

XP161A0390PR



Power MOS FET

- ◆N-Channel Power MOS FET
- ◆DMOS Structure
- ◆Low On-State Resistance: 0.09Ω (max)
- ◆Ultra High-Speed Switching
- ◆SOT-89 Package

General Description

The XP161A0390PR is an 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.

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

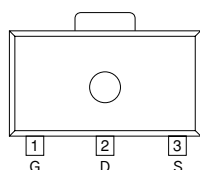
Low on-state resistance: $R_{ds(on)}=0.09\Omega$ ($V_{gs}=4.5V$)
 $R_{ds(on)}=0.13\Omega$ ($V_{gs}=2.5V$)
 $R_{ds(on)}=0.3\Omega$ ($V_{gs}=1.5V$)

Ultra high-speed switching

Operational Voltage : 1.5V

High density mounting : SOT-89

Pin Configuration



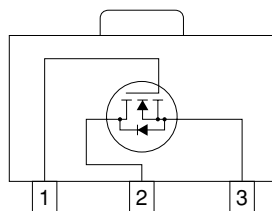
SOT-89
(TOP VIEW)

Pin Assignment

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

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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_{ds}	20	V
Gate-Source Voltage	V_{gs}	± 8	V
Drain Current (DC)	I_d	3	A
Drain Current (Pulse)	I_{dp}	9	A
Reverse Drain Current	I_{dr}	3	A
Continuous Channel Power Dissipation (note)	P_d	2	W
Channel Temperature	T_{ch}	150	$^\circ\text{C}$
Storage Temperature	T_{stg}	-55~150	$^\circ\text{C}$

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=20V, Vgs=0V			10	μA
Gate-Source Leakage Current	Igss	Vgs=±8V, Vds=0V			±10	μA
Gate-Source Cut-off Voltage	Vgs(off)	Id=1mA, Vds=10V	0.5			V
Drain-Source On-state Resistance (note)	Rds(on)	Id=1.5A, Vgs=4.5V		0.07	0.09	Ω
		Id=1.5A, Vgs=2.5V		0.1	0.13	Ω
		Id=1.5A, Vgs=1.5V		0.17	0.3	Ω
Forward Transfer Admittance (note)	Yfs	Id=1.5A, Vds=10V		6		S
Body Drain Diode Forward Voltage	Vf	If=3A, 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=1MHz		380		pF
Output Capacitance	Coss			170		pF
Feedback Capacitance	Crss			60		pF

Switching Characteristics

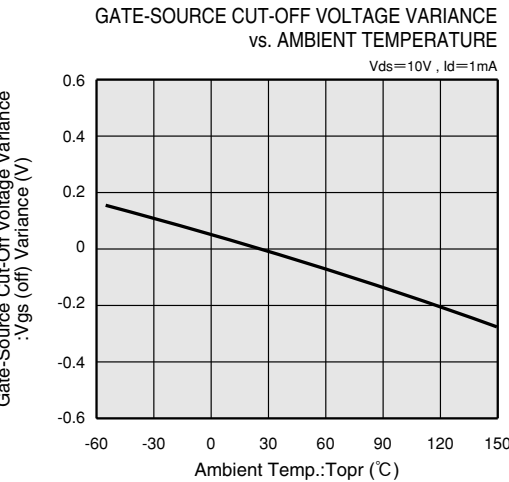
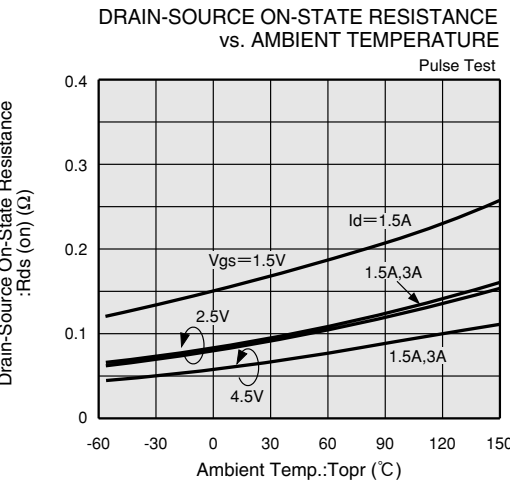
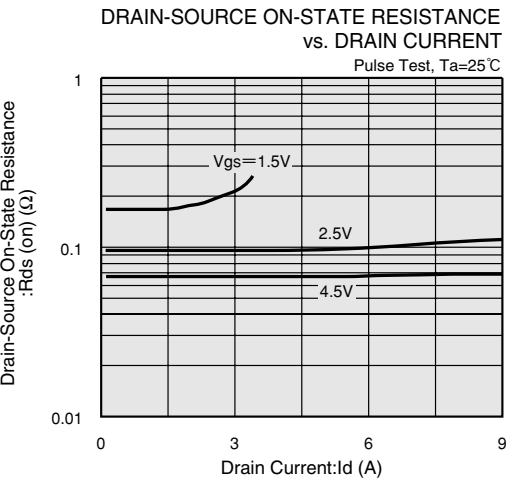
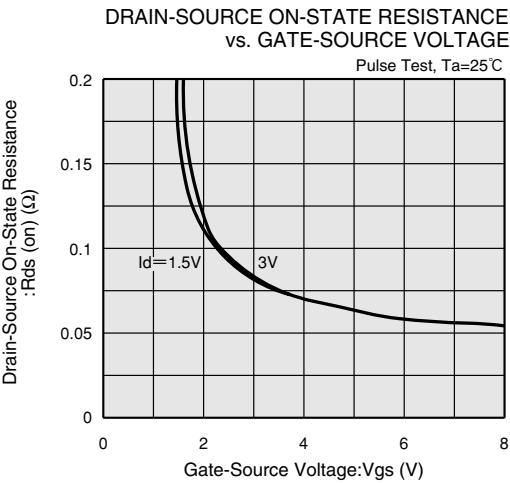
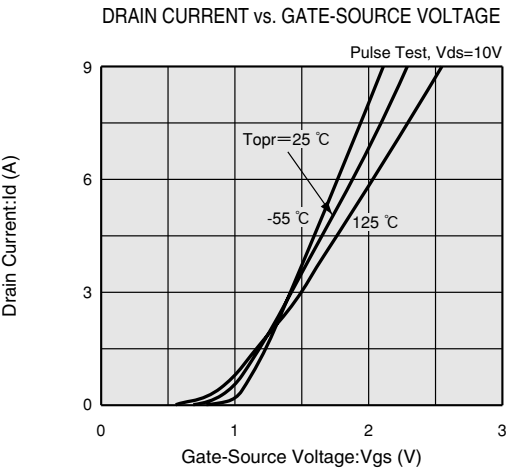
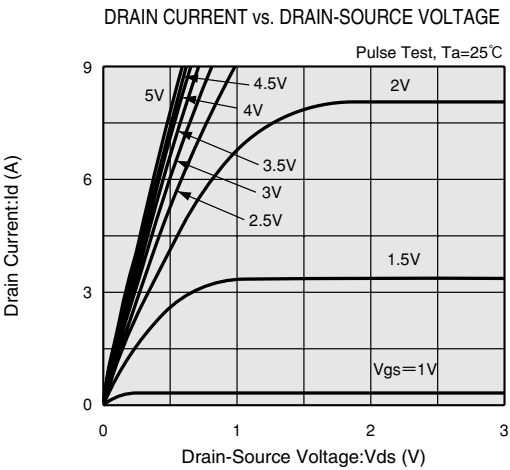
Ta=25°C

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Turn-on Delay Time	td (on)	Vgs=5V, Id=1.5A Vdd=10V		10		ns
Rise Time	tr			15		ns
Turn-off Delay Time	td (off)			70		ns
Fall Time	tf			40		ns

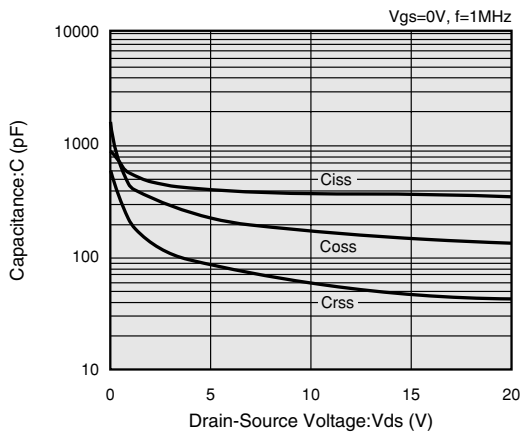
Thermal Characteristics

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

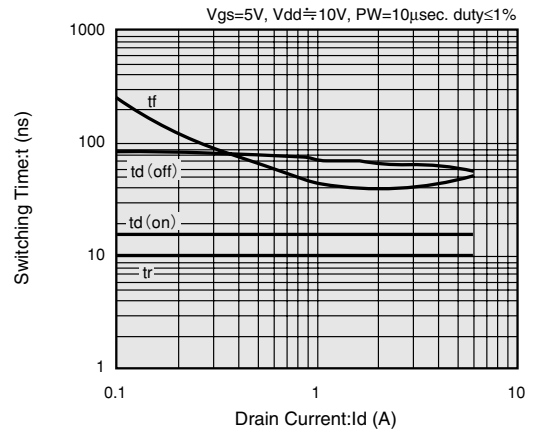
Typical Performance Characteristics



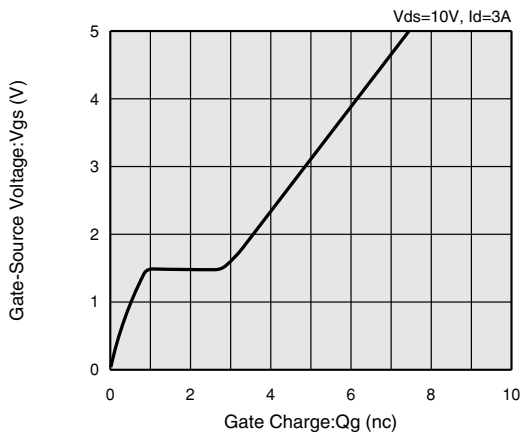
CAPACITANCE vs. DRAIN-SOURCE VOLTAGE



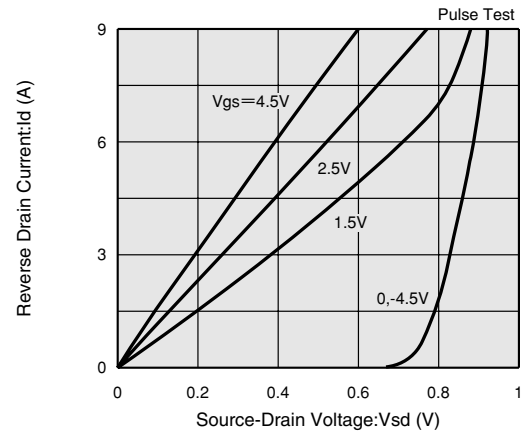
SWITCHING TIME vs. DRAIN CURRENT



GATE-SOURCE VOLTAGE vs. GATE CHARGE



REVERSE DRAIN CURRENT vs. SOURCE-DRAIN VOLTAGE



STANDARDIZED TRANSITION THERMAL RESISTANCE vs. PULSE WIDTH

