XP151A11B0MR

☉ TOREX

Power MOS FET

- ◆ **N-Channel Power MOS FET**
- ◆ **DMOS Structure**
- ◆ **Low On-State Resistance : 0.17Ω (max)**
- ◆ **Ultra High-Speed Switching**
- ◆ **Gate Protect Diode Built-in**
- ◆ **SOT-23 Package**

■Applications

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

■General Description

The XP151A11B0MR 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.
In order to counter static, a gate protect diode is built-in.
The small SOT-23 package makes high density mounting possible.

■Features

Low on-state resistance : Rds (on) = 0.12Ω (Vgs = 10V)
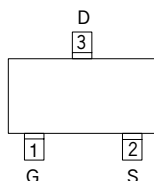: Rds (on) = 0.17Ω (Vgs = 4.5V)
Ultra high-speed switching
Gate Protect Diode Built-in
Operational Voltage : 4.5V
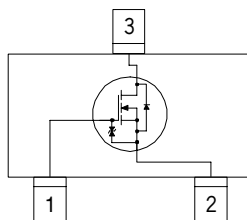**High density mounting** : SOT-23

■Pin Configuration

SOT-23
（TOP VIEW）

■Pin Assignment

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

■Equivalent Circuit

N-Channel MOS FET
(1 device built-in)

■Absolute Maximum Ratings

Ta=25℃

PARAMETER	SYMBOL	RATINGS	UNITS
Drain - Source Voltage	Vdss	30	V
Gate - Source Voltage	Vgss	± 20	V
Drain Current (DC)	Id	1	A
Drain Current (Pulse)	Idp	4	A
Reverse Drain Current	Idr	1	A
Continuous Channel Power Dissipation (note)	Pd	0.5	W
Channel Temperature	Tch	150	℃
Storage Temperature	Tstg	-55 ~ 150	℃

(note) : When implemented on a ceramic PCB

11

■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			±10	μA
Gate-Source Cut-off Voltage	Vgs (off)	Id = 1mA , Vds = 10V	1.0		3.0	V
Drain-Source On-state Resistance (note)	Rds (on)	Id = 0.5A , Vgs = 10V		0.09	0.12	Ω
		Id = 0.5A , Vgs = 4.5V		0.13	0.17	Ω
Forward Transfer Admittance (note)		Yfs		Id = 0.5A , Vds = 10V		2.4		S
Body Drain Diode Forward Voltage	Vf	If = 1A , Vgs = 0V		0.8	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		150		pF
Output Capacitance	Coss			90		pF
Feedback Capacitance	Crss			30		pF

Switching Characteristics

Ta=25°C

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Turn-on Delay Time	td (on)	Vgs = 5V , Id = 0.5A Vdd = 10V		10		ns
Rise Time	tr			15		ns
Turn-off Delay Time	td (off)			25		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		250		°C / W

11

■Typical Performance Characteristics

DRAIN CURRENT vs. DRAIN-SOURCE VOLTAGE

Ta=25℃, Pulse Test

Drain Current:Id (A)

10V
5V, 4.5V
4V
3.5V
3V
Vgs=2.5V

Drain-Source Voltage:Vds (V)
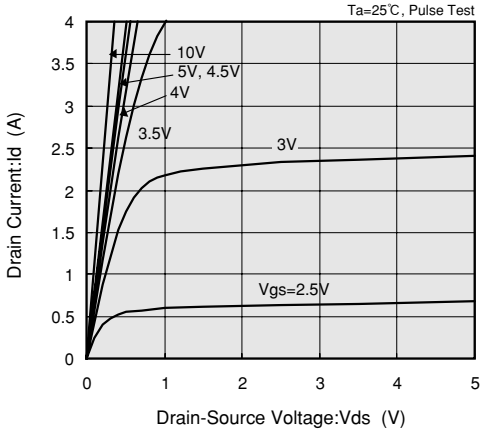
DRAIN CURRENT vs. GATE-SOURCE VOLTAGE

Vds=10V, Pulse Test

Drain Current:Id (A)

25℃
Ta=125℃
-55℃

Gate-Source Voltage:Vgs (V)
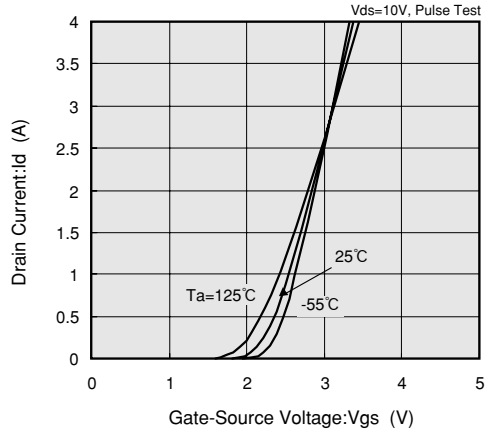
DRAIN-SOURCE ON-STATE RESISTANCE vs. GATE-SOURCE VOLTAGE

Ta=25℃, Pulse Test

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

Id=1A
0.5A

Gate-Source Voltage:Vgs (V)
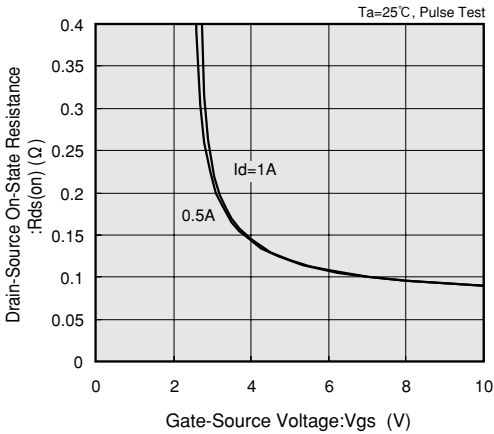
DRAIN-SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT

Ta=25℃, Pulse Test

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

Vgs=4.5V
10V
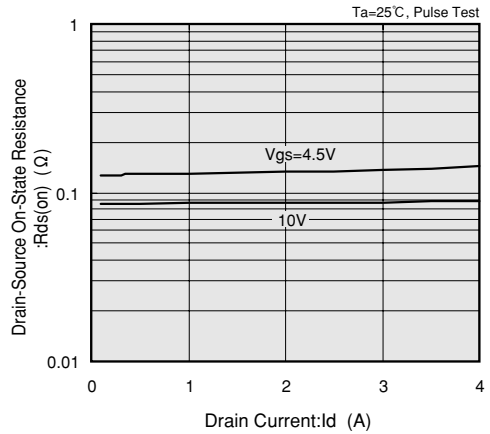
Drain Current:Id (A)

DRAIN-SOURCE ON-STATE RESISTANCE vs. AMBIENT TEMPERATURE

Pulse Test

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

Id=1A
0.5A
Vgs=4.5V
0.5A, 1A
10V
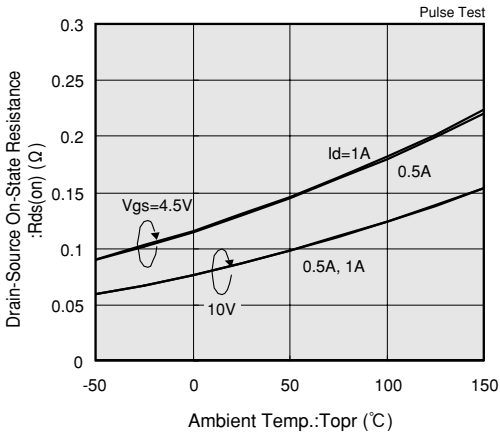
Ambient Temp.:Topr (℃)

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

Vds=10V, Id=1mA

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

Ambient Temp.:Topr (℃)

11
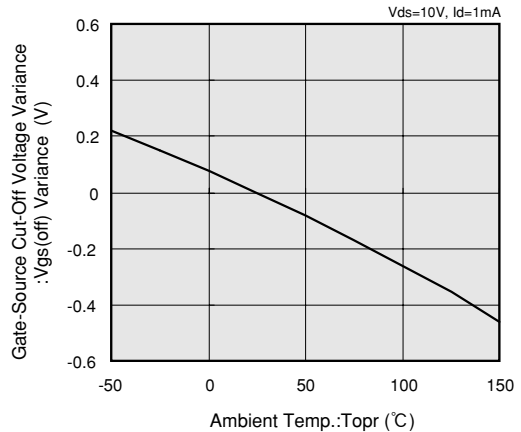
CAPACITANCE vs. DRAIN-SOURCE VOLTAGE

Vgs=0V, f=1MHz, Ta=25℃

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

Ciss, Coss, Crss
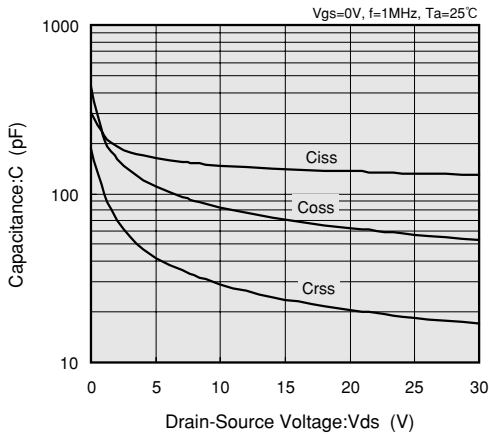
SWITCHING TIME vs. DRAIN CURRENT

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)
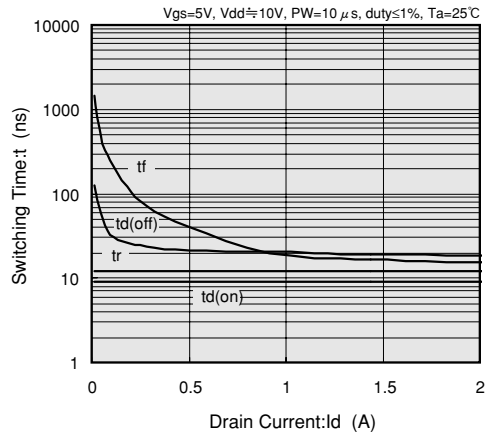
GATE-SOURCE VOLTAGE vs. GATE CHARGE

Vds=10V, Id=1A, Ta=25℃

Gate-Source Voltage:Vgs (V) vs Gate Charge:Qg (nc)
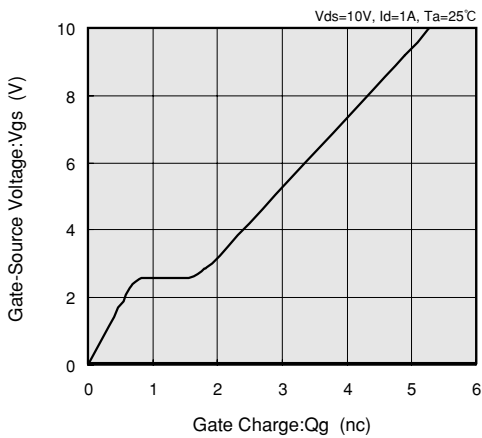
REVERSE DRAIN CURRENT vs. SOURCE-DRAIN VOLTAGE

Ta=25℃, Pulse Test

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

4.5V

Vgs=0V, -4.5V
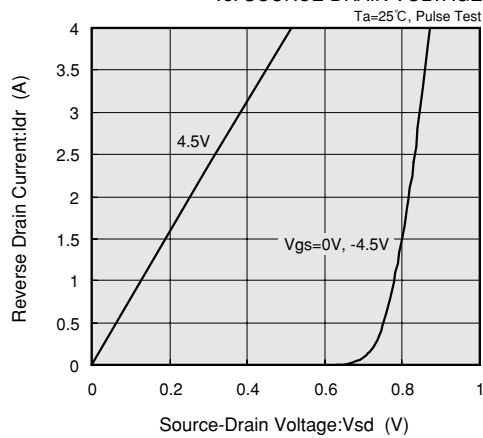
STANDARDIZED TRANSITION THERMAL RESISTANCE vs. PULSE WIDTH

Rth(ch-a)=250℃/W, (Implemented on a ceramic PCB)

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

Single Pulse

11