

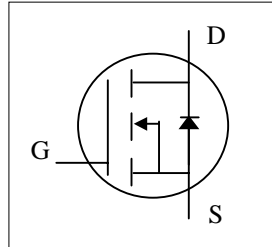
# XP65SL380DH

**Halogen-Free Product**

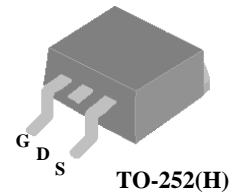


*N-CHANNEL ENHANCEMENT MODE  
POWER MOSFET*

- ▼ 100% R<sub>g</sub> & UIS Test
- ▼ Fast Switching Characteristic
- ▼ Simple Drive Requirement
- ▼ RoHS Compliant & Halogen-Free



BV <sub>DSS</sub>	650V
R <sub>DS(ON)</sub>	0.38 Ω
I <sub>D</sub> <sup>3</sup>	10A



## Description

XP65SL380D series are innovative design and silicon process technology to achieve the lowest possible on-resistance and fast switching performance. It provides the designer with an extreme efficient device for use in a wide range of power applications.

The TO-252 package is widely preferred for commercial-industrial surface mount applications and suited for low voltage applications such as DC/DC converters.

## Absolute Maximum Ratings @T<sub>j</sub>=25°C (unless otherwise specified)

Symbol	Parameter	Rating	Units
V <sub>DS</sub>	Drain-Source Voltage	650	V
V <sub>GS</sub>	Gate-Source Voltage	±20	V
V <sub>GS</sub>	Gate-Source Voltage, AC (f > 1Hz)	±30	V
I <sub>D</sub> @T <sub>C</sub> =25°C	Drain Current, V <sub>GS</sub> @ 10V <sup>3</sup>	10	A
I <sub>D</sub> @T <sub>C</sub> =100°C	Drain Current, V <sub>GS</sub> @ 10V <sup>3</sup>	6.5	A
I <sub>DM</sub>	Pulsed Drain Current <sup>1</sup>	24	A
dv/dt	MOSFET dv/dt Ruggedness (V <sub>DS</sub> = 0 ...400V )	40	V/ns
P <sub>D</sub> @T <sub>C</sub> =25°C	Total Power Dissipation	78.1	W
P <sub>D</sub> @T <sub>A</sub> =25°C	Total Power Dissipation <sup>6</sup>	2	W
E <sub>AS</sub>	Single Pulse Avalanche Energy <sup>4</sup>	75	mJ
dv/dt	Peak Diode Recovery dv/dt <sup>5</sup>	15	V/ns
T <sub>STG</sub>	Storage Temperature Range	-55 to 150	°C
T <sub>J</sub>	Operating Junction Temperature Range	-55 to 150	°C

## Thermal Data

Symbol	Parameter	Value	Units
R <sub>thj-c</sub>	Maximum Thermal Resistance, Junction-case	1.6	°C/W
R <sub>thj-a</sub>	Maximum Thermal Resistance, Junction-ambient (PCB mount) <sup>6</sup>	62.5	°C/W

**Electrical Characteristics @T<sub>j</sub>=25°C(unless otherwise specified)**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250uA	650	-	-	V
R <sub>DS(ON)</sub>	Static Drain-Source On-Resistance <sup>2</sup>	V <sub>GS</sub> =10V, I <sub>D</sub> =3.2A	-	-	0.38	Ω
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250uA	2	-	5	V
g <sub>fs</sub>	Forward Transconductance	V <sub>DS</sub> =15V, I <sub>D</sub> =3.2A	-	6	-	S
I <sub>DSS</sub>	Drain-Source Leakage Current	V <sub>DS</sub> =520V, V <sub>GS</sub> =0V	-	-	100	uA
I <sub>GSS</sub>	Gate-Source Leakage	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V	-	-	±1	uA
Q <sub>g</sub>	Total Gate Charge	I <sub>D</sub> =5A	-	33	52.8	nC
Q <sub>gs</sub>	Gate-Source Charge	V <sub>DS</sub> =480V	-	8	-	nC
Q <sub>gd</sub>	Gate-Drain ("Miller") Charge	V <sub>GS</sub> =10V	-	14	-	nC
t <sub>d(on)</sub>	Turn-on Delay Time	V <sub>DD</sub> =300V	-	13	-	ns
t <sub>r</sub>	Rise Time	I <sub>D</sub> =5A	-	11	-	ns
t <sub>d(off)</sub>	Turn-off Delay Time	R <sub>G</sub> =3.3Ω	-	33	-	ns
t <sub>f</sub>	Fall Time	V <sub>GS</sub> =10V	-	8	-	ns
C <sub>iss</sub>	Input Capacitance	V <sub>GS</sub> =0V	-	1160	1860	pF
C <sub>oss</sub>	Output Capacitance	V <sub>DS</sub> =100V	-	40	-	pF
C <sub>rss</sub>	Reverse Transfer Capacitance	f=1.0MHz	-	5	-	pF
R <sub>g</sub>	Gate Resistance	f=1.0MHz	-	3.3	6.6	Ω

**Source-Drain Diode**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V <sub>SD</sub>	Forward On Voltage <sup>2</sup>	I <sub>S</sub> =3.2A, V <sub>GS</sub> =0V	-	0.8	-	V
t <sub>rr</sub>	Reverse Recovery Time	I <sub>S</sub> =5A, V <sub>GS</sub> =0V	-	120	-	ns
Q <sub>rr</sub>	Reverse Recovery Charge	di/dt=100A/μs	-	710	-	nC

**Notes:**

- 1.Pulse width limited by max. junction temperature.
- 2.Pulse test
- 3.Limited by max. junction temperature. Maximum duty cycle D=0.75
- 4.Starting T<sub>j</sub>=25°C , V<sub>DD</sub>=50V , L=150mH , R<sub>G</sub>=25Ω
- 5.I<sub>SD</sub> ≤ I<sub>D</sub>, V<sub>DD</sub> ≤ BV<sub>DSS</sub>, starting T<sub>J</sub> = 25°C
- 6.Surface mounted on 1 in<sup>2</sup> copper pad of FR4 board

THIS PRODUCT IS SENSITIVE TO ELECTROSTATIC DISCHARGE, PLEASE HANDLE WITH CAUTION.

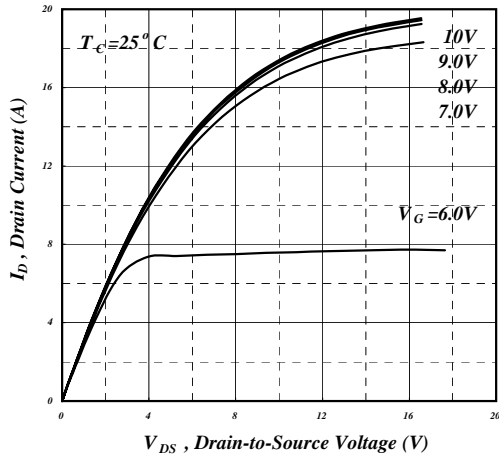
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XSEMI DOES NOT ASSUME ANY LIABILITY ARISING OUT OF THE APPLICATION OR USE OF ANY PRODUCT OR CIRCUIT

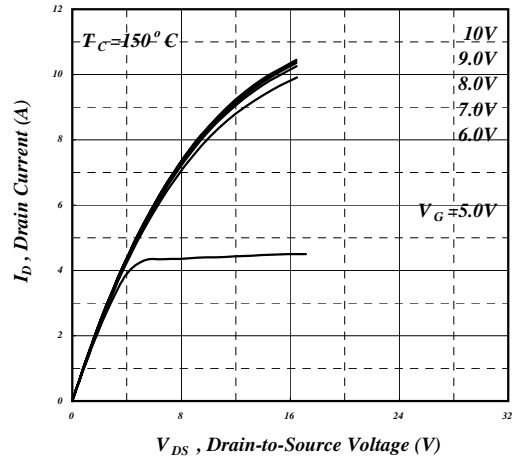
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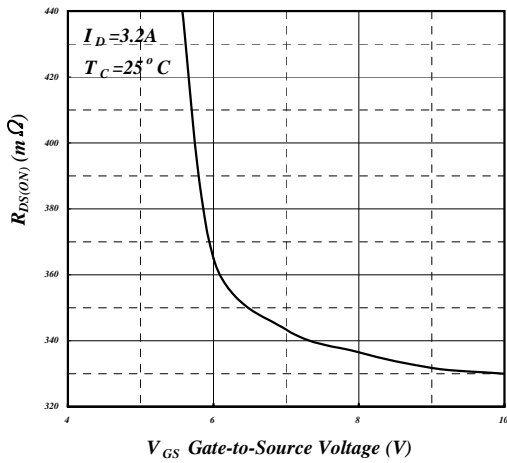
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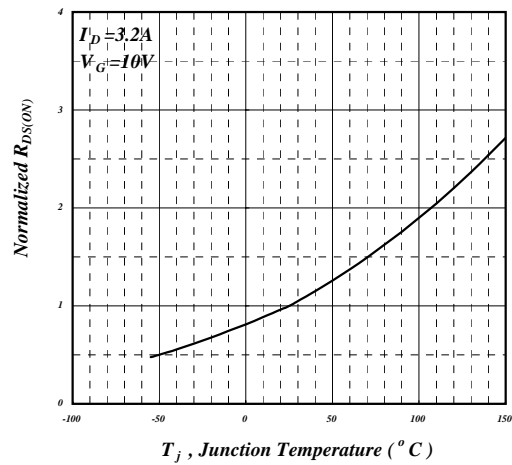
**Fig 1. Typical Output Characteristics**



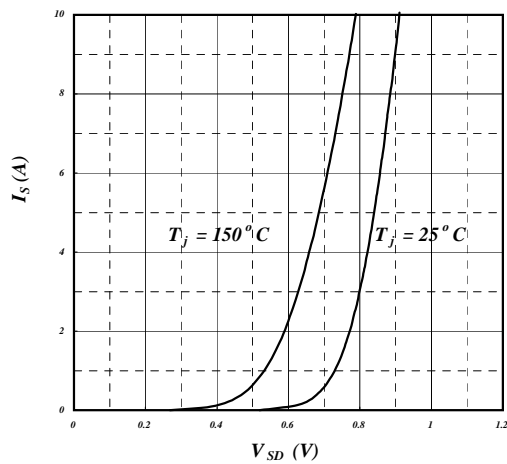
**Fig 2. Typical Output Characteristics**



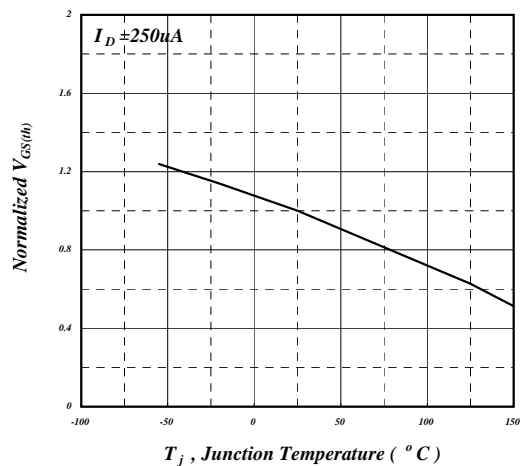
**Fig 3. On-Resistance v.s. Gate Voltage**



**Fig 4. Normalized On-Resistance v.s. Junction Temperature**



**Fig 5. Forward Characteristic of Reverse Diode**



**Fig 6. Gate Threshold Voltage v.s. Junction Temperature**

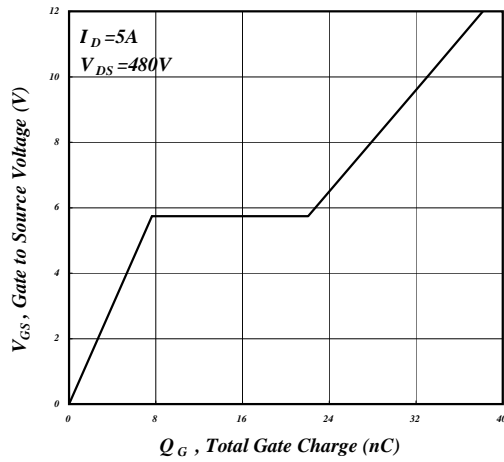


Fig 7. Gate Charge Characteristics

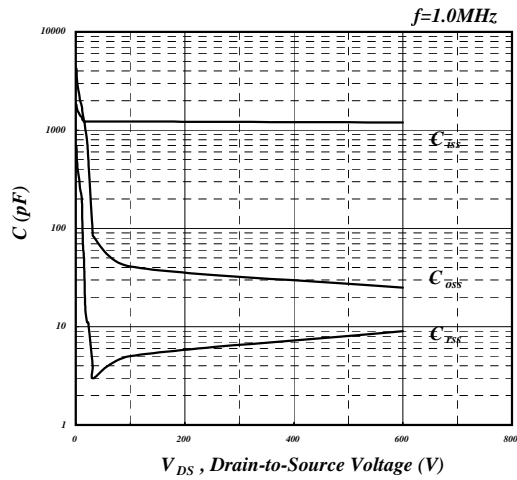


Fig 8. Typical Capacitance Characteristics

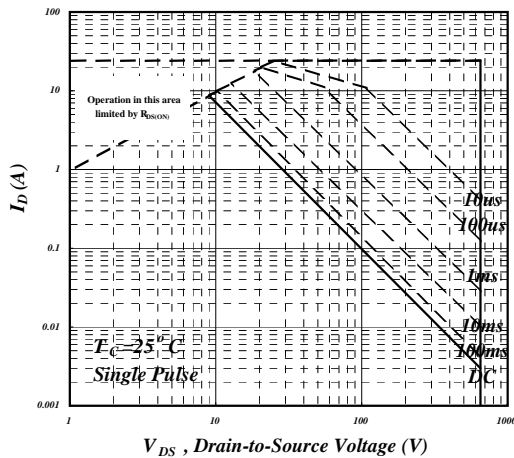


Fig 9. Maximum Safe Operating Area

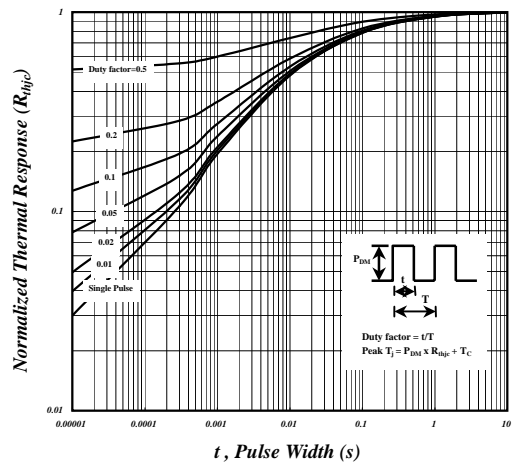


Fig 10. Effective Transient Thermal Impedance

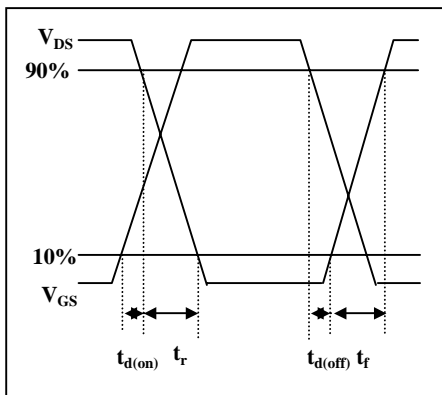


Fig 11. Switching Time Waveform

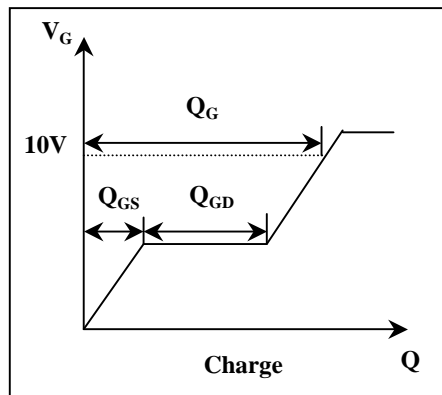
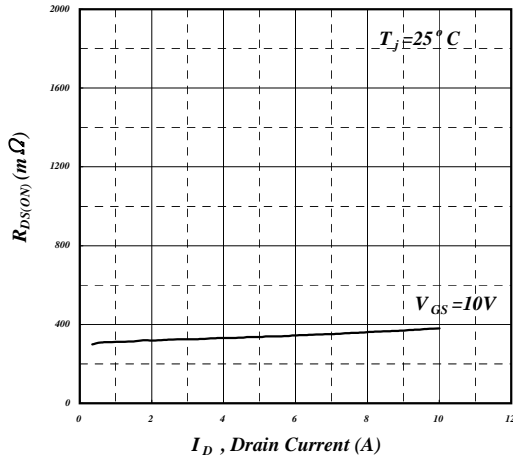
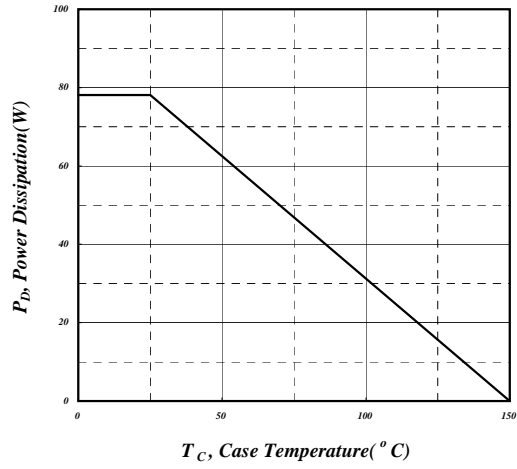


Fig 12. Gate Charge Waveform



**Fig 13. Typ. Drain-Source on State Resistance**



**Fig 14. Total Power Dissipation**

### MARKING INFORMATION

