XP131A1330SR Power MOSFET

◆ **N-Channel Power MOS FET**
◆ **DMOS Structure**
◆ **Low On-State Resistance : 0.03Ω (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 XP131A1330SR 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) = 0.03Ω (Vgs = 4.5V)
Rds (on) = 0.04Ω (Vgs = 2.5V)
Rds (on) = 0.07Ω (Vgs = 1.5V)
Ultra high-speed switching
**Operational Voltage :** 1.5V
High density mounting : SOP - 8

■ Pin Configuration
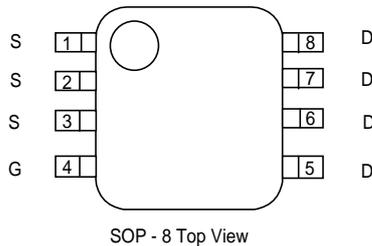
SOP - 8 Top View

■ Pin Assignment

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

■ Equivalent Circuit
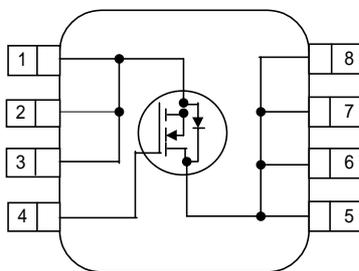
N - Channel MOS FET
(1 device built-in)

■ Absolute Maximum Ratings

Ta=25°C

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	30	A
Reverse Drain Current	Idr	8	A
Continuous Channel Power Dissipation (note)	Pd	2.5	W
Channel Temperature	Tch	150	°C
Storage Temperature	Tstg	-55 to 150	°C

(note) : When implemented on a glass epoxy PCB

TOREX

■ 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			± 1	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 = 4A , Vgs = 4.5V		0.025	0.03	Ω
		Id = 4A , Vgs = 2.5V		0.03	0.04	Ω
		Id = 4A , Vgs = 1.5V		0.045	0.07	Ω
Forward Transfer Admittance (note)		Yfs		Id = 4A , Vds = 10V		22		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°C

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Input Capacitance	Ciss			950		pF
Output Capacitance	Coss	Vds = 10V , Vgs = 0V		430		pF
Feedback Capacitance	Crss	f = 1 MHz		180		pF

Switching characteristics

Ta=25°C

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Turn-on Delay Time	td (on)			15		ns
Rise Time	tr	Vgs = 5V , Id = 4A		20		ns
Turn-off Delay Time	td (off)	Vdd = 10V		80		ns
Fall Time	tf			15		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		°C / W

■ Electrical Characteristics

Drain Current vs. Drain/Source Voltage

Pulse Test, Ta=25℃

Drain Current:Id (A) vs. Drain/Source Voltage:Vds (V)

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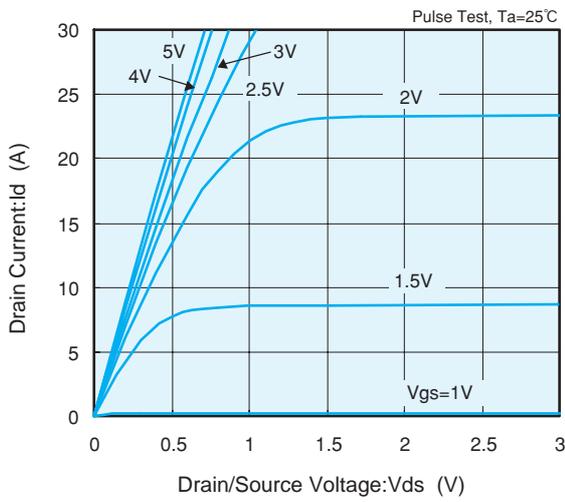
Drain Current vs. Gate/Source Voltage

Vds=10V, Pulse Test

Drain Current:Id (A) vs. Gate/Source Voltage:Vgs (V)

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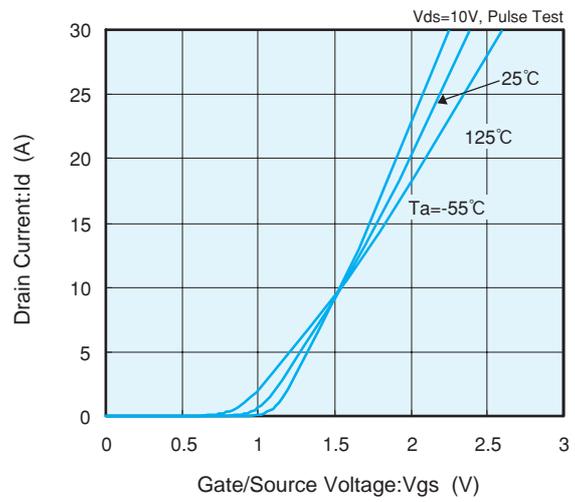
Drain/Source On-State Resistance vs. Gate/Source Voltage

Pulse Test, Ta=25℃

Drain/Source On-State Resistance:Rds (on) (Ω) vs. Gate/Source Voltage:Vgs (V)

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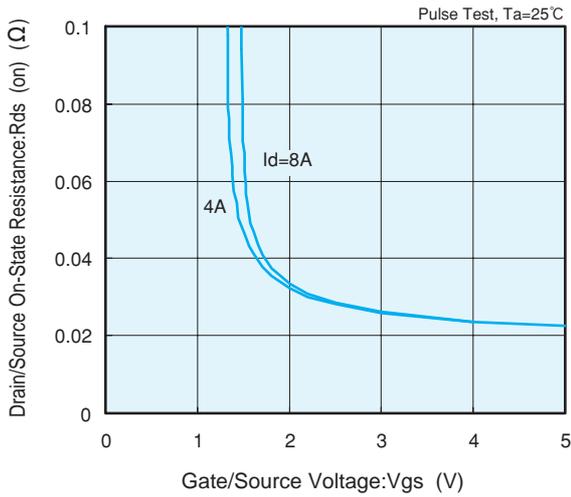
Drain/Source On-State Resistance vs. Drain Current

Pulse Test, Ta=25℃

Drain/Source On-State Resistance:Rds (on) (Ω) vs. Drain Current:Id (A)

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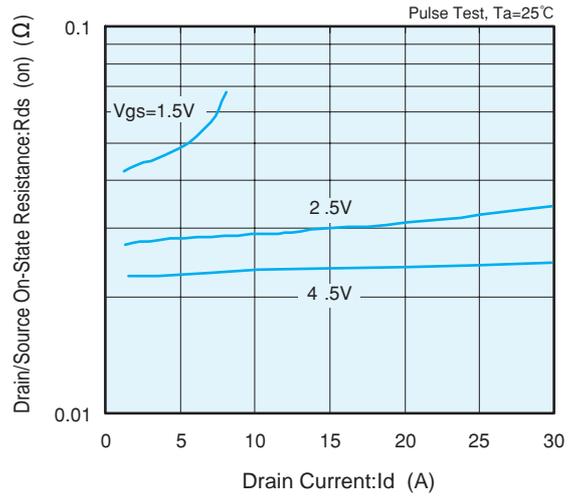
Drain/Source On-State Resistance vs. Ambient Temperature

Pulse Test

Drain/Source On-State Resistance:Rds (on) (Ω) vs. Ambient Temp. :Topr (℃)

Curves labeled: Id=4A, 1A, Vgs=1.5V, 2.5V, 4A, 8A, 4A, 8A, 4.5V
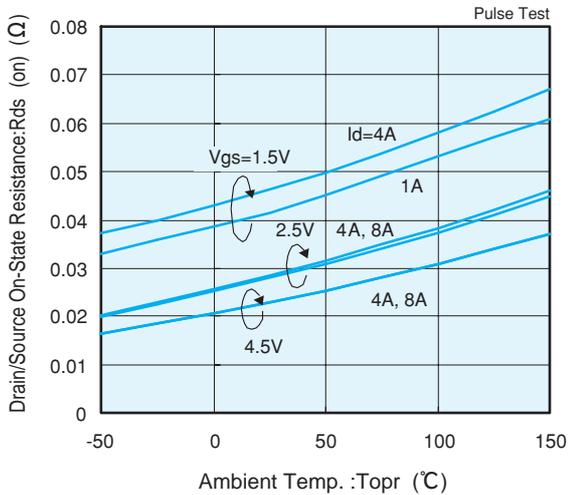
Gate/Source Cut-Off Voltage Variance vs. Ambient Temperature

Vds=10V, Id=1mA

Gate/Source Cut-Off Voltage Variance :Vgs(off) Variance (V) vs. Ambient Temp. :Topr (℃)
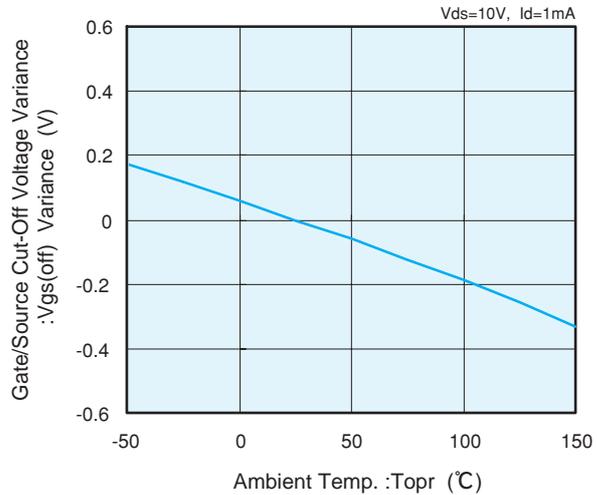
■ Electrical Characteristics

Drain/Source Voltage vs. Capacitance

Vgs=0V, f=1MHz, Ta=25℃

Capacitance:C (pF) vs. Drain/Source Voltage:Vds (V)

Ciss
Coss
Crss
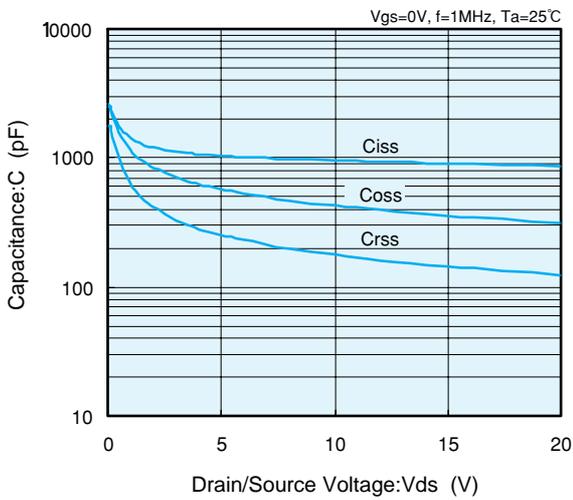
Switching Time vs. Drain Current

Vgs=5V, Vdd≒10V, PW=10μs, duty≦1%, Ta=25℃

Switching Time:t (ns) vs. Drain Current:Id (A)

tf
td(off)
tr
td(on)
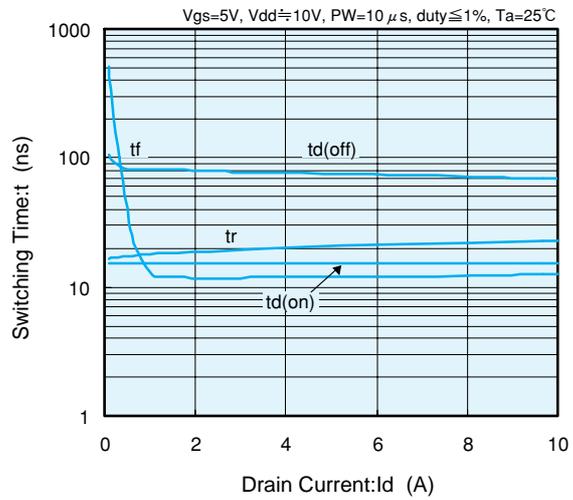
Gate/Source Voltage vs. Gate Charge

Vds=10V, Id=8A, Ta=25℃

Gate/Source Voltage:Vgs (V) vs. Gate Charge:Qg (nc)
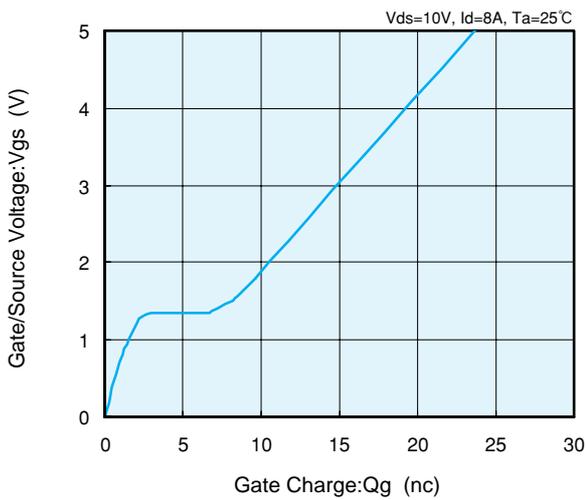
Reverse Drain Current vs. Source/Drain Voltage

Pulse Test, Ta=25℃

Reverse Drain Current:Idr (A) vs. Source/Drain Voltage:Vsd (V)

4.5V
2.5V
1.5V
Vgs=0V, -4.5V
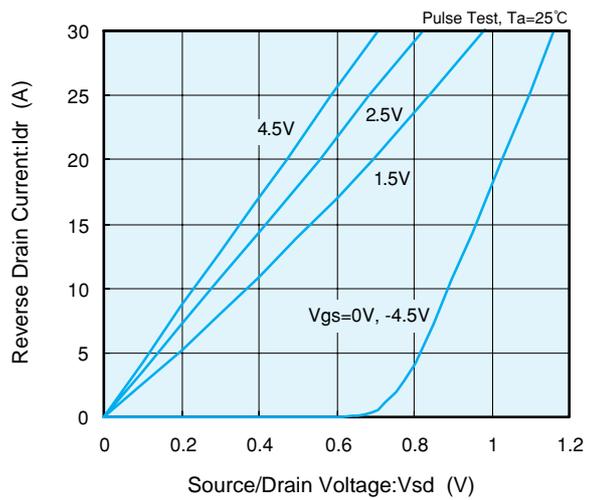
Standardized Transition Thermal Resistance vs. Pulse Width

Rth (ch-a) = 50℃/W (Implemented on a glass epoxy PCB)

Standardized Transition Thermal resistance: γs(t) vs. Pulse Width:PW (s)

Single Pulse

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