RECTRON SEMICONDUCTOR
TECHNICAL SPECIFICATION

RSM60N120T7L

N-Channel SiC Power MOSFET

Features

- High Blocking Voltage with Low On-Resistance
- High Speed Switching with Low Capacitance
- Easy to connect in parallel and to Drive

V_{DS}	1200 V
$R_{DS(on)}$	40 mΩ
I_D@25℃	60 A

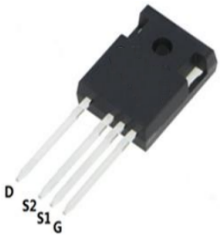
Benefits

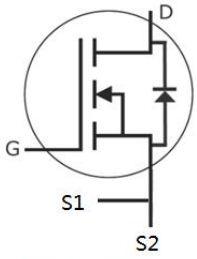
- Higher System Efficiency
- Reduced Cooling Requirements
- Increased Power Density
- Increased System Switching Frequency

Applications

- High Voltage DC/DC Converters
- Motor Drives
- Switch Mode Power Supplies
- Pulsed Power applications

Package





S1: Driver Source
S2: Power Source

Part Number	Package	Marking
RSM60N120T7L	TO-247-4	60N120

Maximum Ratings (T_C=25℃ unless otherwise specified)

Symbol	Parameter	Value	Unit	Test Conditions	Note
V_{DSmax}	Drain-Source Voltage	1200	V	V_{GS}=0V, I_D=100μA	
V_{GSmax}	Gate-Source Voltage	-10/+25	V	Absolute maximum values	
V_{GSop}	Gate-Source Voltage	-5/+20	V	Recommended operational values	
I_D	Continuous Drain Current	60	A	V_{GS}=20V, T_c=25°C	
		40		V_{GS}=20V, T_c=100°C	
$I_{D(pulse)}$	Pulsed Drain Current	160	A	Pulse width t_p limited by T_{Jmax}	
P_D	Power Dissipation	330	W	T_c=25°C, T_J=150°C	
T_J, T_{STG}	Operating Junction and Storage Temperature	-55 to +175	℃		

Electrical Characteristics (T_C=25℃ unless otherwise specified)

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions	Note
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	1200			V	V_{GS}=0V, I_D=100μA	
$V_{GS(th)}$	Gate Threshold Voltage	1.9	2.5	4.0	V	V_{DS}=V_{GS}, I_D=10mA	
			1.8			V_{DS}=V_{GS}, I_D=10mA, T_J=150℃	
I_{DSS}	Zero Gate Voltage Drain Current		1	100	μA	V_{DS}=1200V, V_{GS}=0V	
I_{GSS+}	Gate-Source Leakage Current		10	250	nA	V_{DS}=0V, V_{GS}=25V	
I_{GSS-}	Gate-Source Leakage Current		10	250	nA	V_{DS}=0V, V_{GS}=-10V	
$R_{DS(on)}$	Drain-Source On-State Resistance		40	55	mΩ	V_{GS}=20V, I_D=40A	
			80			V_{GS}=20V, I_D=40A, T_J=150℃	
C_{iss}	Input Capacitance		2946		pF	V_{GS}=0V V_{DS}=1000V f=1MHz V_{AC}=25mV	
C_{oss}	Output Capacitance		167				
C_{rss}	Reverse Transfer Capacitance		6.6				
E_{oss}	C_{oss} Stored Energy		92		μJ		
E_{ON}	Turn-On Switching Energy		1.1		mJ	V_{DS}=800V, V_{GS}=-5V/20V I_D=40A, $R_{G(ext)}$=2.5Ω, L=100μH	
E_{OFF}	Turn-Off Switching Energy		0.85				
$t_{d(on)}$	Turn-On Delay Time		12		ns	V_{DS}=800V, V_{GS}=-5V/20V, I_D=40A $R_{G(ext)}$=2.5Ω, R_L=20Ω	
t_r	Rise Time		10				
$t_{d(off)}$	Turn-Off Delay Time		25				
t_f	Fall Time		6.2				
$R_{G(int)}$	Internal Gate Resistance		2.3		Ω	f=1MHz, V_{AC}=25mV	
Q_{GS}	Gate to Source Charge		37		nC	V_{DS}=800V V_{GS}=-5V/20V I_D=40A	
Q_{GD}	Gate to Drain Charge		18				
Q_G	Total Gate Charge		142				

Reverse Diode Characteristics

Symbol	Parameter	Typ.	Max.	Unit	Test Conditions	Note
V_{SD}	Diode Forward Voltage	4.5		V	V_{GS}=-5V, I_{SD}=20A	
		4.2			V_{GS}=-5V, I_{SD}=20A, T_J=150°C	
I_S	Continuous Diode Forward Current		TBD	A	T_C=25°C	
t_{rr}	Reverse Recover Time	41		ns	V_R=800V, I_{SD}=40A	
Q_{rr}	Reverse Recovery Charge	142		nC		
I_{rrm}	Peak Reverse Recovery Current	6		A		

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit	Test Conditions	Note
$R_{\theta JC}$	Thermal Resistance from Junction to Case	0.34		℃/W		
$R_{\theta JA}$	Thermal Resistance from Junction to Ambient		40			

RATING AND CHARACTERISTICS CURVES (RSM60N120T7L)

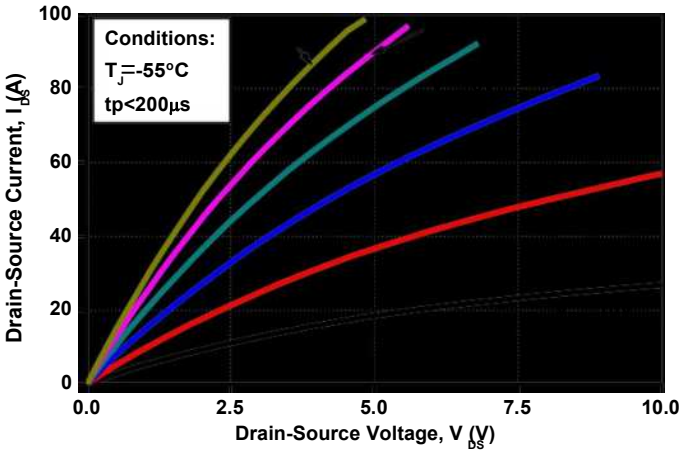


Figure 1. Output Characteristics T_J -55 °C

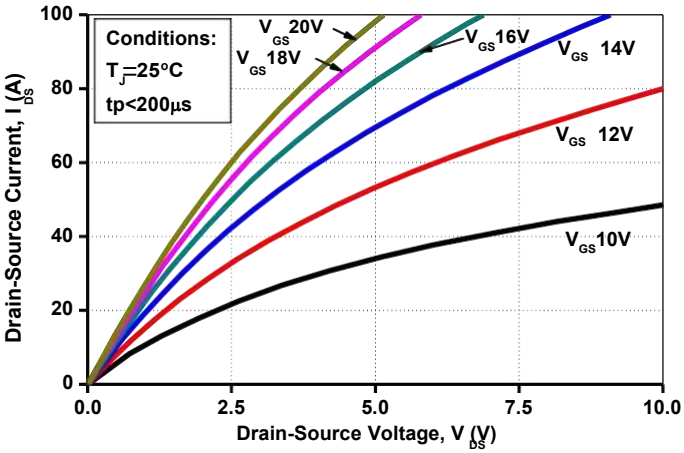


Figure 2. Output Characteristics T_J 25 °C

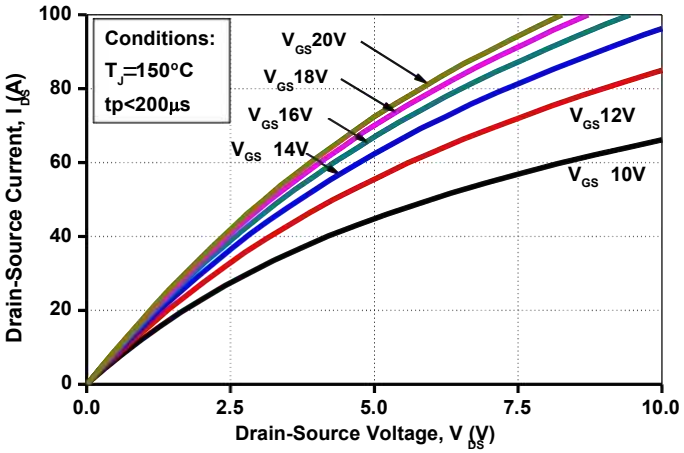


Figure 3. Output Characteristics T_J 150°C

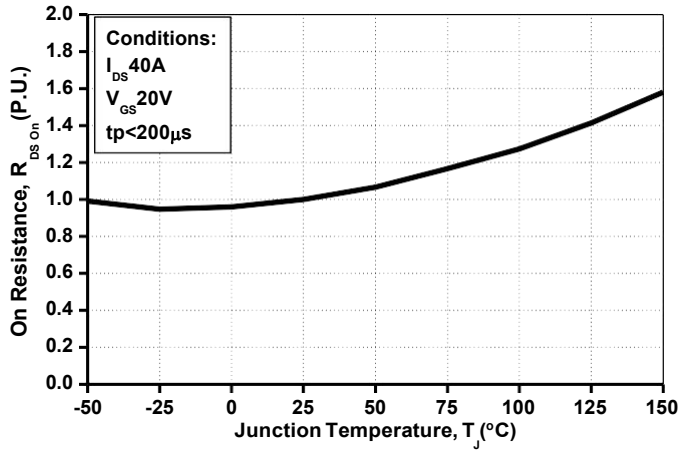


Figure 4. Normalized On-Resistance vs. Temperature

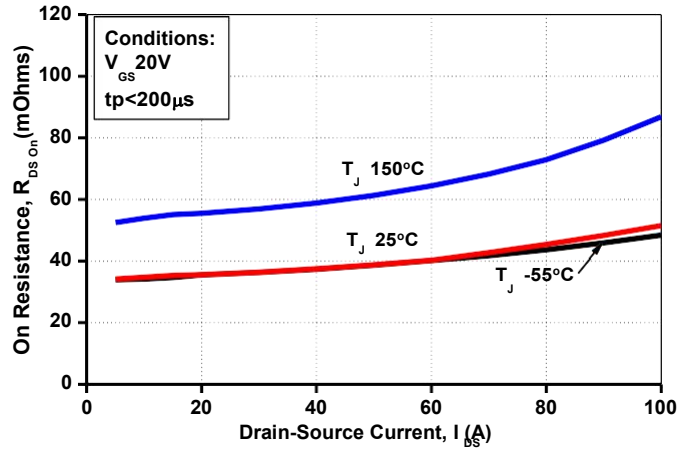


Figure 5. On-Resistance vs. Drain Current
For Various Temperatures

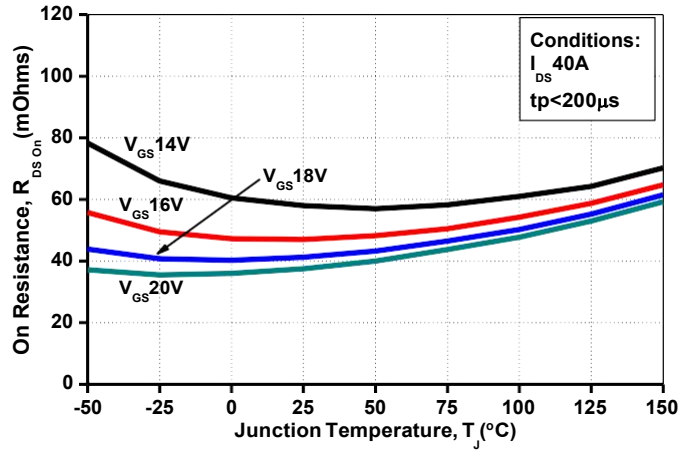


Figure 6. On-Resistance vs. Temperature
For Various Gate Voltage

RATING AND CHARACTERISTICS CURVES (RSM60N120T7L)

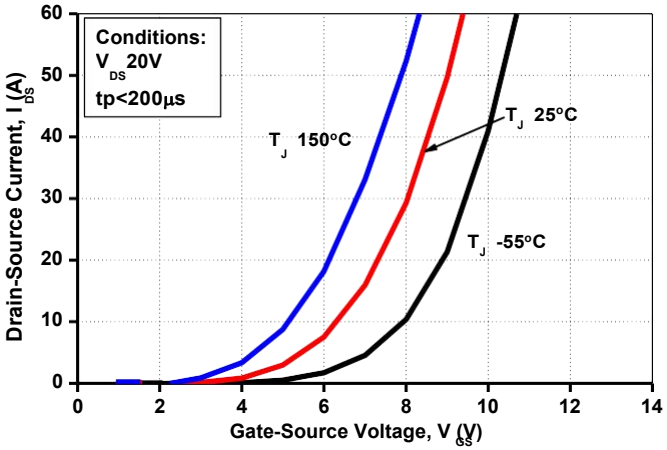


Figure 7. Transfer Characteristic for Various Junction Temperatures

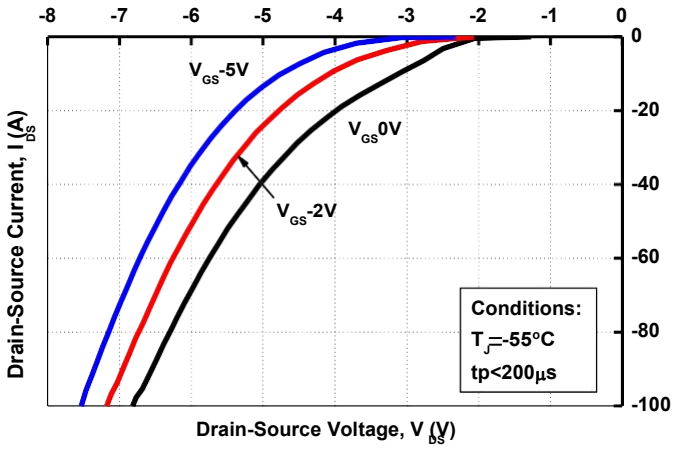


Figure 8. Body Diode Characteristic at -55 ºC

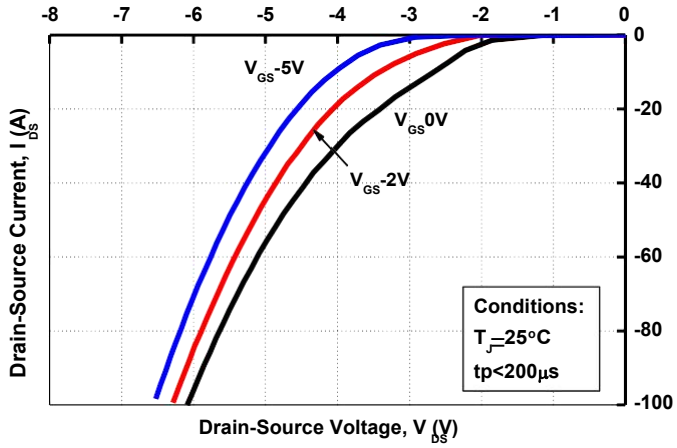


Figure 9. Body Diode Characteristic at 25 ºC

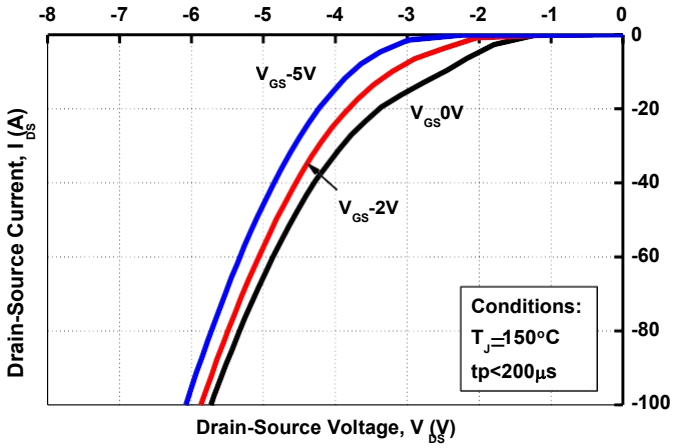


Figure 10. Body Diode Characteristic at 150 ºC

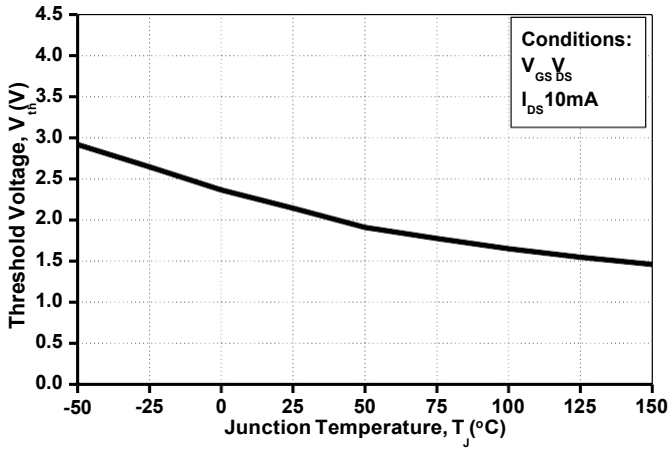


Figure 11. Threshold Voltage vs. Temperature

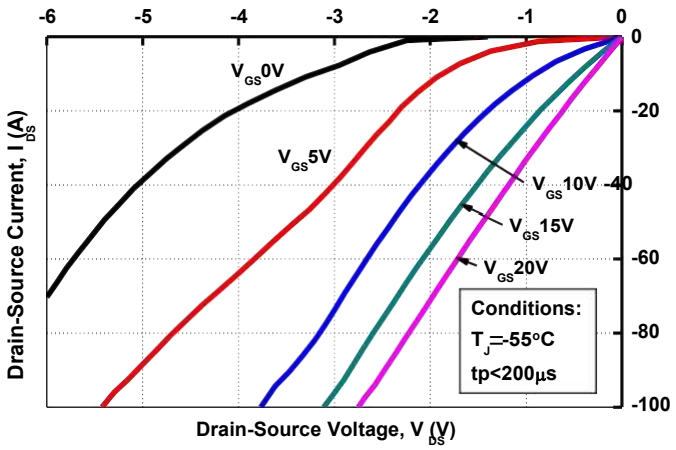


Figure 12. 3rd Quadrant Characteristic at -55 ºC

RATING AND CHARACTERISTICS CURVES (RSM60N120T7L)

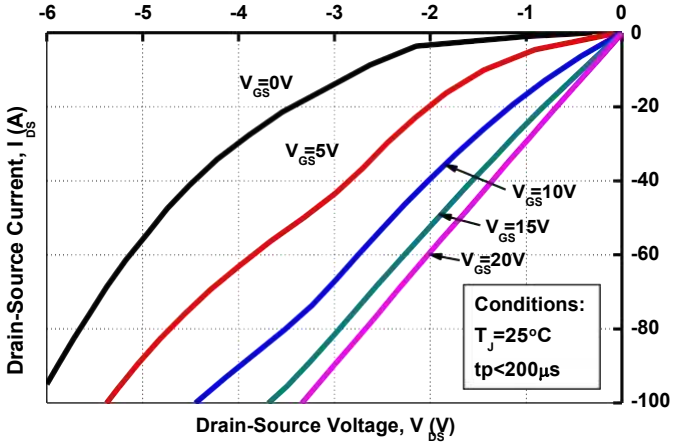


Figure 13. 3rd Quadrant Characteristic at 25 ºC

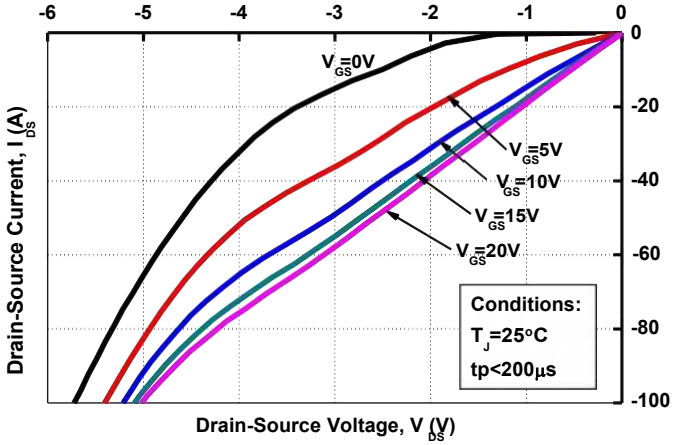


Figure 14. 3rd Quadrant Characteristic at 150 ºC

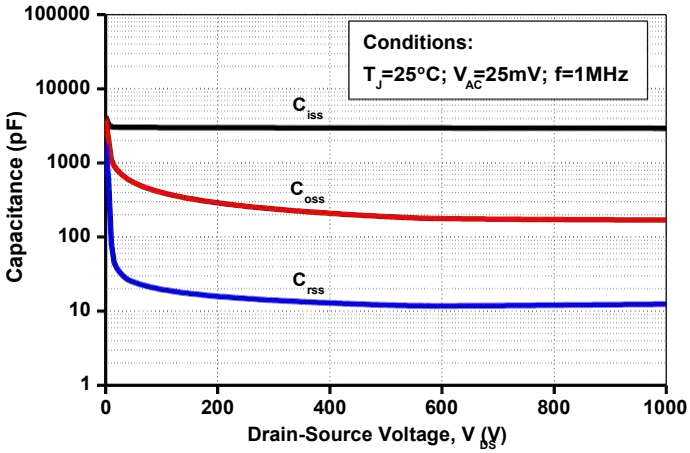


Figure 15. Capacitances vs. Drain-Source Voltage (0 - 200V)

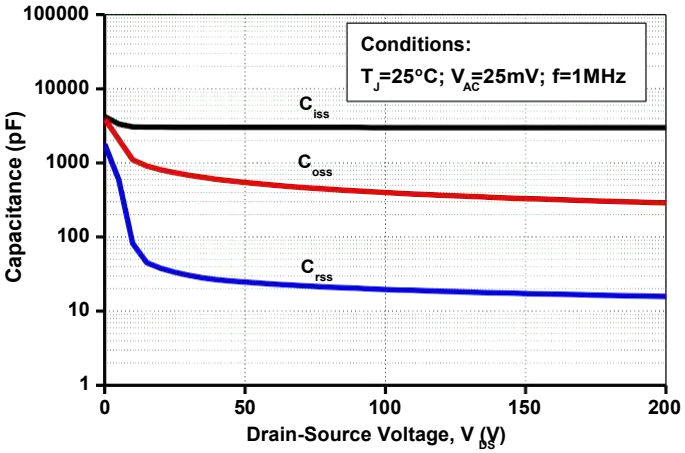
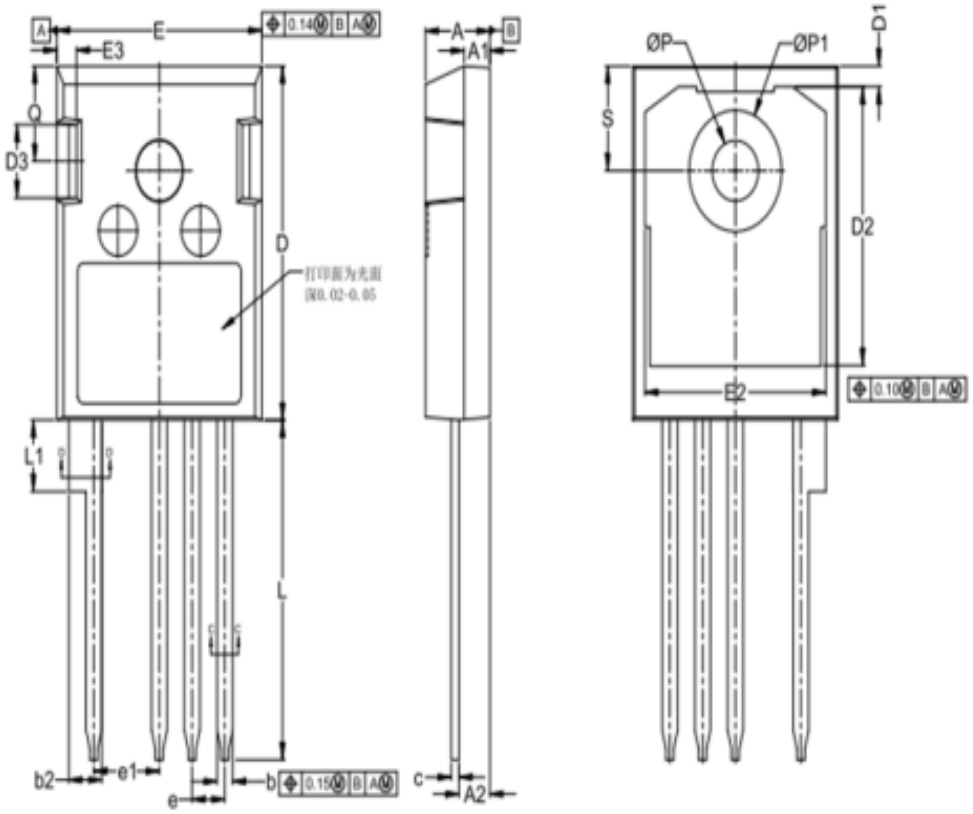
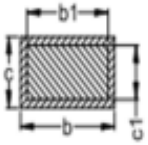


Figure 16. Capacitances vs. Drain-Source Voltage (0 - 1000V)

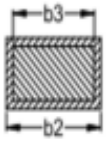
TO-247-4 Package



SIDE VIEW(Front)



SECTION:C-C



SECTION:D-D

DIM / SYMBOL	MIN.	NOM.	MAX.
A	4.900	5.000	5.100
A1	1.940	2.040	2.140
A2	2.300	2.400	2.500
b	1.140	1.240	1.330
b1	1.100	1.200	1.300
b2	2.490	2.590	2.690
b3	2.450	2.550	2.650
c	0.550	0.640	0.700
c1	0.500	0.600	0.700
D	20.850	20.950	21.050
D1	1.022	1.222	1.400
D2	16.348	16.548	16.748
D3	4.232	4.332	4.432
E	15.800	15.900	16.000
E2	13.821	14.021	14.221
E3	1.430	1.530	1.630
e	2.540 BSC.		
e1	5.080 BSC.		
L	19.900	20.100	20.300
L1	4.024	4.224	4.424
ØP	3.500	3.600	3.700
ØP1	7.088	7.188	7.288
Q	5.435	5.635	5.835
S	6.040	6.200	6.300

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