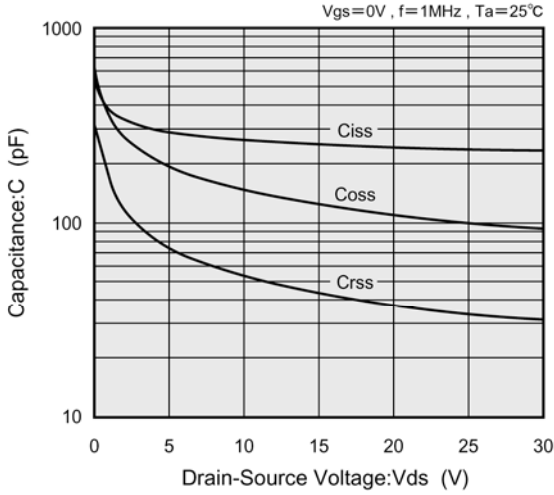


(6) Gate-Source Cut-Off Voltage Variance vs. Ambient Temperature

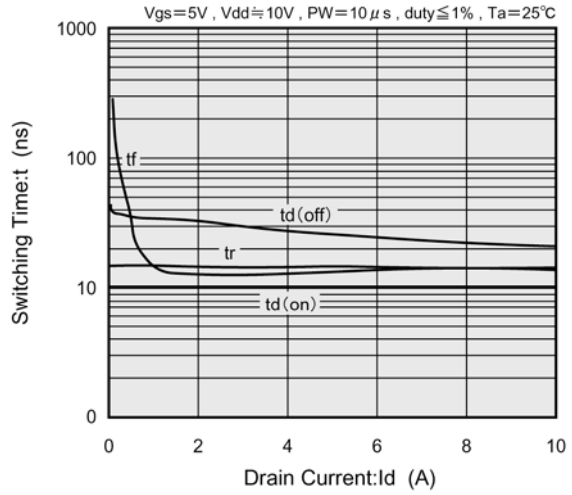


## TYPICAL PERFORMANCE CHARACTERISTICS (Continued)

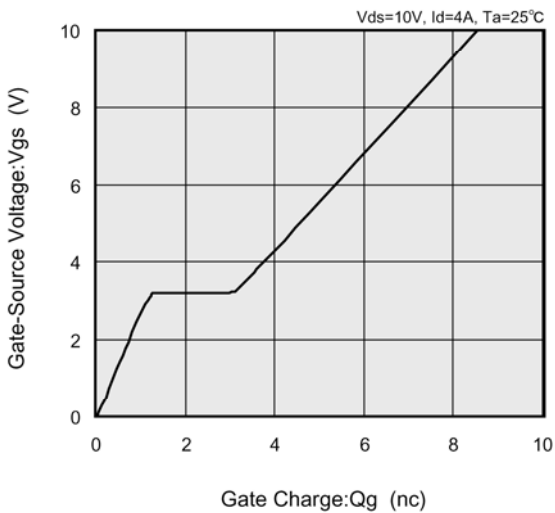
(7) Capacitance vs. Drain-Source Voltage



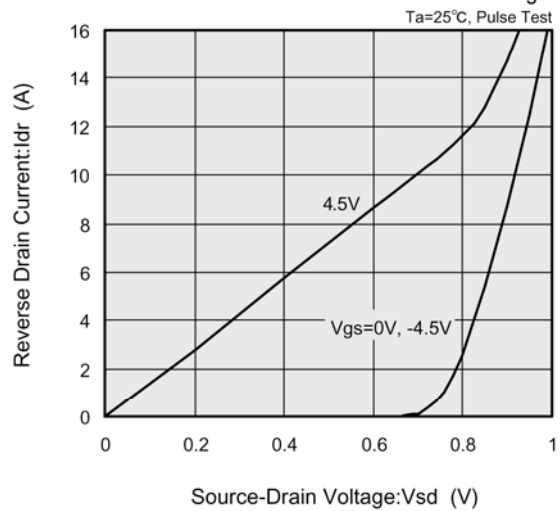
(8) Switching Time vs. Drain Current



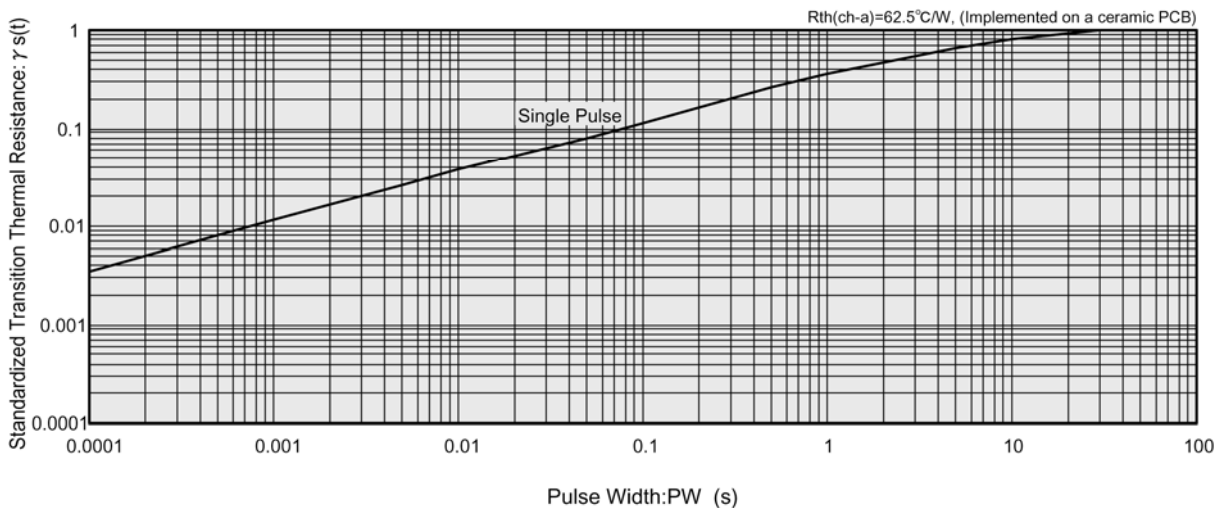
(9) Gate-Source Voltage vs. Gate Charge



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



(11) Standardized transition Thermal Resistance vs. Pulse Width



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