

- ◆ N-Channel Power MOS FET
- ◆ DMOS Structure
- ◆ Low On-State Resistance : 0.05Ω (max)
- ◆ Ultra High-Speed Switching
- ◆ SOT-89 Package
- ◆ Gate Protect Diode built-in

Applications

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

General Description

The XP161A1355PR is a N-Channel Power MOS FET 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-89 package makes high density mounting possible.

Features

Low on-state resistance : $R_{ds(on)} = 0.05\Omega$ ($V_{gs} = 4.5V$)

$R_{ds(on)} = 0.07\Omega$ ($V_{gs} = 2.5V$)

$R_{ds(on)} = 0.15\Omega$ ($V_{gs} = 1.5V$)

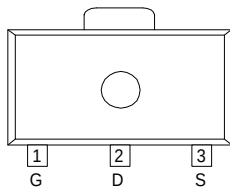
Ultra high-speed switching

Gate protect diode built-in

Operational Voltage : 1.5V

High density mounting : SOT - 89

Pin Configuration

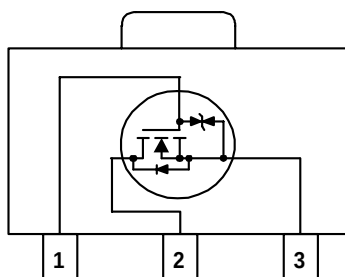


SOT - 89 Top View

Pin Assignment

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

Equivalent Circuit



N - Channel MOS FET
(1 device built-in)

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}	± 8	V
Drain Current (DC)	I_d	4	A
Drain Current (Pulse)	I_{dp}	16	A
Reverse Drain Current	I_{dr}	4	A
Continuous Channel Power Dissipation (note)	P_d	2	W
Channel Temperature	T_{ch}	150	$^\circ\text{C}$
Storage Temperature	T_{stg}	- 55 to 150	$^\circ\text{C}$

(note) : 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 = 20 , Vgs = 0V			10	μA
Gate-Source Leakage Current	Igss	Vgs = ± 8 , 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 (note)	Rds (on)	Id = 2A , Vgs = 4.5V		0.37	0.05	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 (note)	Yfs	Id = 2A , Vds = 10V		10		S
Body Drain Diode Forward Voltage	Vf	If = 4A , Vgs = 0V		0.85	1.1	V

(note) : Effective during pulse test.

Dynamic characteristics

Ta=25°C

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Input Capacitance	Ciss	Vds = 10V , Vgs = 0V f = 1 MHz		390		pF
Output Capacitance	Coss			210		pF
Feedback Capacitance	Crss			90		pF

Switching characteristics

Ta=25°C

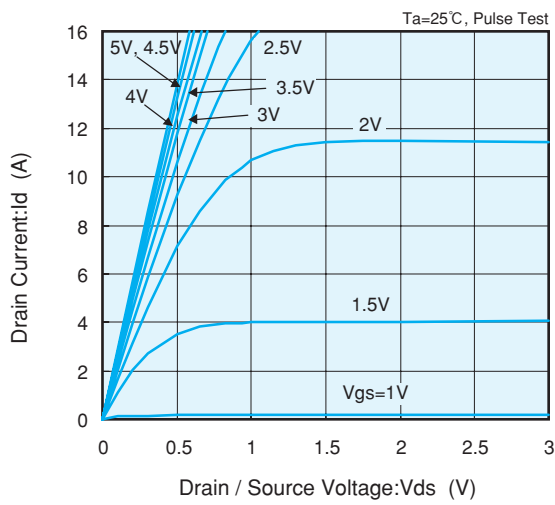
PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Turn-on Delay Time	td (on)	Vgs = 5V , Id = 2A Vdd = 10V		10		ns
Rise Time	tr			15		ns
Turn-off Delay Time	td (off)			85		ns
Fall Time	tf			45		ns

Thermal characteristics

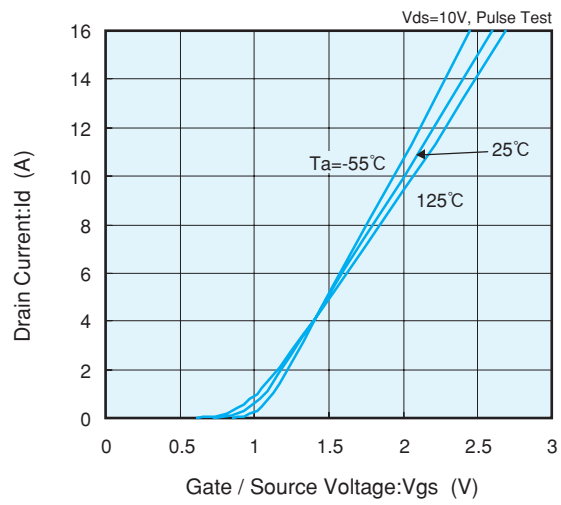
PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Thermal Resistance (channel - surroundings)	Rth (ch - a)	Implement on a glass epoxy resin PCB		62.5		°C / W

XP161A1355PR Electrical Characteristics

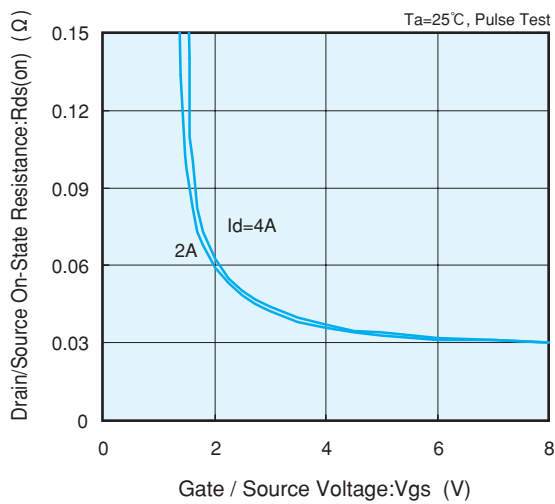
Drain Current vs. Drain/Source Voltage



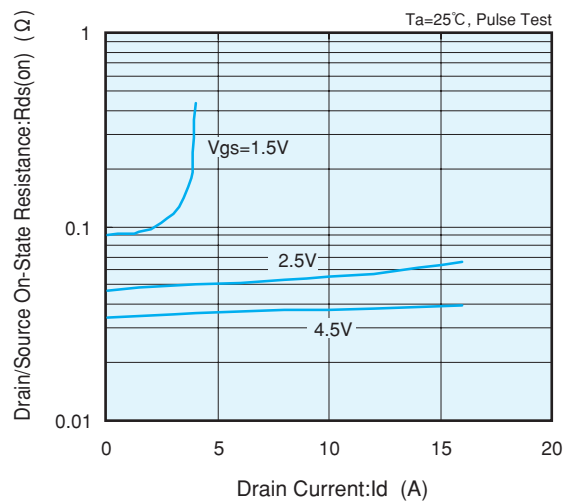
Drain Current vs. Gate/Source Voltage



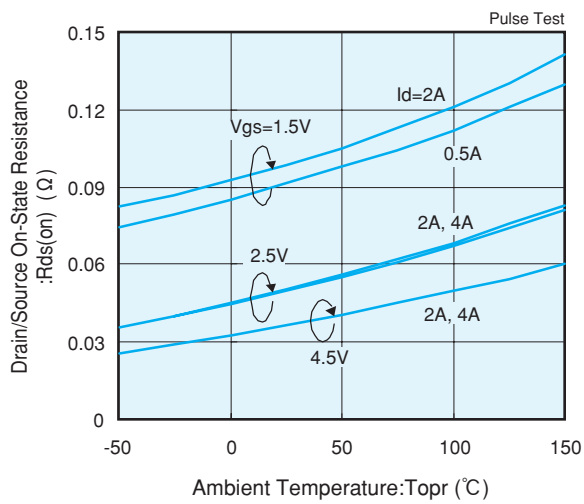
Drain/Source On-State Resistance vs. Gate/Source Voltage



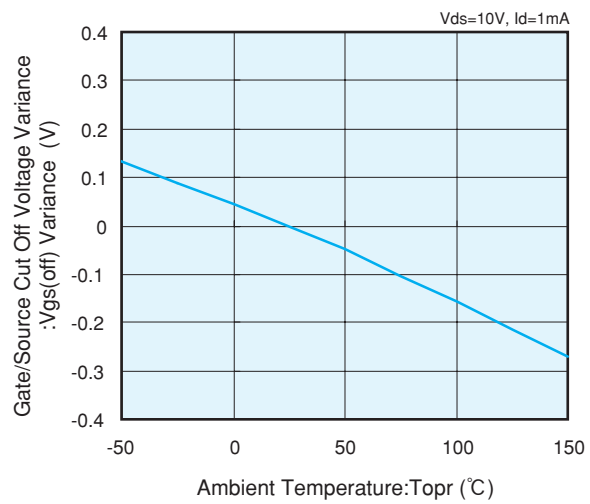
Drain/Source On-State Resistance vs. Drain Current



Drain/Source On-State Resistance vs. Ambient Temp.

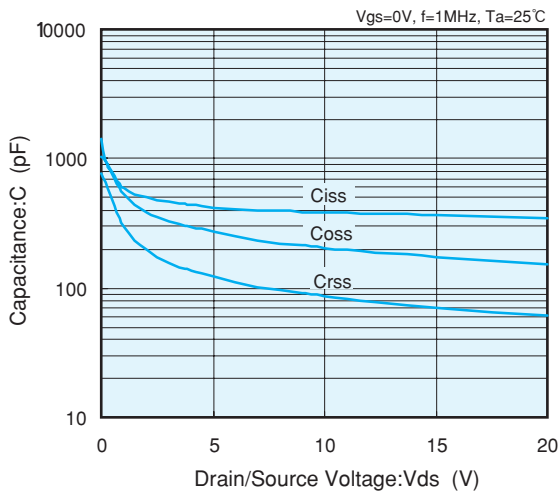


Gate/Source Cut Off Voltage Variance vs. Ambient Temp.

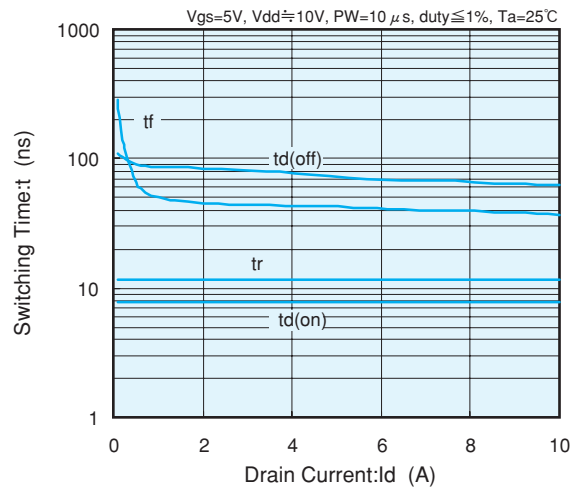


■ XP161A1355PR Electrical Characteristics

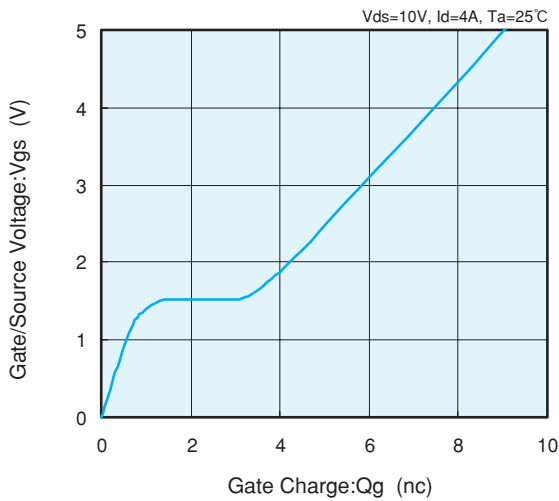
Capacitance vs. Drain/Source Voltage



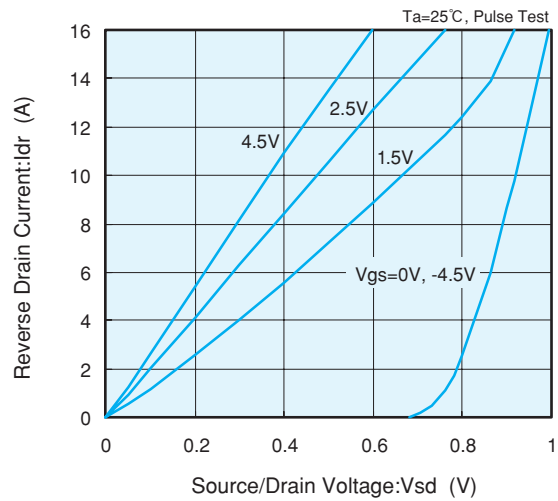
Switching Time vs. Drain Current



Gate/Source Voltage vs. Gate Charge



Reverse Drain Current vs. Source/Drain Voltage



Standardized Transition Thermal Resistance vs. Pulse Width

