XP131A0232SR Power MOSFET

◆ **N-Channel Power MOS FET**
◆ **DMOS Structure**
◆ **Low On-State Resistance: 0.032Ω MAX**
◆ **Ultra High-Speed Switching**
◆ **SOP-8 Package**

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

■ General Description

The XP131A0232SR 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.
The small SOP-8 package makes high density mounting possible.

■ Features

Low on-state resistance: Rds(on)=0.032Ω(Vgs=4.5V)
Rds(on)=0.045Ω(Vgs=2.5V)
Rds(on)=0.08Ω(Vgs=1.5V)
Ultra high-speed switching
**Operational Voltage:** 1.5V
High density mounting: SOP-8

⑦

■ Pin Configuration

```
S  1          8  D
S  2          7  D
S  3          6  D
G  4          5  D
```

SOP-8
(TOP VIEW)
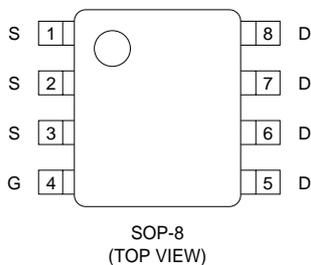
■ Pin Assignment

PIN NUMBER	PIN NAME	FUNCTION
1~3	S	Source
4	G	Gate
5~8	D	Drain

■ Equivalent Circuit

```
1          8
2          7
3          6
4          5
```

N-Channel MOS FET
(1 device built-in)
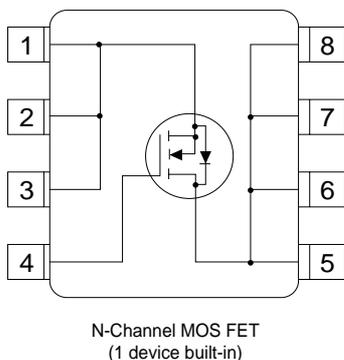
■ Absolute Maximum Ratings

Ta=25℃

PARAMETER	SYMBOL	RATINGS	UNITS
Drain-Source Voltage	Vdss	20	V
Gate-Source Voltage	Vgss	±8	V
Drain Current (DC)	Id	8	A
Drain Current (Pulse)	Idp	25	A
Reverse Drain Current	Idr	8	A
Continuous Channel Power Dissipation (note)	Pd	2.5	W
Channel Temperature	Tch	150	℃
Storage Temperature	Tstg	-55~150	℃

Note: When implemented on a glass epoxy PCB

■ Electrical Characteristics

DC characteristics
Ta=25℃

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=4A, Vgs=4.5V		0.025	0.032	Ω
		Id=4A, Vgs=2.5V		0.035	0.045	Ω
		Id=4A, Vgs=1.5V		0.055	0.08	Ω
Forward Transfer Admittance (note)	|Yfs|	Id=4A, Vds=10V		18		S
Body Drain Diode Forward Voltage	Vf	If=8A, Vgs=0V		0.85	1.1	V

Note: Effective during pulse test.

Dynamic characteristics
Ta=25℃

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Input Capacitance	Ciss	Vds=10V, Vgs=0V f=1MHz		1200		pF
Output Capacitance	Coss			550		pF
Feedback Capacitance	Crss			180		pF

Switching characteristics
Ta=25℃

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Turn-on Delay Time	td (on)	Vgs=5V, Id=4A Vdd=10V		15		ns
Rise Time	tr			15		ns
Turn-off Delay Time	td (off)			80		ns
Fall Time	tf			10		ns

Thermal characteristics

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Thermal Resistance (channel-surroundings)	Rth (ch-a)	Implement on a glass epoxy resin PCB		50		℃/W

■ Electrical Characteristics

Drain Current vs. Drain /Source Voltage

Pulse Test, Ta=25℃

(Y-axis: Drain Current:Id (A), 0 to 25)
(X-axis: Drain/Source Voltage:Vds (V), 0 to 3)

Curves labeled: 5V, 4V, 3V, 2.5V, 2V, 1.5V, Vgs=1V
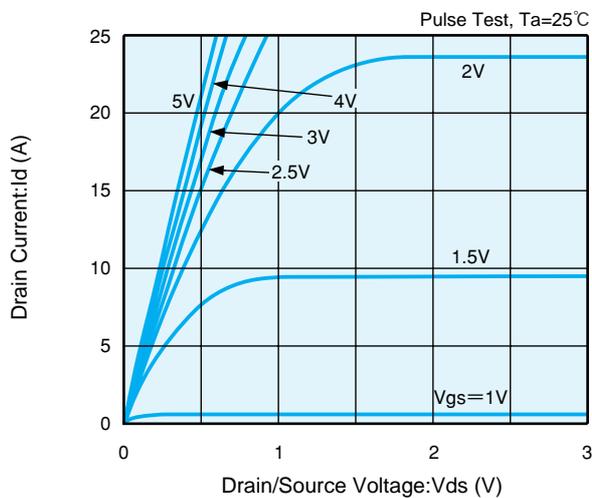
Drain Current vs. Gate/Source Voltage

Pulse Test, Vds=10V

(Y-axis: Drain Current:Id (A), 0 to 25)
(X-axis: Gate/Source Voltage:Vgs (V), 0 to 3)

Curves labeled: Topr=25℃, 125℃, -55℃
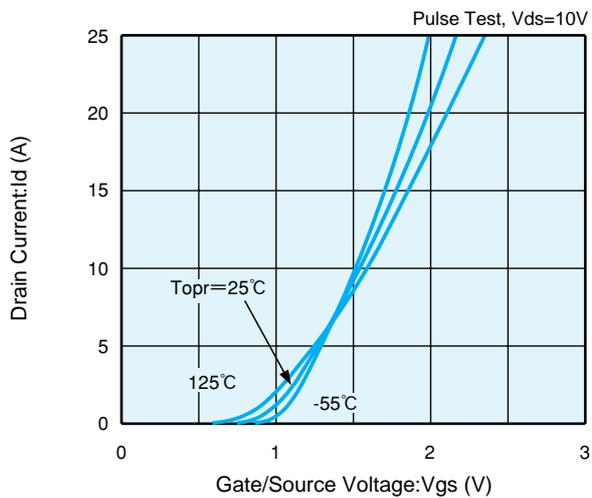
Drain/Source On-State Resistance vs. Gate/Source Voltage

Pulse Test, Ta=25℃

(Y-axis: Drain /Source On-State Resistance :Rds (on) (Ω), 0 to 0.1)
(X-axis: Gate/Source Voltage:Vgs (V), 0 to 8)

Curves labeled: Id=4A, 8A
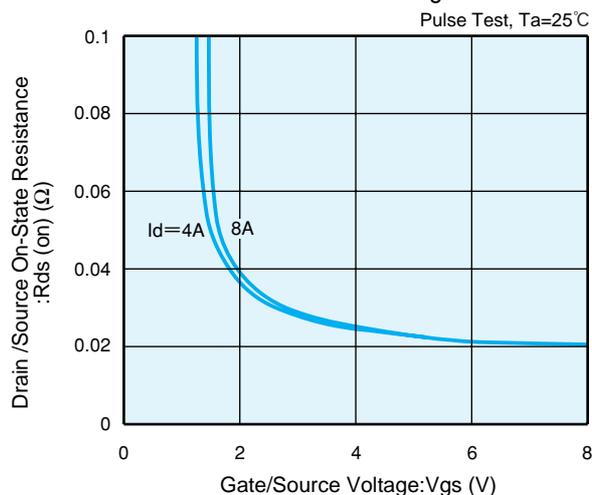
Drain/Source On-State Resistance vs. Drain Current

Pulse Test, Ta=25℃

(Y-axis: Drain /Source On-State Resistance :Rds (on) (Ω), 0.01 to 0.1)
(X-axis: Drain Current:Id (A), 0 to 25)

Curves labeled: Vgs=1.5V, 2.5V, 4.5V
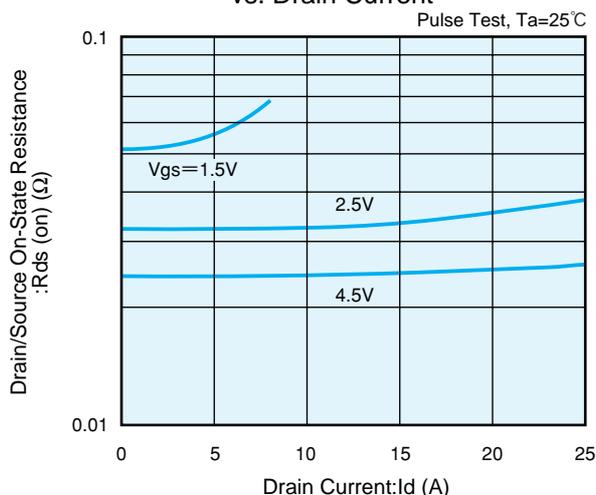
Drain/Source On-State Resistance vs. Ambient Temp.

Pulse Test

(Y-axis: Drain/Source On-State Resistance :Rds (on) (Ω), 0 to 0.1)
(X-axis: Ambient Temperature:Topr (℃), -60 to 150)

Curves labeled: Id=4A, Vgs=1.5V, 2.5V, 4.5V, 4A,8A
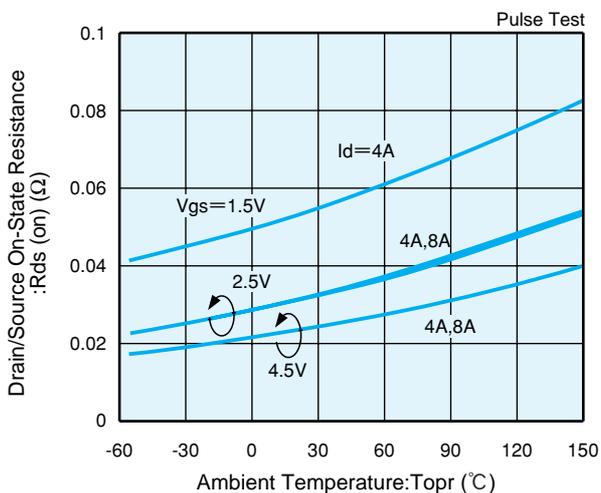
Gate/Source Cut Off Voltage Variance vs. Ambient Temp.

Vds=10V, Id=1mA

(Y-axis: Gate/Source Cut Off Voltage Variance :Vgs (off) Variance (V), -0.5 to 0.5)
(X-axis: Ambient Temperature:Topr (℃), -60 to 150)

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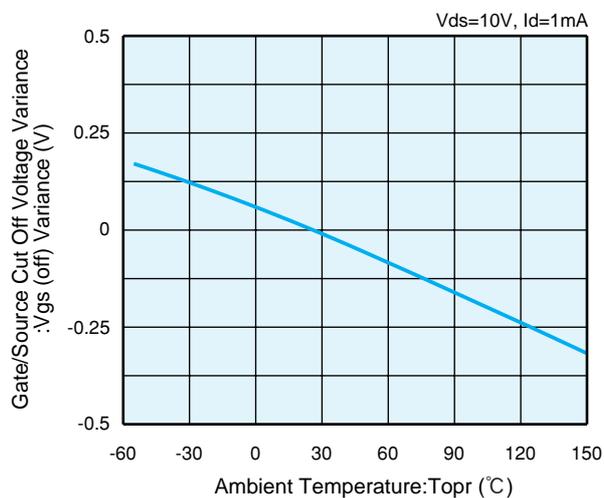
■ Electrical Characteristics

Drain/Source Voltage vs. Capacitance

Vgs=0V, f=1MHz
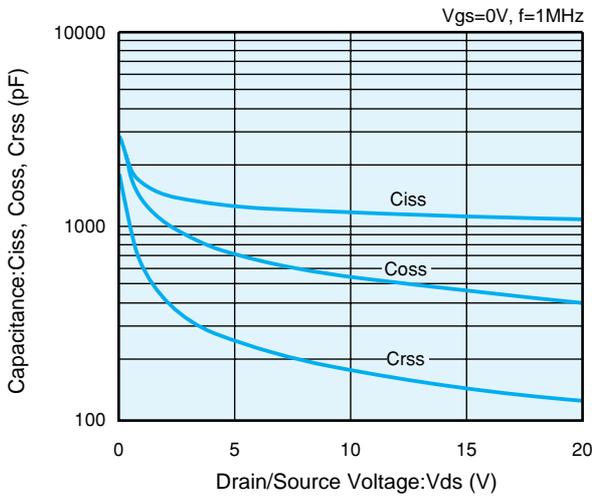
Switching Time vs. Drain Current

Vgs=5V, Vdd≒10V, PW=10μsec. duty≦1%
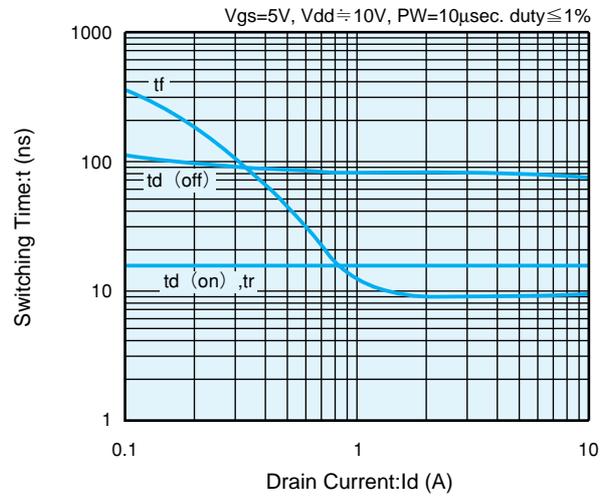
Gate/Source Voltage vs. Gate Charge

Vds=10V, Id=8A
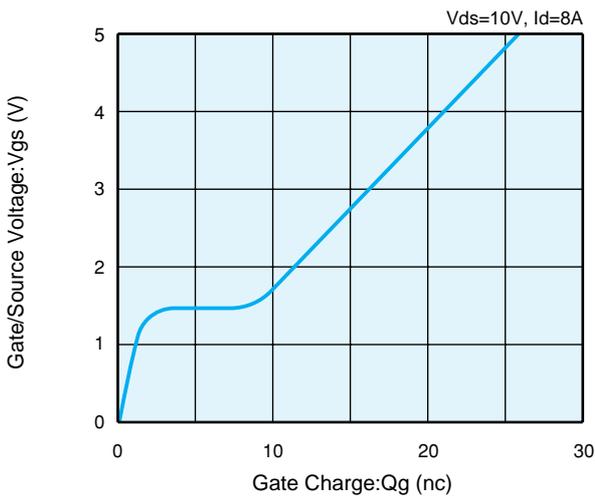
Reverse Drain Current vs. Source/Drain Voltage

Pulse Test
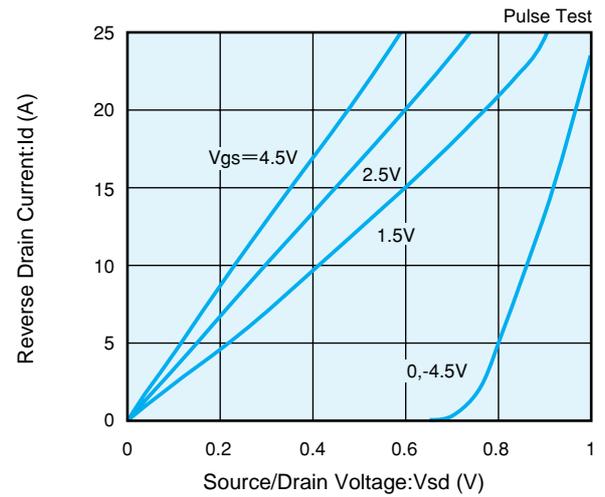
Standardized Transition Thermal Resistance vs. Pulse Width

Rth (ch-a)=50°C/W, (Implemented on a glass epoxy PCB)

Single Pulse