

XP131A1145SR



Power MOS FET

- ◆N-Channel Power MOS FET
- ◆DMOS Structure
- ◆Low On-State Resistance: 0.045Ω (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 XP131A1145SR 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 SOP-8 package makes high density mounting possible.

Features

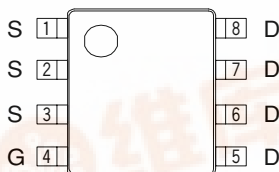
Low on-state resistance : Rds(on)=0.03Ω (Vgs=10V)
: Rds(on)=0.045Ω (Vgs=4.5V)

Ultra high-speed switching

Operational Voltage : 4.5V

High density mounting : SOP-8

Pin Configuration

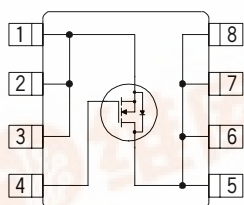


SOP-8
(TOP VIEW)

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 | 30 | V |
| Gate-Source Voltage | Vgss | ±20 | V |
| Drain Current (DC) | Id | 7 | A |
| Drain Current (Pulse) | Idp | 30 | A |
| Reverse Drain Current | Idr | 7 | A |
| Continuous Channel Power Dissipation (note) | Pd | 2.5 | W |
| Channel Temperature | Tch | 150 | °C |
| Storage Temperature | Tstg | -55~150 | °C |

Electrical Characteristics

DC Characteristics

Ta=25°C

| PARAMETER | SYMBOL | CONDITIONS | MIN | TYP | MAX | UNITS |
|---|----------|------------------|-----|-------|-------|-------|
| Drain Cut-off Current | Idss | Vds=30V, Vgs=0V | | | 10 | μA |
| Gate-Source Leakage Current | Igss | Vgs=±20V, Vds=0V | | | ±1 | μA |
| Gate-Source Cut-off Voltage | Vgs(off) | Id=1mA, Vds=10V | 1.0 | | 2.5 | V |
| Drain-Source On-state Resistance (note) | Rds(on) | Id=4A, Vgs=10V | | 0.025 | 0.03 | Ω |
| | | Id=4A, Vgs=4.5V | | 0.035 | 0.045 | Ω |
| Forward Transfer Admittance (note) | Yfs | Id=4A, Vds=10V | | 14 | | S |
| Body Drain Diode Forward Voltage | Vf | If=7A, 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 | | 620 | | pF |
| Output Capacitance | Coss | | | 350 | | pF |
| Feedback Capacitance | Crss | | | 120 | | pF |

Switching Characteristics

Ta=25°C

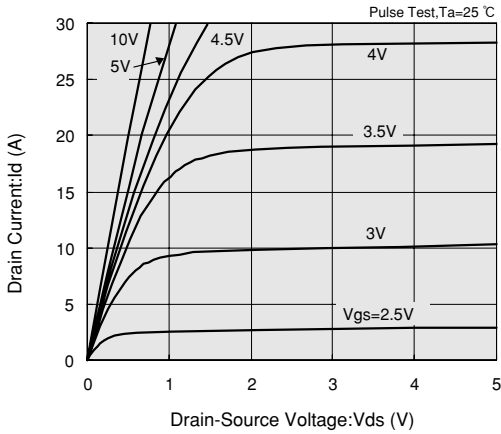
| PARAMETER | SYMBOL | CONDITIONS | MIN | TYP | MAX | UNITS |
|---------------------|----------|--------------------------|-----|-----|-----|-------|
| Turn-on Delay Time | td (on) | Vgs=5V, Id=4A Vdd=10V | | 15 | | ns |
| Rise Time | tr | | | 20 | | ns |
| Turn-off Delay Time | td (off) | | | 30 | | ns |
| Fall Time | tf | | | 10 | | ns |

Thermal Characteristics

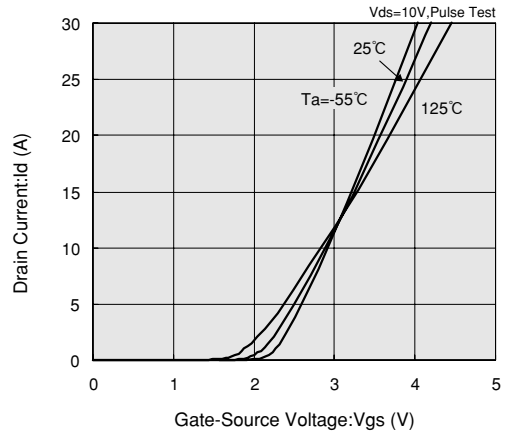
| PARAMETER | SYMBOL | CONDITIONS | MIN | TYP | MAX | UNITS |
|---------------------------------------|------------|--------------------------------------|-----|-----|-----|-------|
| Thermal Resistance (channel-ambience) | Rth (ch-a) | Implement on a glass epoxy resin PCB | | 50 | | °C/W |

Typical Performance Characteristics

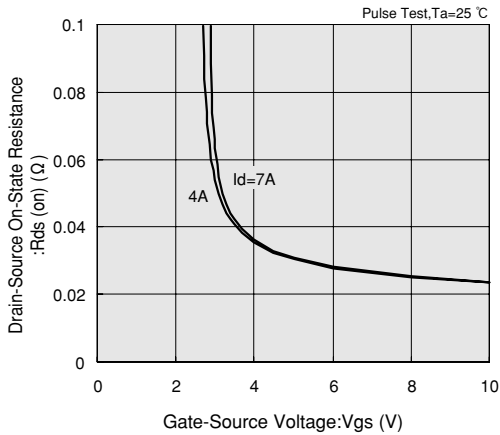
DRAIN CURRENT vs. DRAIN-SOURCE VOLTAGE



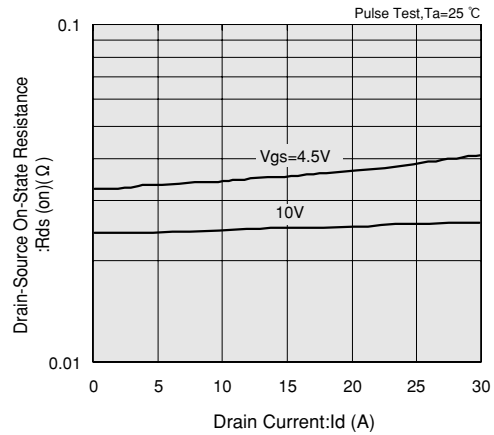
DRAIN CURRENT vs. GATE-SOURCE VOLTAGE



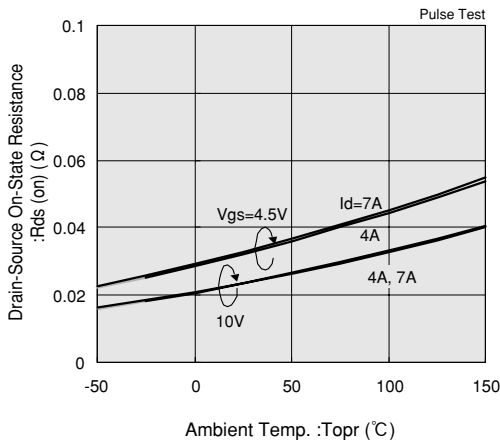
DRAIN-SOURCE ON-STATE RESISTANCE vs. GATE-SOURCE VOLTAGE



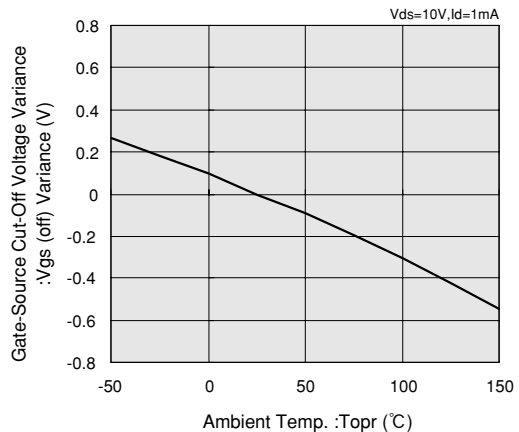
DRAIN-SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



DRAIN-SOURCE ON-STATE RESISTANCE vs. AMBIENT TEMPERATURE

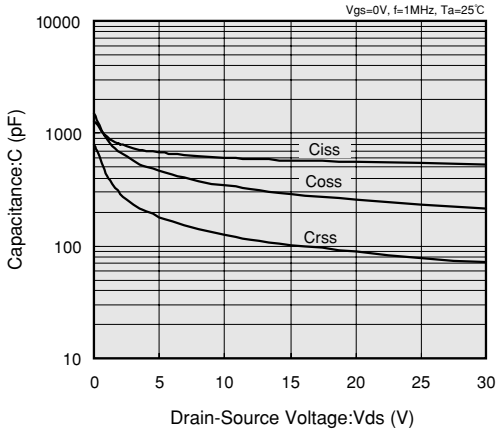


GATE-SOURCE CUT-OFF VOLTAGE VARIANCE vs. AMBIENT TEMPERATURE

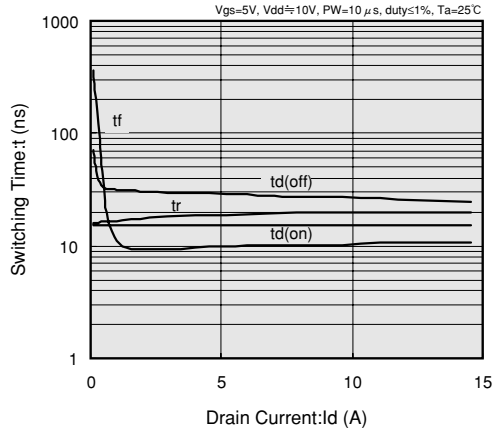


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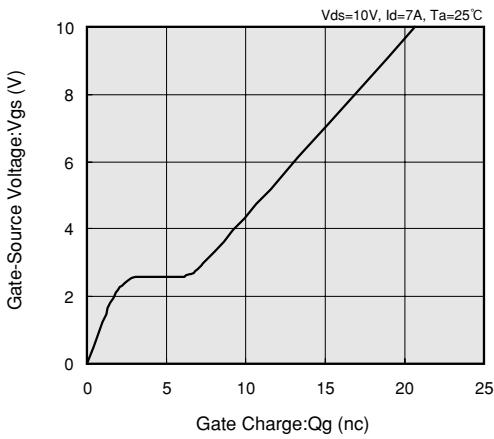
CAPACITANCE vs. DRAIN-SOURCE VOLTAGE



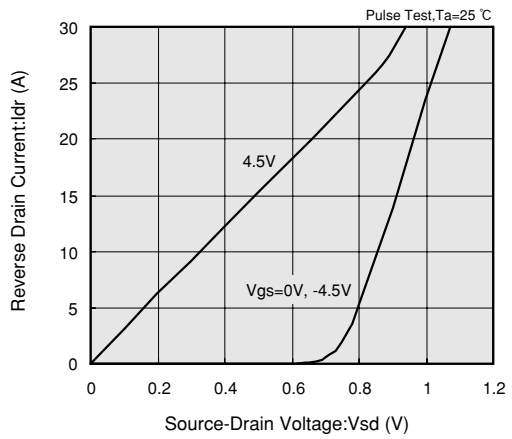
SWITCHING TIME vs. DRAIN CURRENT



GATE-SOURCE VOLTAGE vs. GATE CHARGE



REVERSE DRAIN CURRENT vs. SOURCE-DRAIN VOLTAGE



STANDARDIZED TRANSITION THERMAL RESISTANCE vs. PULSE WIDTH

