

Power MOSFET

■ GENERAL DESCRIPTION

The XP161A1355PR 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 : $R_{ds(on)} = 0.05 \Omega @ V_{gs} = 4.5V$
: $R_{ds(on)} = 0.07 \Omega @ V_{gs} = 2.5V$
: $R_{ds(on)} = 0.15 \Omega @ V_{gs} = 1.5V$

Ultra High-Speed Switching

Gate Protect Diode Built-in

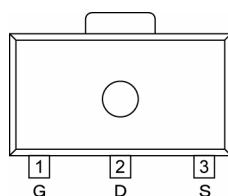
Driving Voltage : 1.5V

N-Channel Power MOSFET

DMOS Structure

Small Package : SOT-89

■ PIN CONFIGURATION

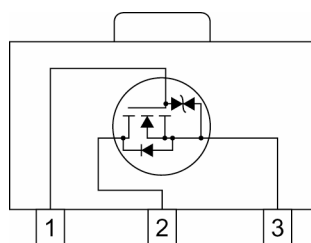


SOT-89
(TOP VIEW)

■ PIN ASSIGNMENT

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

■ EQUIVALENT CIRCUIT



N-channel MOSFET
(1 device built-in)

■ ABSOLUTE MAXIMUM RATINGS

$T_a = 25^\circ C$

PARAMETER	SYMBOL	RATINGS	UNITS
Drain-Source Voltage	V_{ds}	20	V
Gate-Source Voltage	V_{gs}	± 8	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	$^\circ C$
Storage Temperature Range	T_{stg}	-55~150	$^\circ C$

* 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=20V, Vgs= 0V	-	-	10	μA
Gate-Source Leak Current	Igss	Vgs= ±8V, Vds= 0V	-	-	±10	μA
Gate-Source Cut-Off Voltage	Vgs(off)	Id= 1mA, Vds= 10V	0.5	-	1.2	V
Drain-Source On-State Resistance *1	Rds(on)	Id= 2A, Vgs= 4.5V	-	0.037	0.050	Ω
		Id= 2A, Vgs= 2.5V	-	0.05	0.07	Ω
		Id= 0.5A, Vgs= 1.5V	-	0.1	0.15	Ω
Forward Transfer Admittance *1	Yfs	Id= 2A, Vds= 10V	-	10	-	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	-	390	-	pF
Output Capacitance	Coss		-	210	-	pF
Feedback Capacitance	Crss		-	90	-	pF

Switching Characteristics

Ta = 25°C

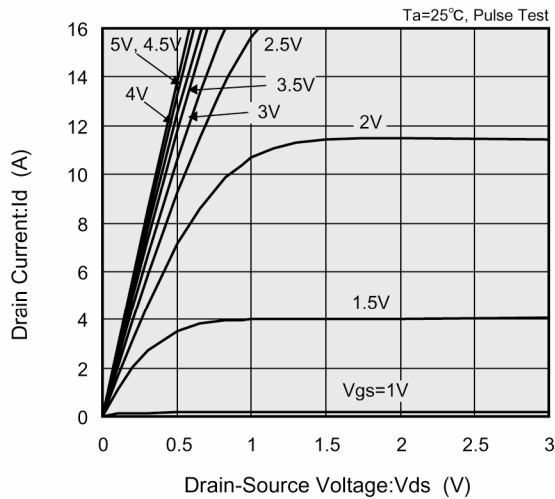
PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNITS
Turn-On Delay Time	td (on)	Vgs= 5V, Id=2A Vdd= 10V	-	10	-	ns
Rise Time	tr		-	15	-	ns
Turn-Off Delay Time	td (off)		-	85	-	ns
Fall Time	tf		-	45	-	ns

Thermal Characteristics

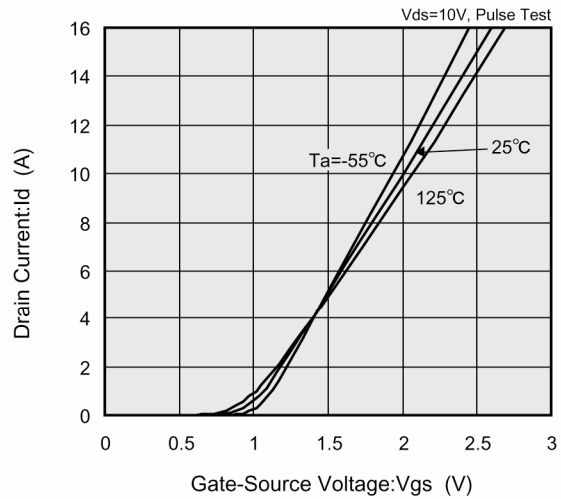
PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNITS
Thermal Resistance (Channel-Ambience)	Rth (ch-a)	Implement on a ceramic PCB	-	62.5	-	°C/W

TYPICAL PERFORMANCE CHARACTERISTICS

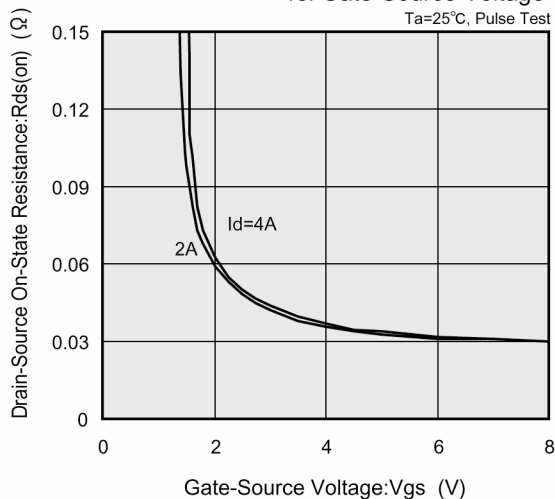
(1) Drain Current vs. Drain-Source Voltage



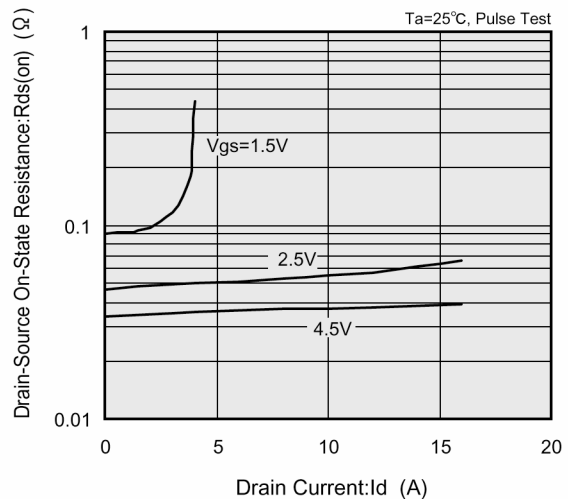
(2) Drain Current vs. Gate-Source Voltage



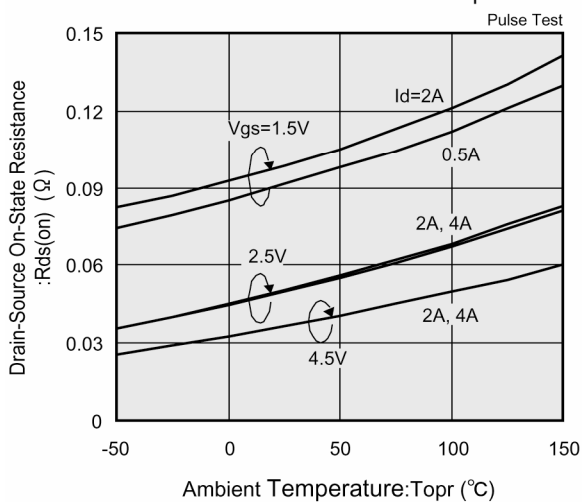
(3) Drain-Source On-State Resistance vs. Gate-Source Voltage



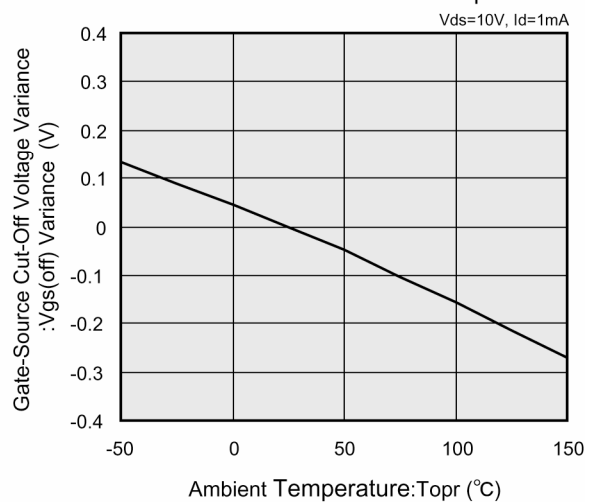
(4) Drain-Source On-State Resistance vs. Drain Current



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

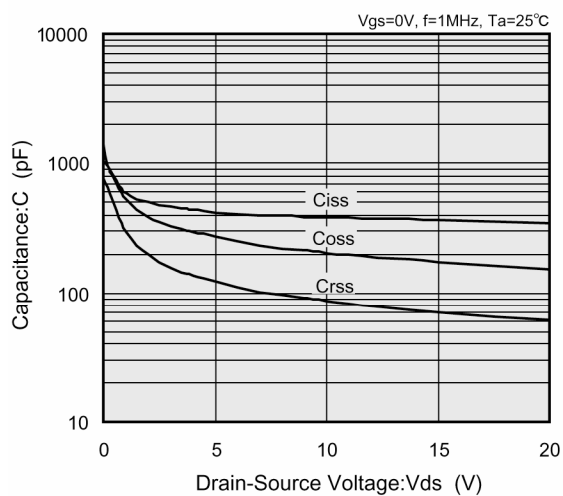


(6) Gate-Source Cut-Off Voltage Variance vs. Ambient Temperature

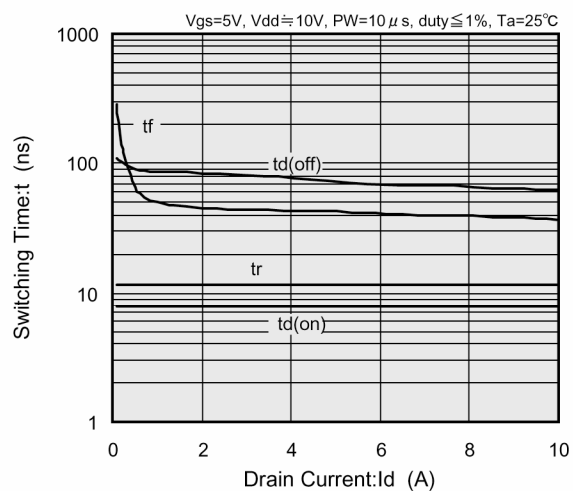


TYPICAL PERFORMANCE CHARACTERISTICS (Continued)

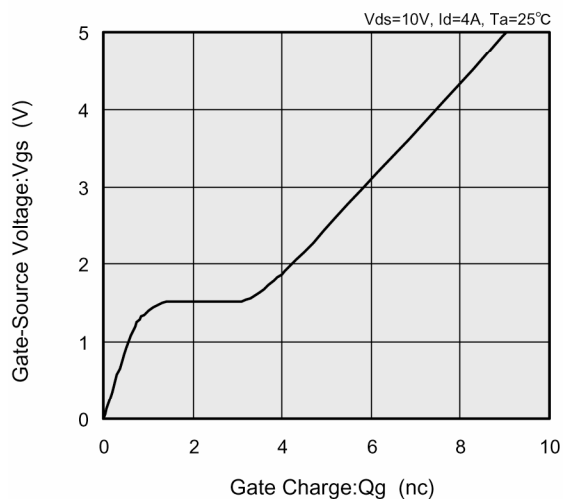
(7) Capacitance vs. Drain-Source Voltage



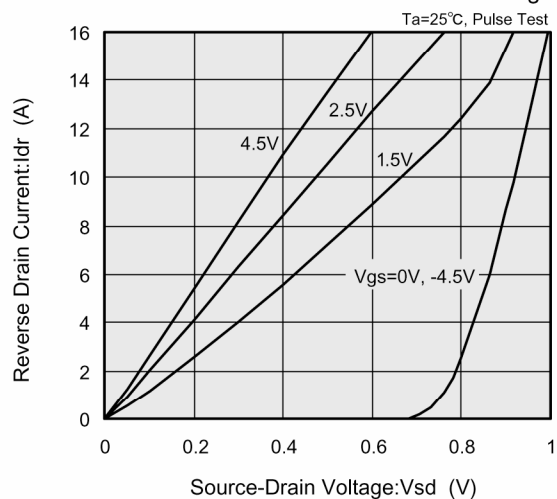
(8) Switching Time vs. Drain Current



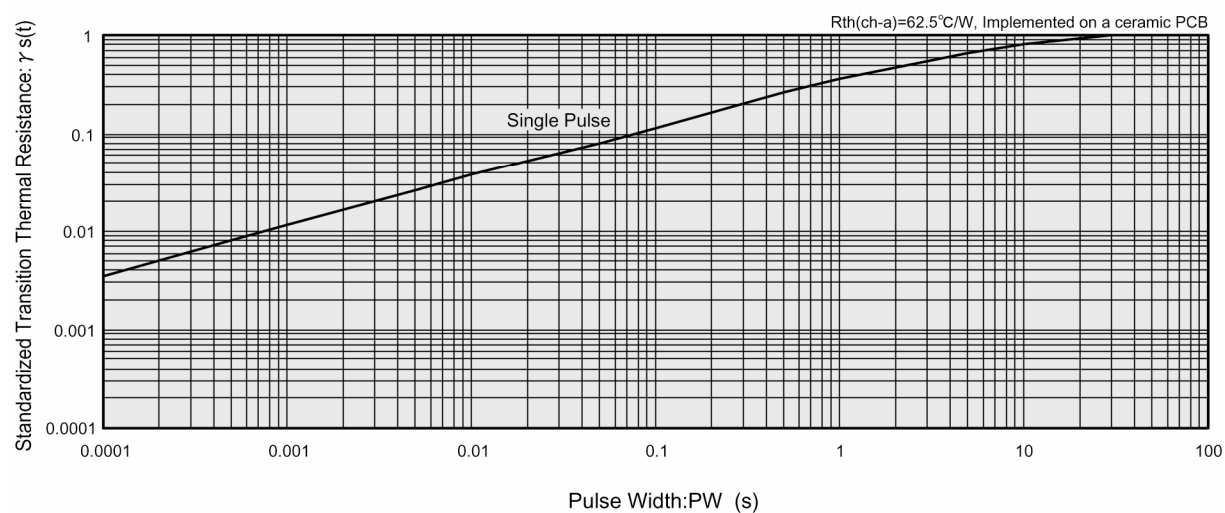
(9) Gate-Source Voltage vs. Gate Charge



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



(11) Standardized transition Thermal Resistance vs. Pulse Width



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