# XP161A1355PR

TOREX

## Power MOS FET

- ◆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

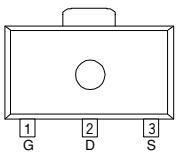
## ■General Description

The XP161A1355PR is 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.
A gate protect diode is built-in to prevent static damage.
The small SOT-89 package makes high density mounting possible.

## ■Features

**Low on-state resistance** : Rds (on) = 0.05Ω ( Vgs = 4.5V )
: Rds (on) = 0.07Ω ( Vgs = 2.5V )
: Rds (on) = 0.15Ω ( Vgs = 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 |

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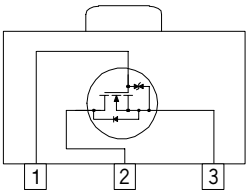
## ■Equivalent Circuit




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 | 4 | A |
| Drain Current (Pulse) | Idp | 16 | A |
| Reverse Drain Current | Idr | 4 | A |
| Continuous Channel Power Dissipation (note) | Pd | 2 | W |
| Channel Temperature | Tch | 150 | °C |
| Storage Temperature | Tstg | - 55 ~ 150 | °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 | | 1.2 | V |
| Drain-Source On-state Resistance | Rds ( on ) | Id = 2A , Vgs = 4.5V | | 0.37 | 0.05 | Ω |
| | | Id = 2A , Vgs = 2.5V | | 0.05 | 0.07 | Ω |
| ( note ) | | 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

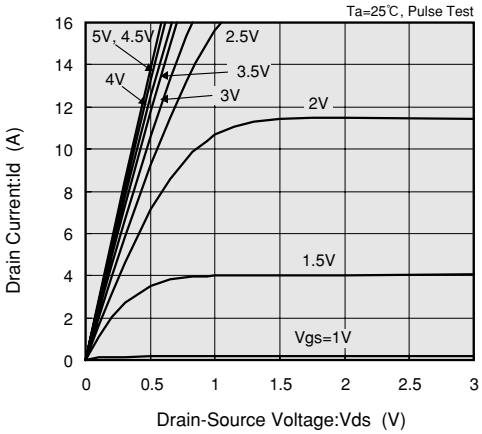
| PARAMETER | SYMBOL | CONDITIONS | MIN | TYP | MAX | UNITS |
|---|---|---|---|---|---|---|
| Turn-on Delay Time | td ( on ) | Vgs = 5V , Id = 2A Vdd = 10V | | 10 | | ns |
| Rise Time | tr | | | 15 | | ns |
| Turn-off Delay Time | td ( off ) | | | 85 | | ns |
| Fall Time | tf | | | 45 | | ns |

## Thermal Characteristics

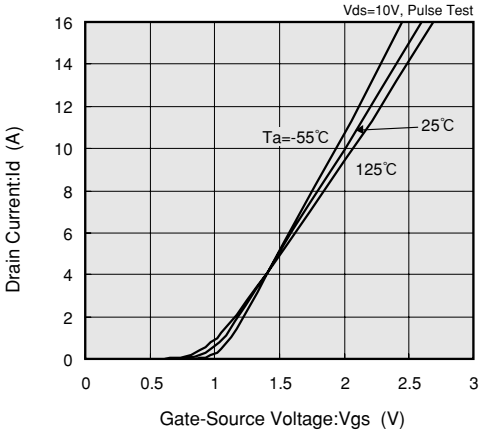
| PARAMETER | SYMBOL | CONDITIONS | MIN | TYP | MAX | UNITS |
|---|---|---|---|---|---|---|
| Thermal Resistance ( channel-ambience ) | Rth ( ch-a ) | Implement on a ceramic PCB | | 62.5 | | °C / W |

## ■Typical Performance Characteristics

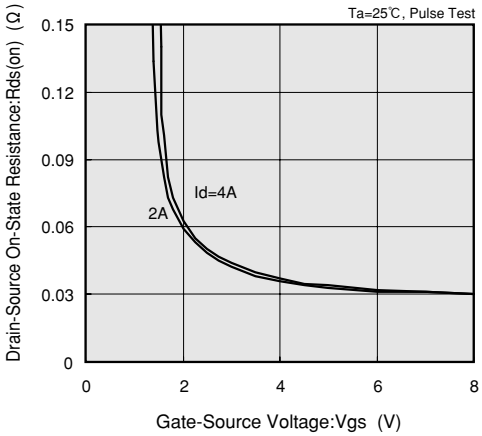
DRAIN CURRENT vs. DRAIN-SOURCE VOLTAGE



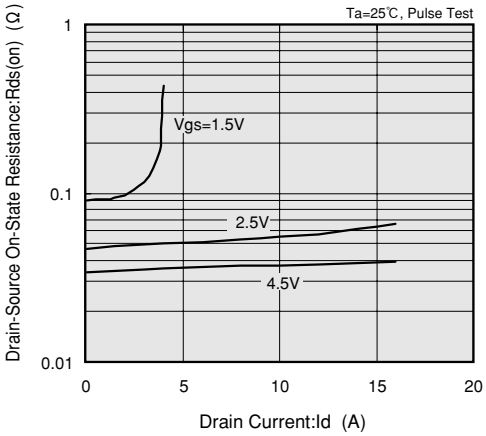

DRAIN CURRENT vs. GATE-SOURCE VOLTAGE



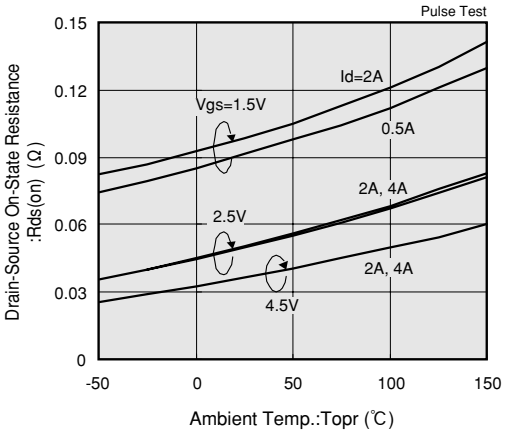

DRAIN-SOURCE ON-STATE RESISTANCE
vs. GATE-SOURCE VOLTAGE



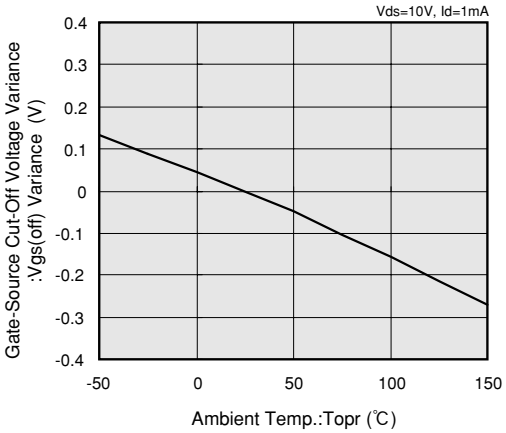

DRAIN-SOURCE ON-STATE RESISTANCE
vs. DRAIN CURRENT




DRAIN-SOURCE ON-STATE RESISTANCE
vs. AMBIENT TEMPERATURE




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

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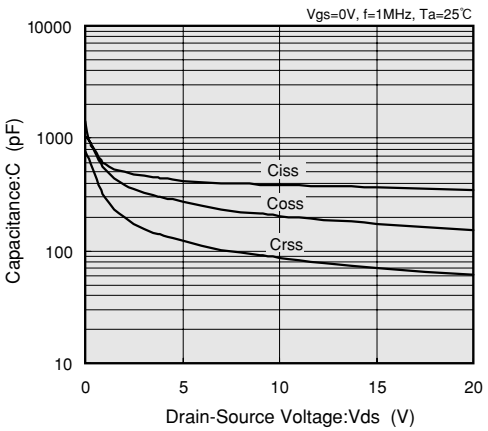
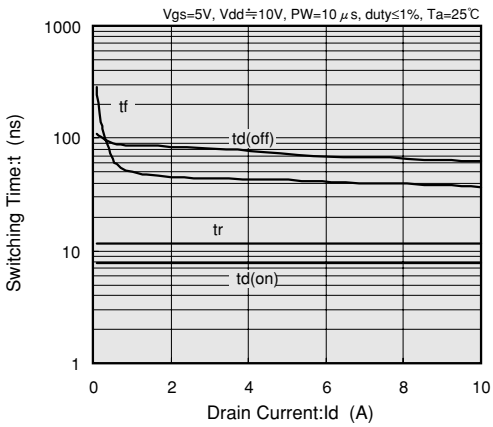
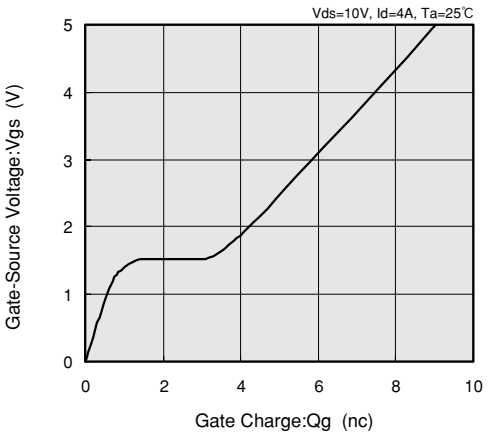
CAPACITANCE vs. DRAIN-SOURCE VOLTAGE



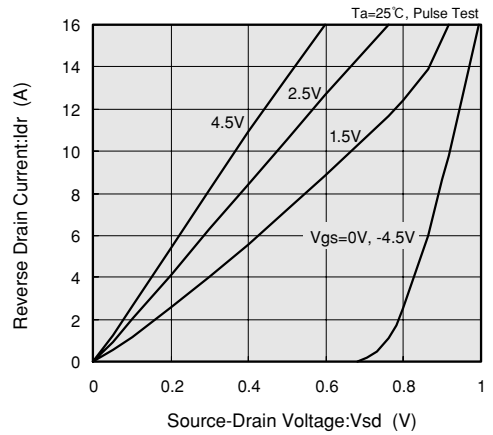

SWITCHING TIME vs. DRAIN CURRENT



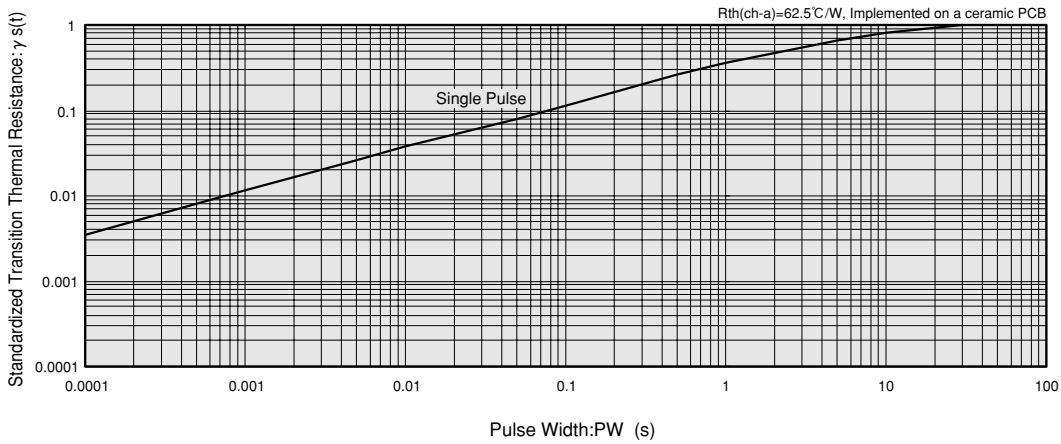

GATE-SOURCE VOLTAGE vs. GATE CHARGE




REVERSE DRAIN CURRENT
vs. SOURCE-DRAIN VOLTAGE




STANDARDIZED TRANSITION THERMAL RESISTANCE vs. PULSE WIDTH

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