

# XP65SL045AFWL

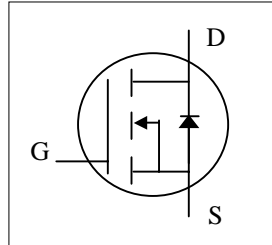
**Halogen-Free Product**



*N-CHANNEL ENHANCEMENT MODE*

*POWER MOSFET*

- ▼ Ultra-Fast Body Diode
- ▼ 100% R<sub>g</sub> & UIS Test
- ▼ Fast Switching Characteristic
- ▼ RoHS Compliant & Halogen-Free

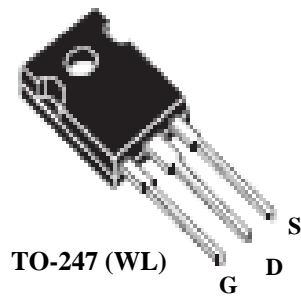


BV <sub>DSS</sub>	650V
R <sub>DS(ON)</sub>	45mΩ
I <sub>D</sub>	63.7A

## Description

XP65SL045AF series are innovated 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-247 package is widely preferred for commercial-industrial applications. The device is suited for switch mode power supplies, DC-AC converters and high current high speed switching circuits.



## 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	63.7	A
I <sub>D</sub> @T <sub>C</sub> =100°C	Drain Current, V <sub>GS</sub> @ 10V	40.3	A
I <sub>DM</sub>	Pulsed Drain Current <sup>1</sup>	210	A
dv/dt	MOSFET dv/dt Ruggedness (V <sub>DS</sub> = 0 ...600V )	20	V/ns
P <sub>D</sub> @T <sub>C</sub> =25°C	Total Power Dissipation	500	W
P <sub>D</sub> @T <sub>A</sub> =25°C	Total Power Dissipation	3.12	W
E <sub>AS</sub>	Single Pulse Avalanche Energy <sup>3</sup>	1875	mJ
dv/dt	Peak Diode Recovery dv/dt <sup>4</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	0.25	°C/W
R <sub>thj-a</sub>	Maximum Thermal Resistance, Junction-ambient	40	°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> =1mA	650	-	-	V
R <sub>DS(ON)</sub>	Static Drain-Source On-Resistance <sup>2</sup>	V <sub>GS</sub> =10V, I <sub>D</sub> =30A	-	-	45	mΩ
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =3mA	2	-	5	V
g <sub>fs</sub>	Forward Transconductance	V <sub>DS</sub> =10V, I <sub>D</sub> =30A	-	55	-	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> =40A	-	273	437	nC
Q <sub>gs</sub>	Gate-Source Charge	V <sub>DS</sub> =480V	-	60	-	nC
Q <sub>gd</sub>	Gate-Drain ("Miller") Charge	V <sub>GS</sub> =10V	-	120	-	nC
t <sub>d(on)</sub>	Turn-on Delay Time	V <sub>DD</sub> =300V	-	50	-	ns
t <sub>r</sub>	Rise Time	I <sub>D</sub> =40A	-	140	-	ns
t <sub>d(off)</sub>	Turn-off Delay Time	R <sub>G</sub> =3.3Ω	-	293	-	ns
t <sub>f</sub>	Fall Time	V <sub>GS</sub> =10V	-	104	-	ns
C <sub>iss</sub>	Input Capacitance	V <sub>GS</sub> =0V	-	10500	16800	pF
C <sub>oss</sub>	Output Capacitance	V <sub>DS</sub> =100V	-	260	-	pF
C <sub>rss</sub>	Reverse Transfer Capacitance	f=1.0MHz	-	70	-	pF
R <sub>g</sub>	Gate Resistance	f=1.0MHz	-	6	-	Ω

**Source-Drain Diode**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
I <sub>S</sub>	Source Current ( Body Diode )	T <sub>C</sub> =25°C	-	-	63.7	A
V <sub>SD</sub>	Forward On Voltage <sup>2</sup>	I <sub>S</sub> =40A, V <sub>GS</sub> =0V	-	0.9	-	V
t <sub>rr</sub>	Reverse Recovery Time	I <sub>S</sub> =40A, V <sub>GS</sub> =0V	-	170	-	ns
Q <sub>rr</sub>	Reverse Recovery Charge	di/dt=100A/μs	-	1	-	μC

**Notes:**

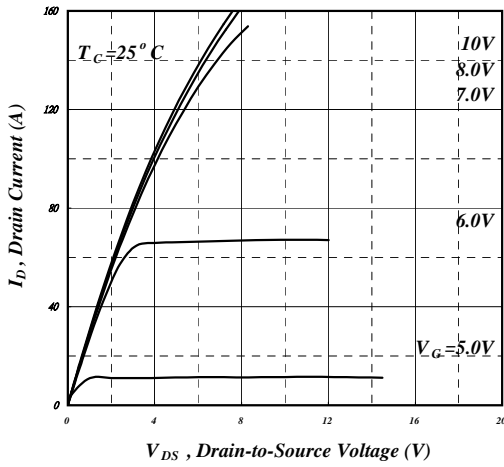
- 1.Pulse width limited by max. junction temperature.
- 2.Pulse test
- 3.Starting T<sub>j</sub>=25°C , V<sub>DD</sub>=50V , L=150mH , R<sub>G</sub>=25Ω
- 4.I<sub>SD</sub> ≤ I<sub>D</sub>, V<sub>DD</sub> ≤ BV<sub>DSS</sub>, starting T<sub>J</sub> = 25°C

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

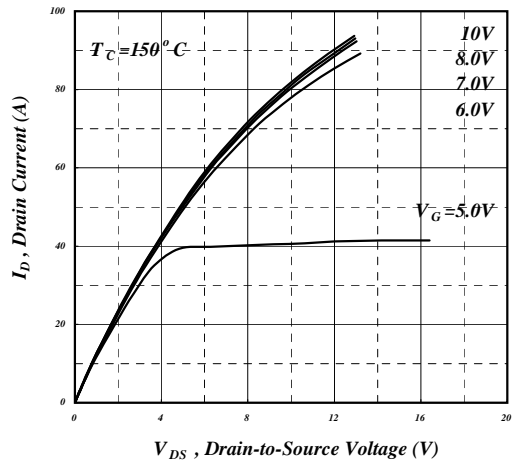
USE OF THIS PRODUCT AS A CRITICAL COMPONENT IN LIFE SUPPORT OR OTHER SIMILAR SYSTEMS IS NOT AUTHORIZED.

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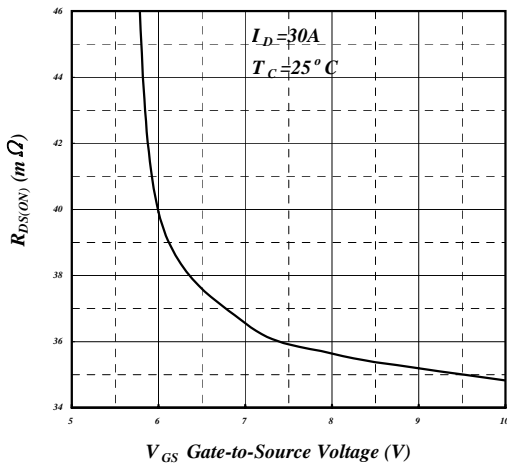
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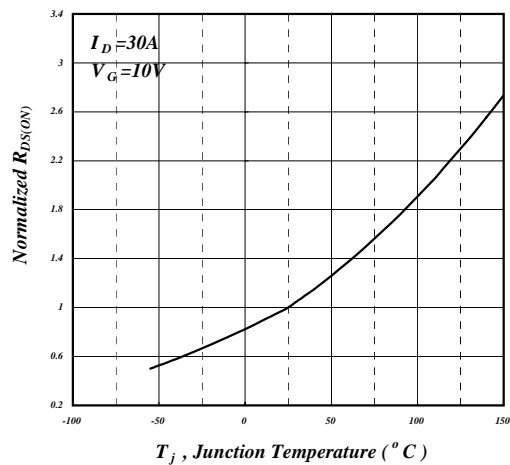
**Fig 1. Typical Output Characteristics**



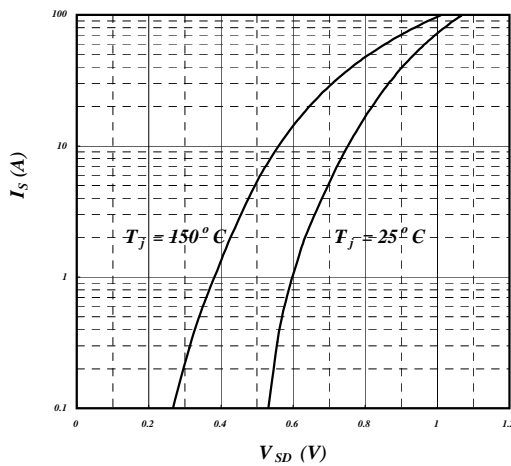
**Fig 2. Typical Output Characteristics**



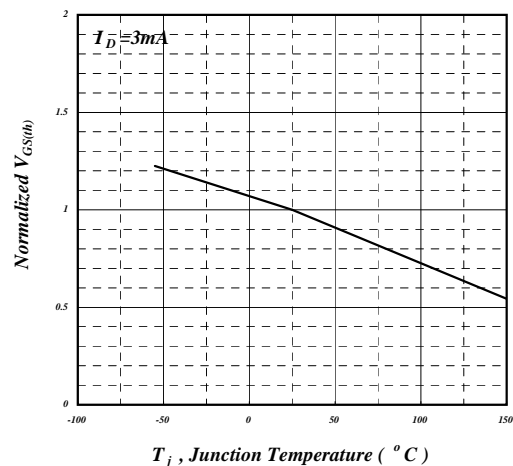
**Fig 3. On-Resistance v.s. Gate Voltage**



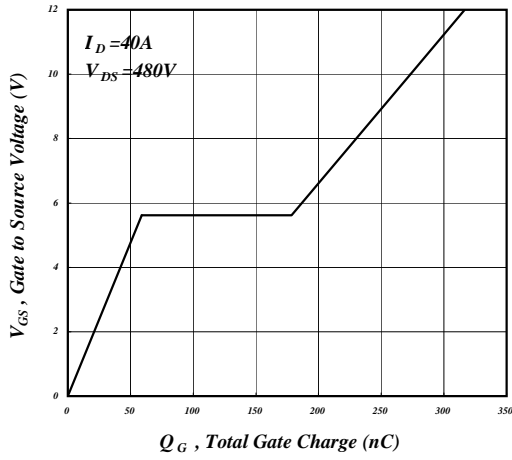
**Fig 4. Normalized On-Resistance v.s. Junction Temperature**



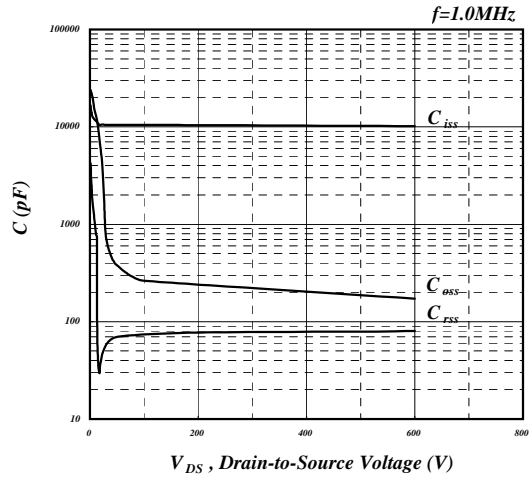
**Fig 5. Forward Characteristic of Reverse Diode**



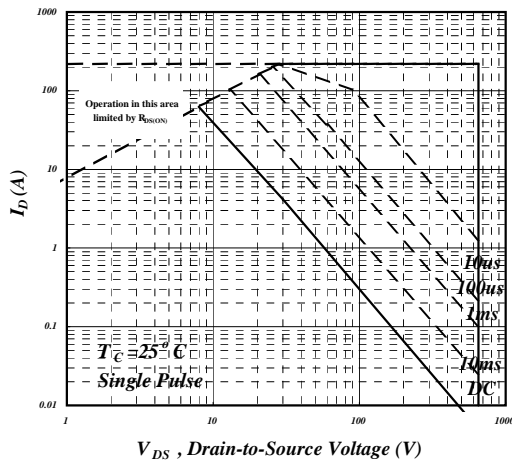
**Fig 6. Gate Threshold Voltage v.s. Junction Temperature**



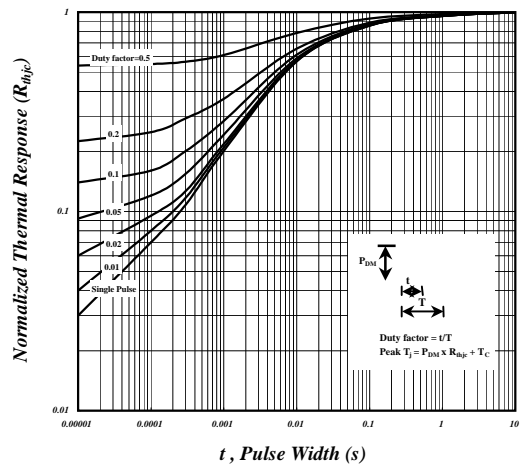
**Fig 7. Gate Charge Characteristics**



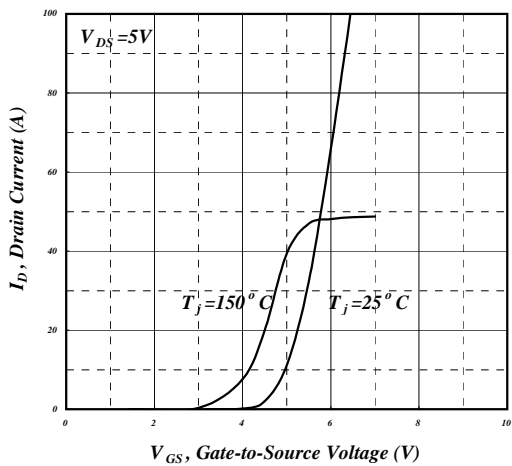
**Fig 8. Typical Capacitance Characteristics**



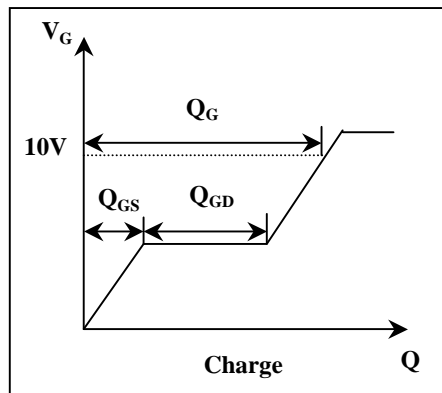
**Fig 9. Maximum Safe Operating Area**



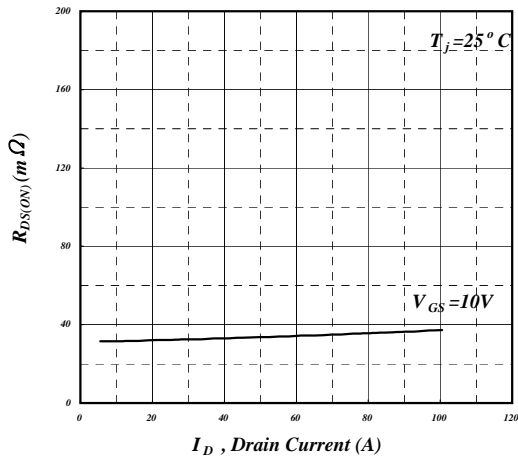
**Fig 10. Effective Transient Thermal Impedance**



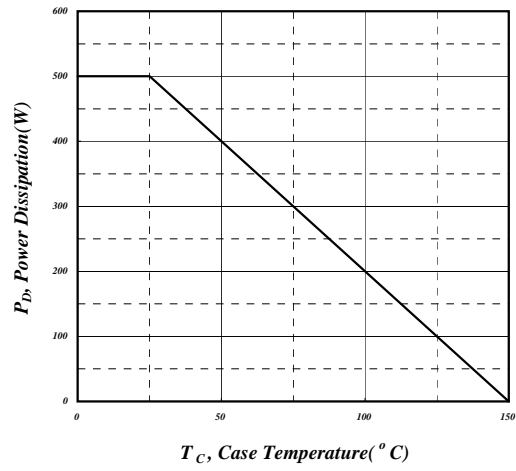
**Fig 11. Transfer Characteristics**



**Fig 12. Gate Charge Waveform**



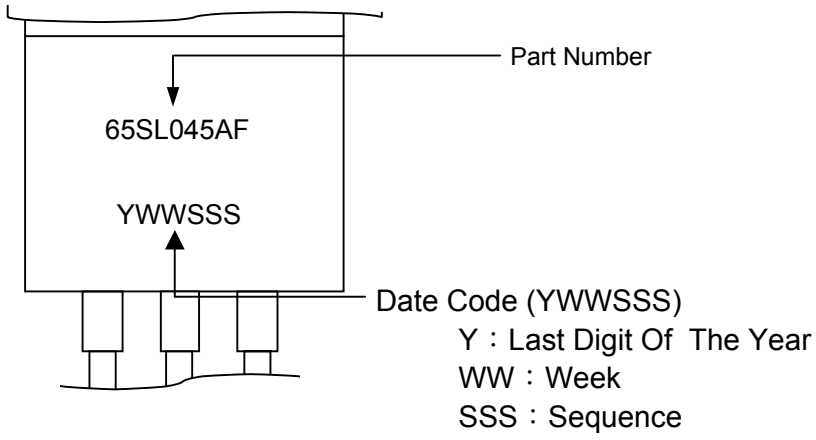
**Fig 13. Typ. Drain-Source on State Resistance**



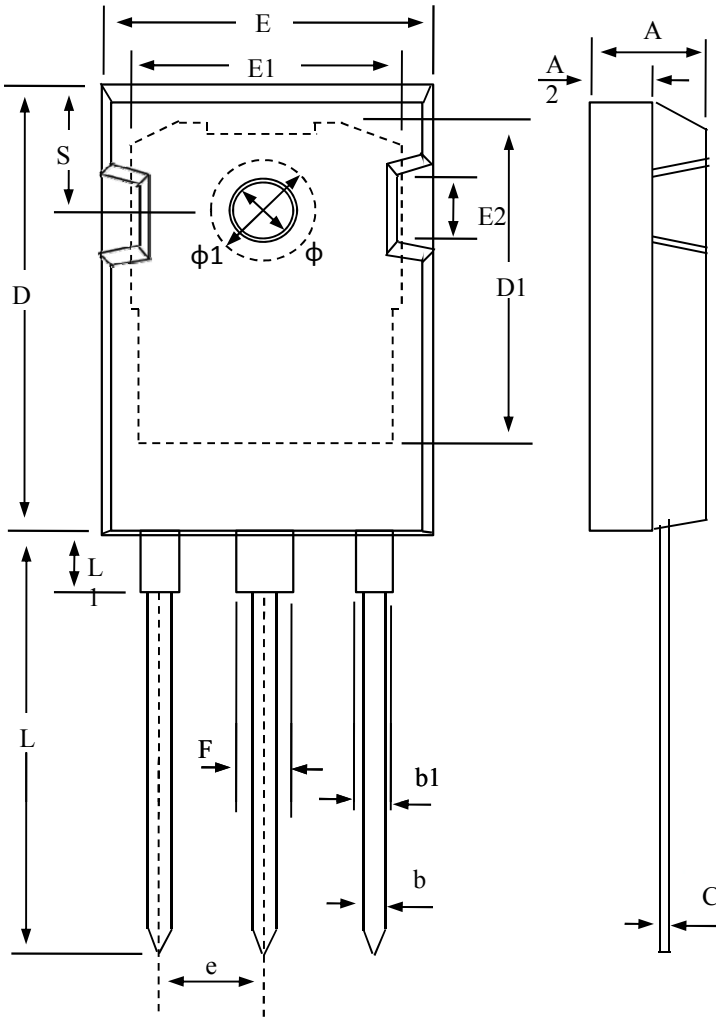
**Fig 14. Total Power Dissipation**

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## MARKING INFORMATION



## Package Outline : TO-247



SYMBOLS	Millimeters		
	MIN	NOM	MAX
A	4.80	5.03	5.25
A2	1.90	2.05	2.20
E	15.75	15.95	16.15
E1	13.00	13.60	14.20
E2	3.60	4.35	5.10
D	20.80	20.95	21.10
D1	16.20	16.95	17.70
C	0.50	0.60	0.70
L	19.80	20.10	20.40
L1	4.10	4.25	4.40
F	2.80	3.10	3.40
b	1.05	1.20	1.35
b1	1.90	2.18	2.45
e	5.44 ref.		
$\phi$	3.50	3.58	3.65
$\phi 1$	7.18 ref.		
S	6.00	6.15	6.30

1.All Dimensions Are in Millimeters.

2.Dimension Does Not Include Mold Protrusions.

**TO-247 FOOTPRINT :**

