

1500V N-channel SiC MOSFET

General Features

- Fast switching with low EMI/RFI
- Low gate charge minimizes switching losses
- Short circuit withstand rated
- Low $R_{DS(ON)}$ temperature coefficient for improved efficiency

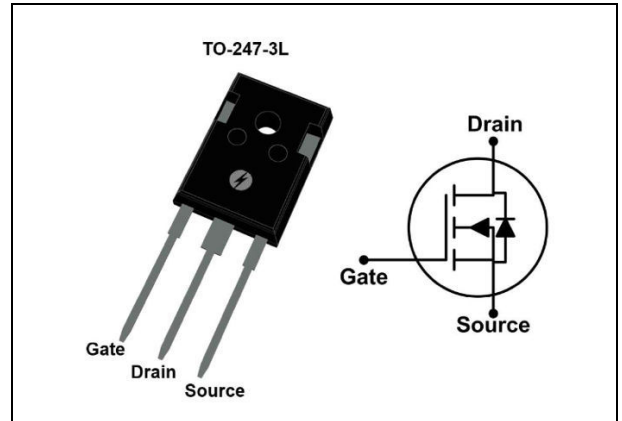
Parameter	Value	Unit
BV_{DSS}	1500	V
$R_{DS(ON),typ. (18V)}$	0.9	Ω
$V_{GS(TH),typ.}$	4.0	V
I_D (at $T_C=25^\circ\text{C}$)	5	A

Applications

- Auxiliary power supplies
- Switch mode power supplies
- High-voltage capacitive loads

Ordering Information

Part Number	Package	Marking
MXP1500N0K9CL	TO-247-3L	MXP1500N0K9CL



Absolute Maximum Ratings

 $T_C=25^\circ\text{C}$ unless specified otherwise

Symbol	Parameter	Value	Unit
V_{DSS}	Drain-to-Source Voltage ^[1]	1500	V
V_{GSS}	Gate-to-Source Voltage	-5 to +22	
I_D	Continuous Drain Current	6	A
	Continuous Drain Current at $T_C=100^\circ\text{C}$	5	
I_{DM}	Pulsed Drain Current at $V_{GS}=18\text{V}$ ^[2]	26	
P_D	Power Dissipation	83	W
	Derating Factor above 25°C	0.6	W/ $^\circ\text{C}$
T_J & T_{STG}	Operating Junction and Storage Temperature	-55 to +175	$^\circ\text{C}$

Caution: Stresses greater than those listed in the "Absolute Maximum Ratings" may cause permanent damage to the device.

Thermal Characteristics

Symbol	Parameter	Min.	Typ.	Max.	Unit
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case		1.7	1.8	$^\circ\text{C}/\text{W}$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient			40	

Electrical Characteristics

OFF Characteristics

 $T_C=25^{\circ}\text{C}$ unless specified otherwise

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
BV_{DSS}	Drain-to-Source Breakdown Voltage	1500			V	$V_{GS}=0V, I_D=1mA$
I_{DSS}	Drain-to-Source Leakage Current			10	μA	$V_{DS}=1.5kV, V_{GS}=0V$
I_{GSS+}	Gate-to-Source Leakage Current, Positive			100	nA	$V_{GS}=22V, V_{DS}=0V$
I_{GSS-}	Gate-to-Source Leakage Current, Negative			-100	nA	$V_{GS}=-5V, V_{DS}=0V$

ON Characteristics

 $T_C=25^{\circ}\text{C}$ unless specified otherwise

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
$R_{DS(ON)}$	Static Drain-to-Source On-Resistance ^[3]	-	0.9	1.1	Ω	$V_{GS}=18V, I_D=2A$
$V_{GS(TH)}$	Gate Threshold Voltage		4		V	$V_{DS}=1V, I_D=5mA$

Dynamic Characteristics

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
C_{ISS}	Input Capacitance		240		pF	$V_{GS}=0V$ $V_{DS}=1.2kV$ $F=1MHz$
C_{RSS}	Reverse Transfer Capacitance		5.8			
C_{OSS}	Output Capacitance		18			

Source-Drain Body Diode Characteristics

 $T_C=25^{\circ}\text{C}$ unless specified otherwise

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
I_{SD}	Continuous Source Current			6	A	Max. rating
V_{SD}	Diode Forward Voltage		5.9		V	$I_S=5A, V_{GS}=0V$

Notes:

[1] $T_J=25^{\circ}\text{C}$ to 175°C

[2] Repetitive rating, pulse width limited by maximum junction temperature

[3] Pulse width $\leq 380\mu s$; duty cycle $\leq 2\%$

Figures

Figure 1. Maximum Effective Thermal Impedance, Junction-to-Case

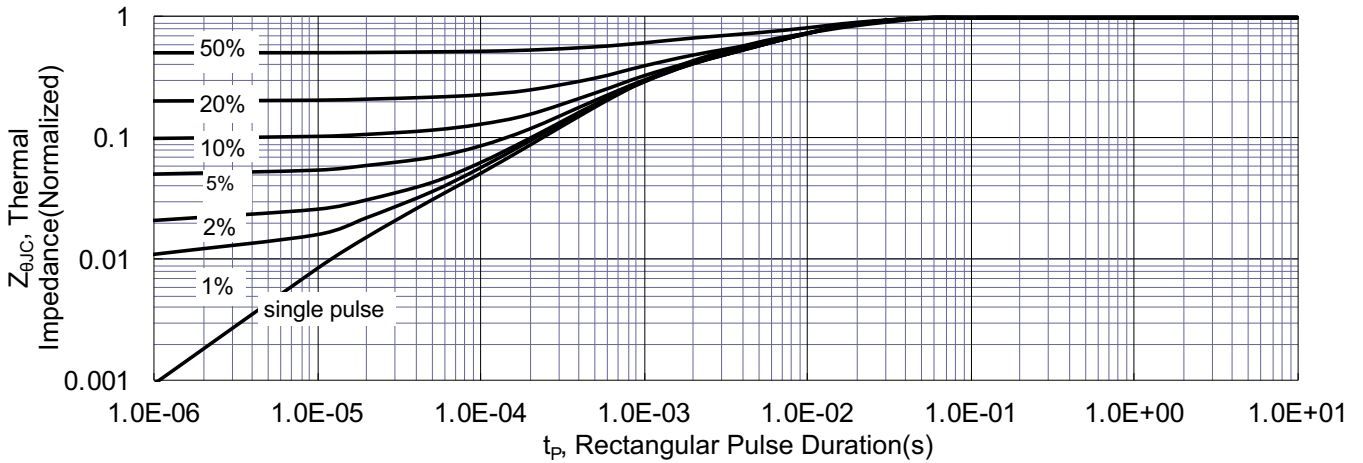


Figure 2. Maximum Power Dissipation vs. Case Temperature

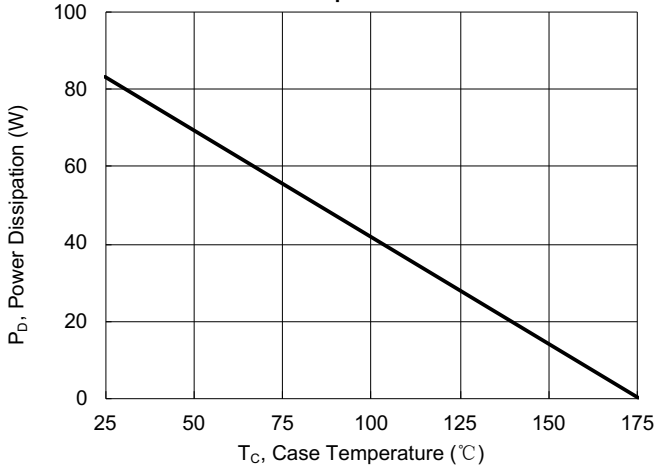


Figure 3. Maximum Continuous Drain Current vs. Case Temperature

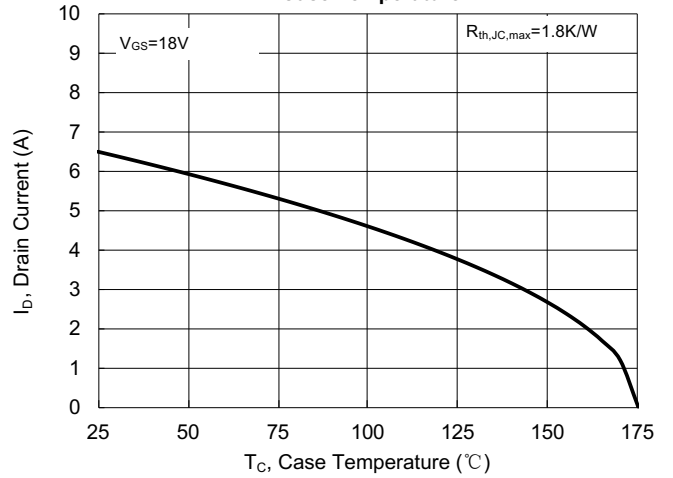


Figure 4. Typical Output Characteristics

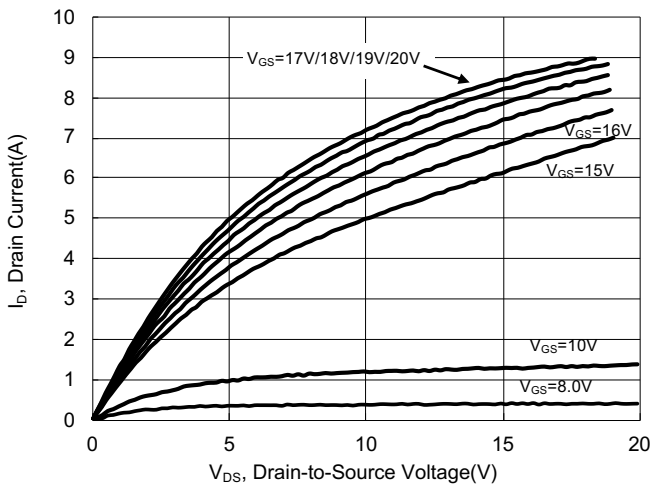


Figure 5. Typical Drain-to-Source ON Resistance vs. Gate Voltage

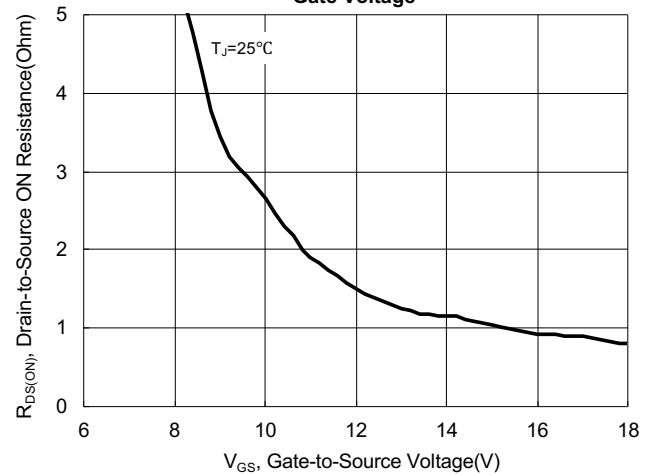


Figure 6. Maximum Peak Current Capability

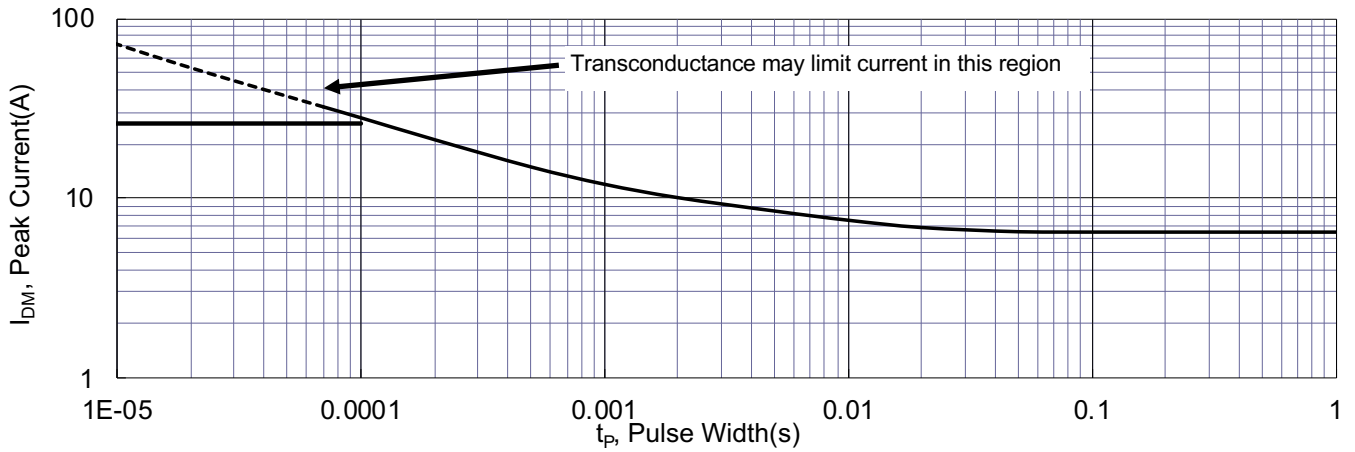


Figure 7. Typical Transfer Characteristics

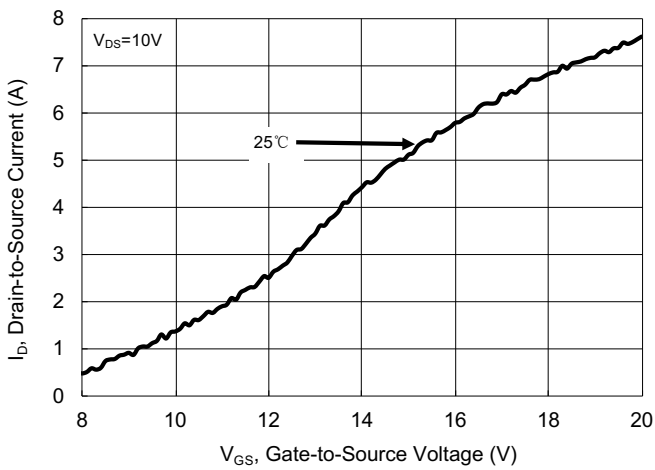


Figure 8. Typical Drain-to-Source ON Resistance

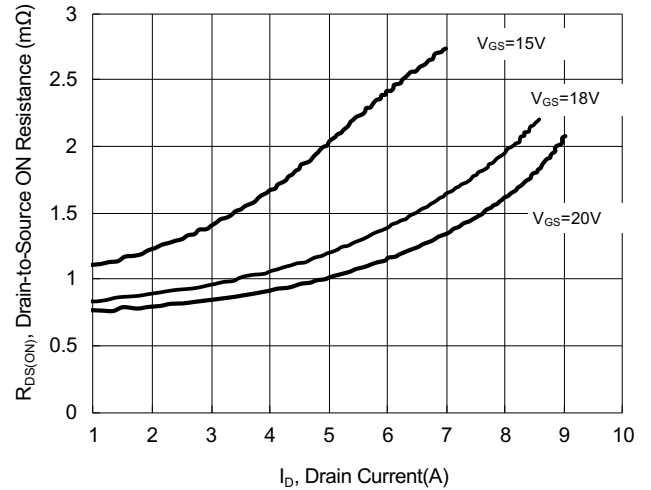


Figure 9. Typical Capacitance vs. Drain-to-Source Voltage

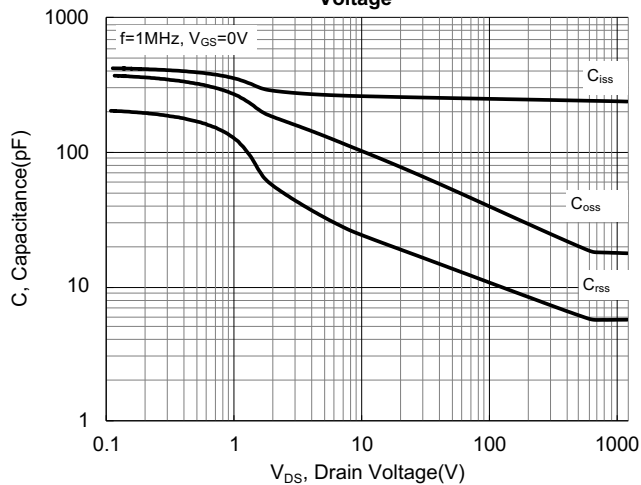
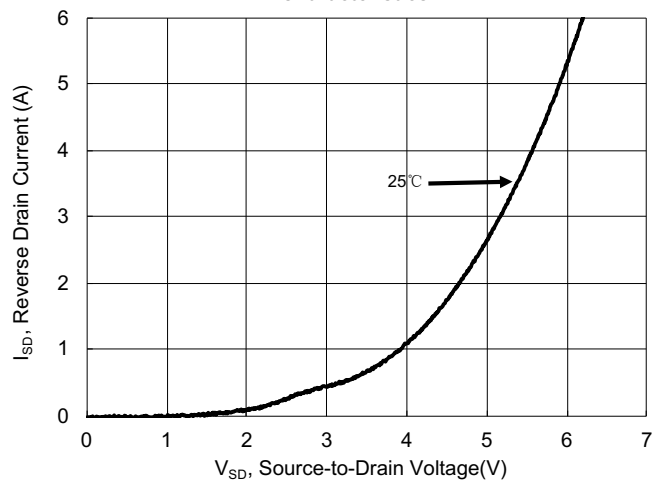
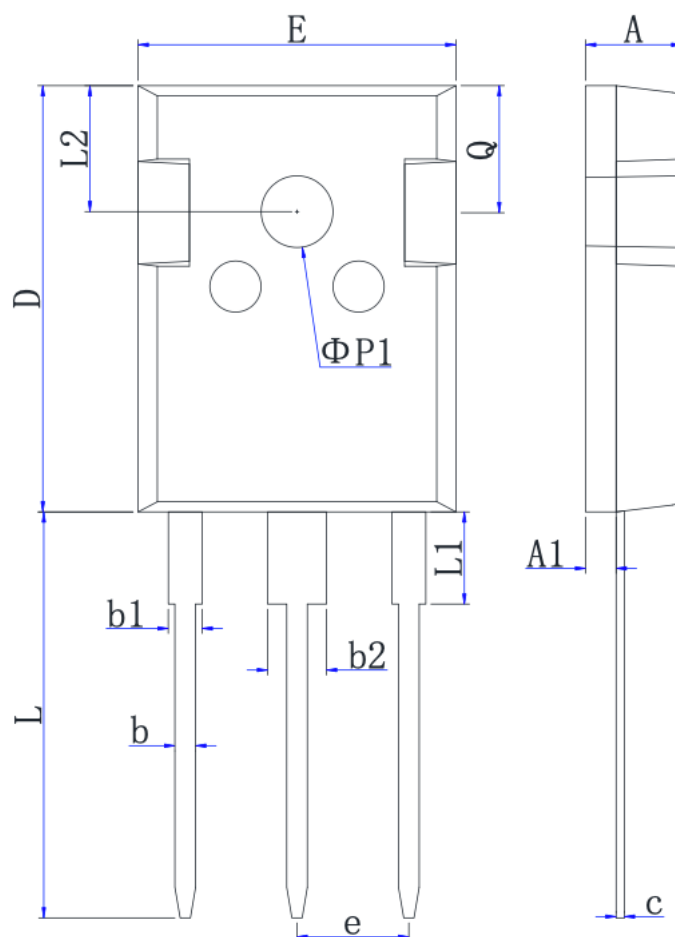


Figure 10. Typical Body Diode Transfer Characteristics



Package Dimensions
TO-247-3L


SYMBOL	MM		INCH	
	MIN	MAX	MIN	MAX
A	4.69	5.31	0.185	0.209
A1	2.21	2.59	0.087	0.102
b	1.01	1.40	0.040	0.055
b1	1.65	2.13	0.065	0.084
b2	2.87	3.12	0.113	0.123
c	0.40	0.79	0.016	0.031
D	20.80	21.46	0.819	0.845
E	15.49	16.26	0.610	0.640
e	5.45BSC		0.215BSC	
L	19.81	20.32	0.780	0.800
L1	—	4.50	—	0.177
L2	6.15BSC		0.242BSC	
Q	5.38	6.20	0.212	0.244
$\Phi P1$	3.50	3.81	0.138	0.150

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