

- ◆ N-Channel Power MOS FET
- ◆ DMOS Structure
- ◆ Low On-State Resistance: **0.17Ω MAX**
- ◆ Ultra High-Speed Switching
- ◆ SOT-23 Package

### Applications

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

### General Description

The XP151A03A7MR 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 SOT-23 package makes high density mounting possible.

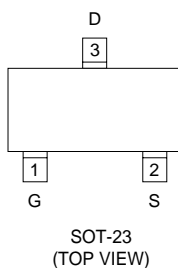
### Features

**Low on-state resistance:**  $R_{ds(on)}=0.17\Omega(V_{gs}=4.5V)$   
 $R_{ds(on)}=0.24\Omega(V_{gs}=2.5V)$   
 $R_{ds(on)}=0.5\Omega(V_{gs}=1.5V)$

**Ultra high-speed switching**  
**Operational Voltage:** 1.5V  
**High density mounting:** SOT-23

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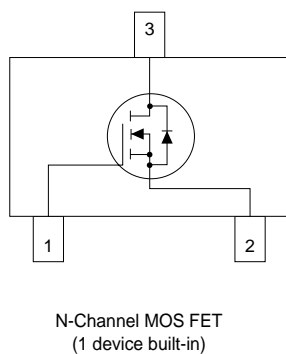
### Pin Configuration



### Pin Assignment

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

### Equivalent Circuit



### Absolute Maximum Ratings

$T_a=25^\circ\text{C}$

PARAMETER	SYMBOL	RATINGS	UNITS
Drain-Source Voltage	$V_{dss}$	20	V
Gate-Source Voltage	$V_{gss}$	$\pm 8$	V
Drain Current (DC)	$I_d$	0.8	A
Drain Current (Pulse)	$I_{dp}$	2.5	A
Reverse Drain Current	$I_{dr}$	0.8	A
Continuous Channel Power Dissipation (note)	$P_d$	0.5	W
Channel Temperature	$T_{ch}$	150	$^\circ\text{C}$
Storage Temperature	$T_{stg}$	-55~150	$^\circ\text{C}$

Note: When implemented on a glass epoxy PCB

## Electrical Characteristics

### DC characteristics

T<sub>a</sub>=25°C

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Drain Cut-off Current	I <sub>dss</sub>	V <sub>ds</sub> =20V, V <sub>gs</sub> =0V			10	μA
Gate-Source Leakage Current	I <sub>gss</sub>	V <sub>gs</sub> =±8V, V <sub>ds</sub> =0V			±10	μA
Gate-Source Cut-off Voltage	V <sub>gs(off)</sub>	I <sub>d</sub> =1mA, V <sub>ds</sub> =10V	0.5			V
Drain-Source On-state Resistance (note)	R <sub>ds(on)</sub>	I <sub>d</sub> =0.4A, V <sub>gs</sub> =4.5V		0.13	0.17	Ω
		I <sub>d</sub> =0.4A, V <sub>gs</sub> =2.5V		0.18	0.24	Ω
		I <sub>d</sub> =0.4A, V <sub>gs</sub> =1.5V		0.3	0.5	Ω
Forward Transfer Admittance (note)	Y <sub>fs</sub>	I <sub>d</sub> =0.4A, V <sub>ds</sub> =10V		3.5		S
Body Drain Diode Forward Voltage	V <sub>f</sub>	I <sub>f</sub> =0.8A, V <sub>gs</sub> =0V		0.8	1.1	V

Note: Effective during pulse test.

### Dynamic characteristics

T<sub>a</sub>=25°C

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Input Capacitance	C <sub>iss</sub>	V <sub>ds</sub> =10V, V <sub>gs</sub> =0V f=1MHz		220		pF
Output Capacitance	C <sub>oss</sub>			100		pF
Feedback Capacitance	C <sub>rss</sub>			30		pF

### Switching characteristics

T<sub>a</sub>=25°C

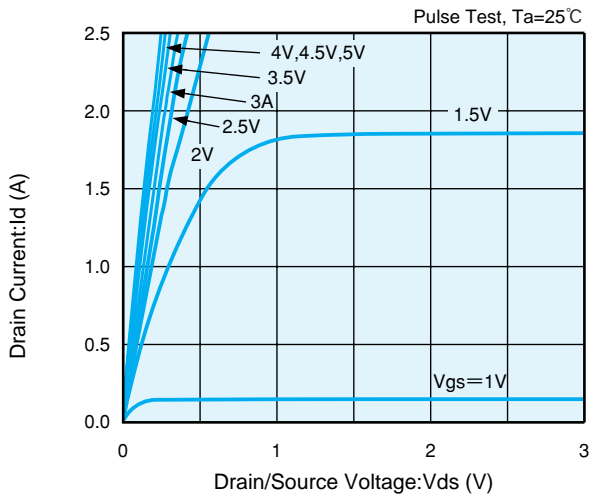
PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Turn-on Delay Time	t <sub>d (on)</sub>	V <sub>gs</sub> =5V, I <sub>d</sub> =0.4A V <sub>dd</sub> =10V		10		ns
Rise Time	t <sub>r</sub>			15		ns
Turn-off Delay Time	t <sub>d (off)</sub>			45		ns
Fall Time	t <sub>f</sub>			60		ns

### Thermal characteristics

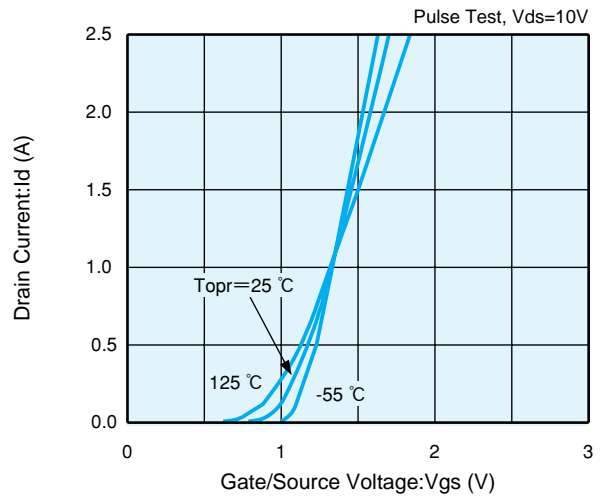
PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Thermal Resistance (channel-surroundings)	R <sub>th (ch-a)</sub>	Implement on a glass epoxy resin PCB		250		°C/W

### XP151A03A7MR Characteristics

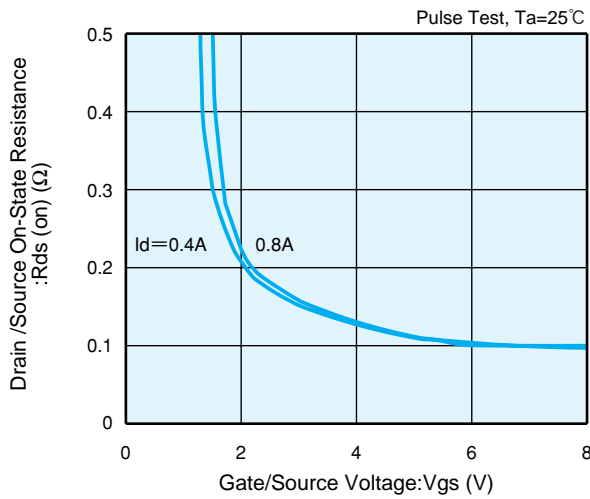
Drain Current vs. Drain /Source Voltage



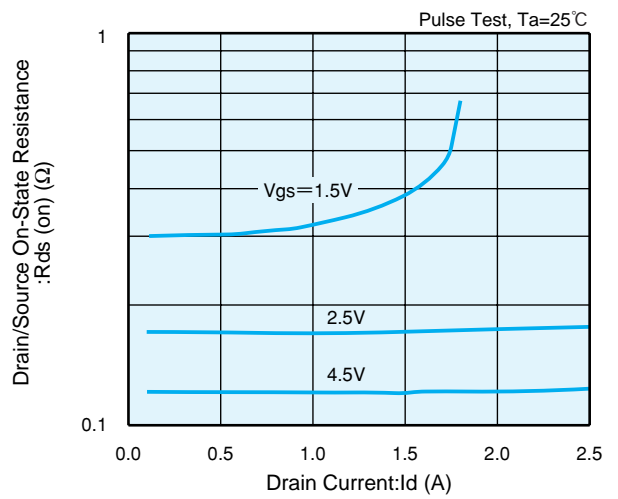
Drain Current vs. Gate/Source Voltage



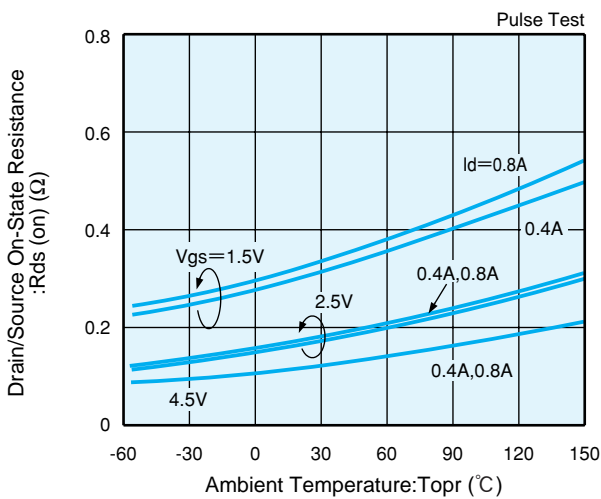
Drain/Source On-State Resistance vs. Gate/Source Voltage



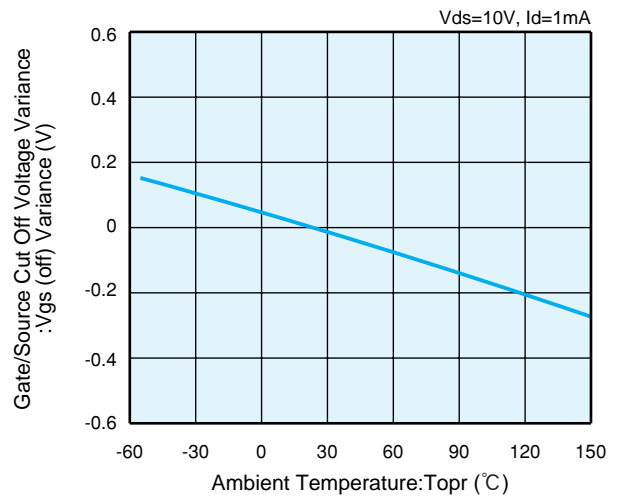
Drain/Source On-State Resistance vs. Drain Current



Drain/Source On-State Resistance vs. Ambient Temp.



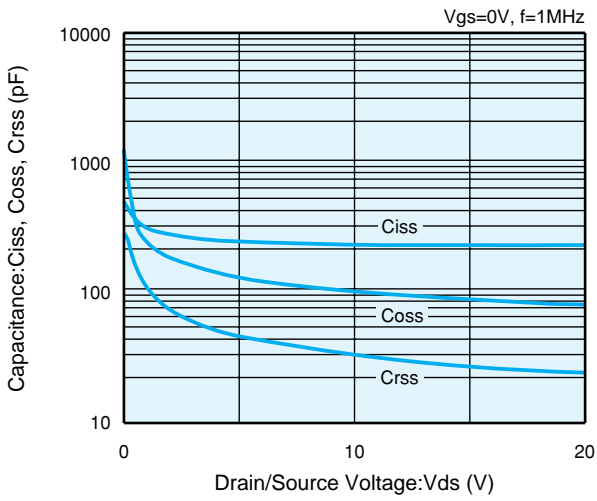
Gate/Source Cut Off Voltage Variance vs. Ambient Temp.



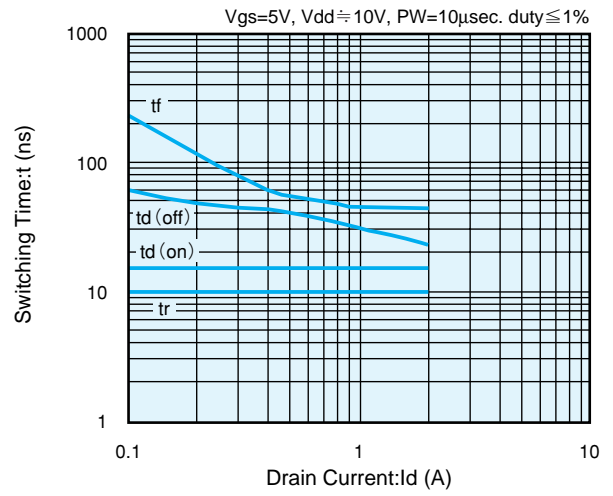
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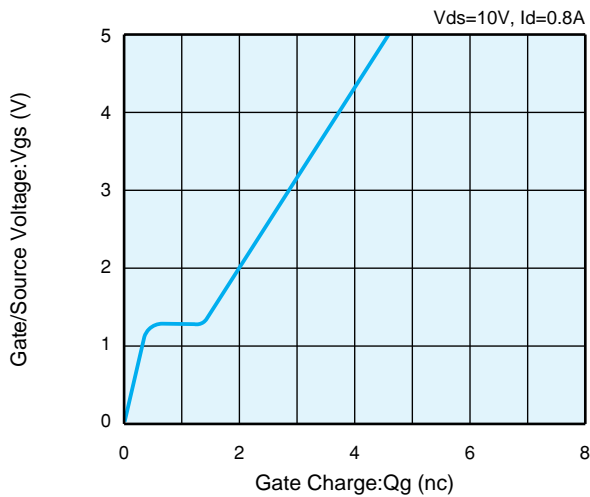
Drain/Source Voltage vs. Capacitance



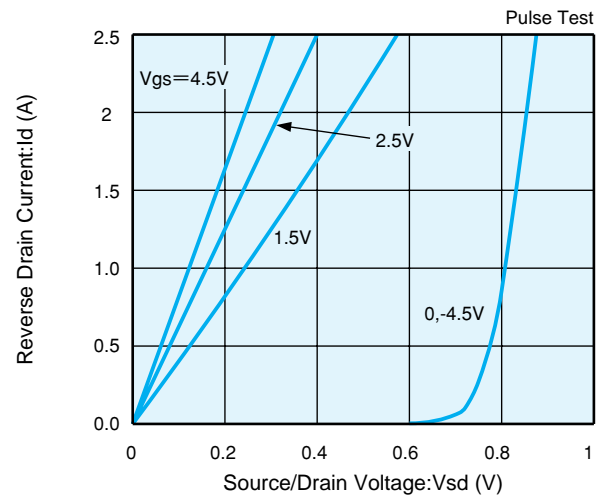
Switching Time vs. Drain Current



Gate/Source Voltage vs. Gate Charge



Reverse Drain Current vs. Source/Drain Voltage



Standardized Transition Thermal Resistance vs. Pulse Width

