XP161A1355PR

Power MOSFET

TOREX

◆N-Channel Power MOSFET

◆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 MOSFET 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
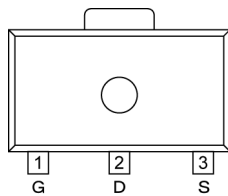
: Rds (on)= 0.15Ω @ Vgs = 1.5V

Ultra High-Speed Switching

Gate Protect Diode Built-in

Driving Voltage : 1.5V
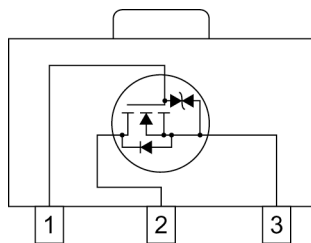
High Density Mounting : SOT-89

■PIN CONFIGURATION

SOT-89
（TOP VIEW）

■PIN ASSIGNMENT

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

■EQUIVALENT CIRCUIT

N-channel MOSFET
(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	4	A
Drain Current (Pulse)	Idp	16	A
Reverse Drain Current	Idr	4	A
Channel Power Dissipation *	Pd	2	W
Channel Temperature	Tch	150	℃
Storage Temperature Range	Tstg	-55~150	℃

* When implemented on a ceramic 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 Leak 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 *1	Rds(on)	Id= 2A, Vgs= 4.5V	-	0.037	0.050	Ω
		Id= 2A, Vgs= 2.5V	-	0.05	0.07	Ω
		Id= 0.5A, Vgs= 1.5V	-	0.1	0.15	Ω
Forward Transfer Admittance *1	| Yfs |	Id= 2A, Vds= 10V	-	10	-	S
Body Drain Diode Forward Voltage	Vf	If= 4A, Vgs= 0V	-	0.85	1.1	V

*1 Effective during pulse test.

Dynamic Characteristics

Ta = 25℃

PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNITS
Input Capacitance	Ciss	Vds= 10V, Vgs=0V f= 1MHz	-	390	-	pF
Output Capacitance	Coss		-	210	-	pF
Feedback Capacitance	Crss		-	90	-	pF

Switching Characteristics

Ta = 25℃

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	-	℃/W

■TYPICAL PERFORMANCE CHARACTERISTICS
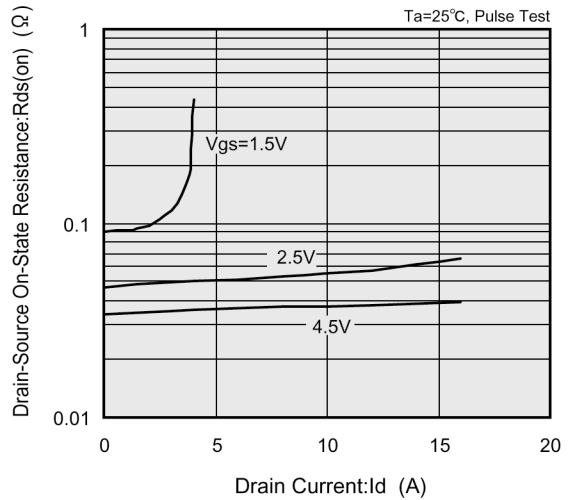
(1) Drain Current vs. Drain-Source Voltage

Ta=25℃, Pulse Test

Drain Current:Id (A)

5V, 4.5V
4V
2.5V
3.5V
3V
2V
1.5V
Vgs=1V

Drain-Source Voltage:Vds (V)
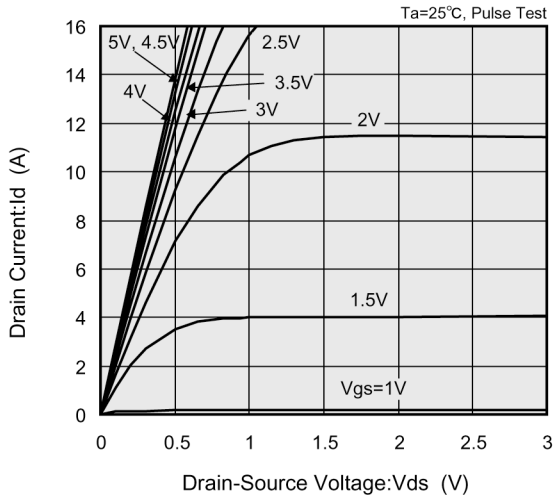
(2) Drain Current vs. Gate-Source Voltage

Vds=10V, Pulse Test

Drain Current:Id (A)

Ta=-55℃
25℃
125℃

Gate-Source Voltage:Vgs (V)
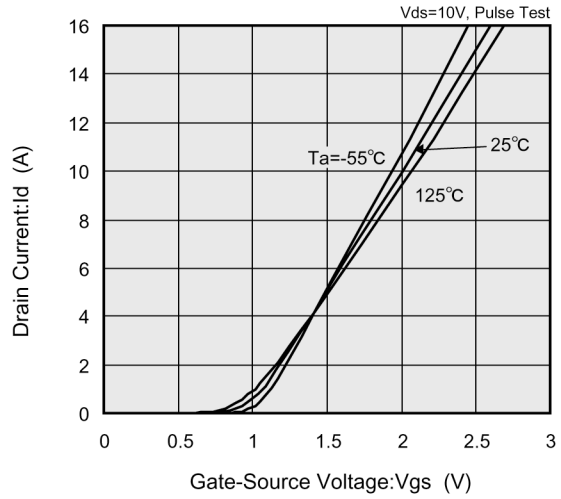
(3) Drain-Source On-State Resistance vs. Gate-Source Voltage

Ta=25℃, Pulse Test

Drain-Source On-State Resistance:Rds(on) (Ω)

Id=4A
2A

Gate-Source Voltage:Vgs (V)
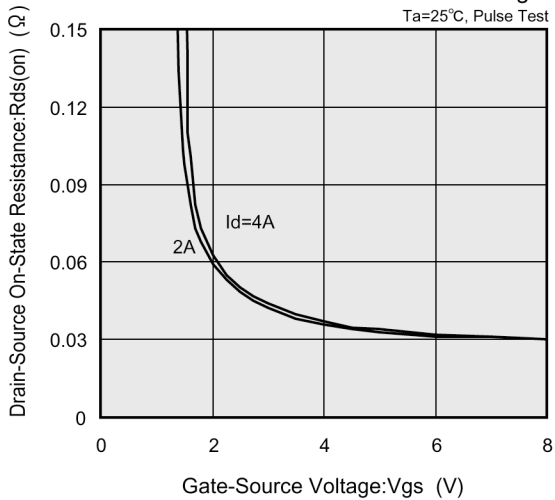
(4) Drain-Source On-State Resistance vs. Drain Current

Ta=25℃, Pulse Test

Drain-Source On-State Resistance:Rds(on) (Ω)

Vgs=1.5V
2.5V
4.5V

Drain Current:Id (A)

(5) Drain-Source On-State Resistance vs. Ambient Temperature

Pulse Test

Drain-Source On-State Resistance :Rds(on) (Ω)

Id=2A
Vgs=1.5V
0.5A
2A, 4A
2.5V
2A, 4A
4.5V

Ambient Temperature:Topr (℃)
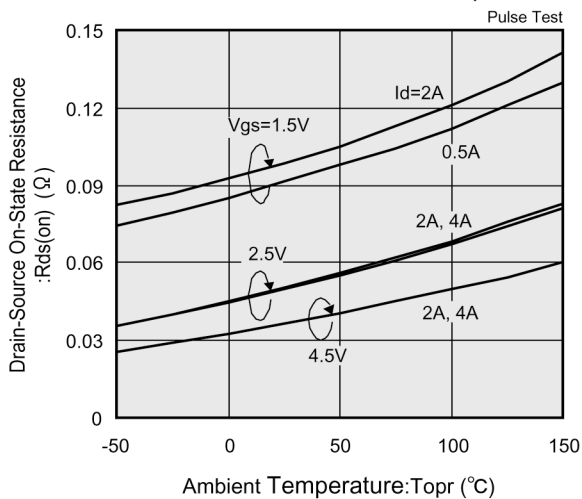
(6) Gate-Source Cut-Off Voltage Variance vs. Ambient Temperature

Vds=10V, Id=1mA

Gate-Source Cut-Off Voltage Variance :Vgs(off) Variance (V)

Ambient Temperature:Topr (℃)
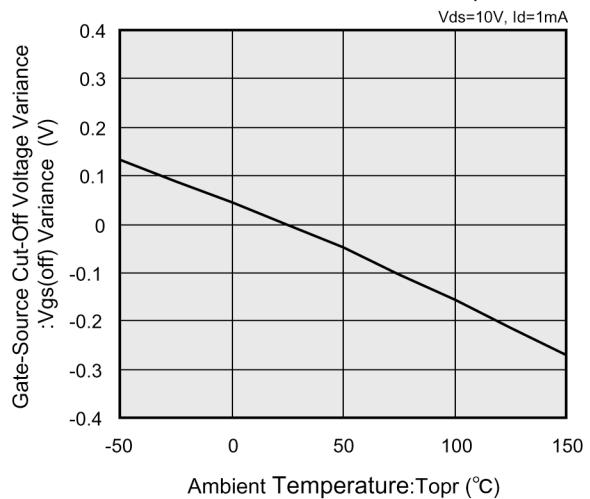
■TYPICAL PERFORMANCE CHARACTERISTICS (Continued)
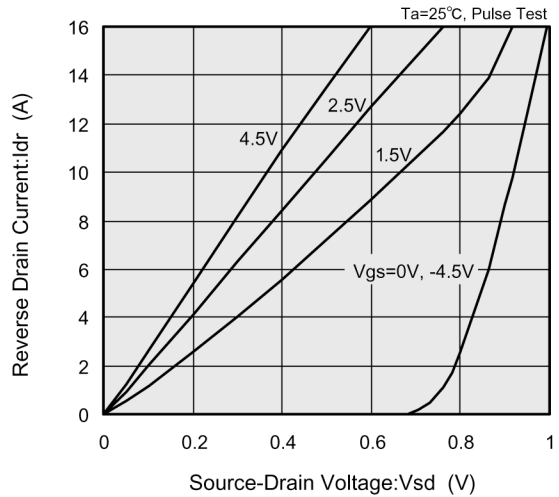
(7) Capacitance vs. Drain-Source Voltage

Vgs=0V, f=1MHz, Ta=25℃

Ciss
Coss
Crss
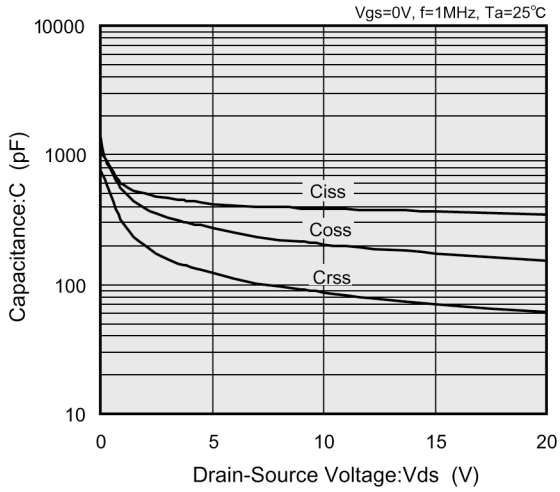
(8) Switching Time vs. Drain Current

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

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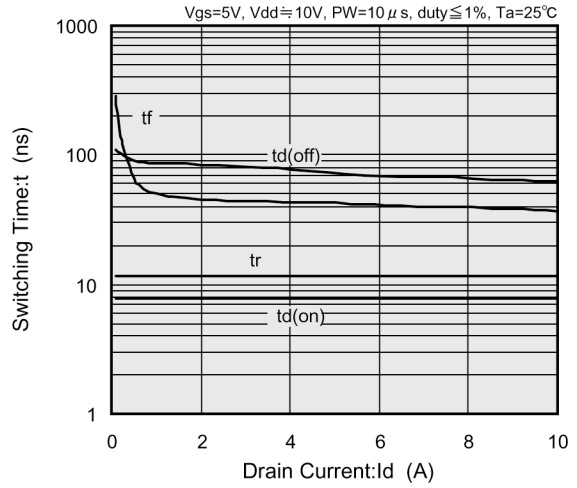
(9) Gate-Source Voltage vs. Gate Charge

Vds=10V, Id=4A, Ta=25℃
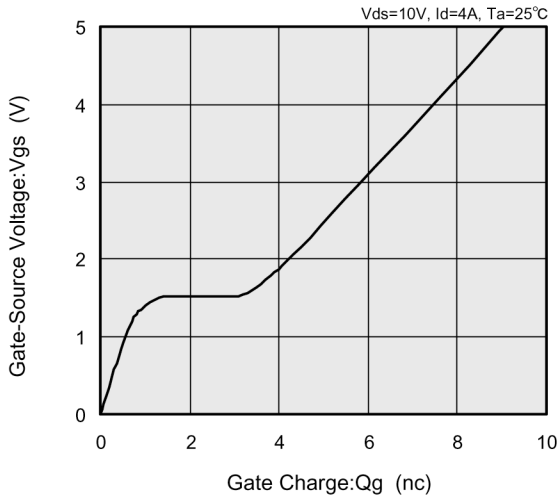
(10) Reverse Drain Current vs. Source-Drain Voltage

Ta=25℃, Pulse Test

2.5V
4.5V
1.5V
Vgs=0V, -4.5V

(11) Standardized transition Thermal Resistance vs. Pulse Width

Rth(ch-a)=62.5℃/W, Implemented on a ceramic PCB

Single Pulse