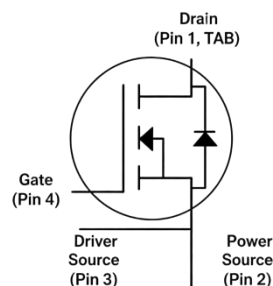


Silicon Carbide Power MOSFET

Parameter	Value	Unit
V_{DS}	1700	V
I_D	152	A
$R_{DS(ON)}$	15	m Ω
Q_G	253	nC



TO-247-4L

Features

- High Blocking Voltage with Low On-Resistance
- High Speed Switching with Low Capacitance
- Avalanche Ruggedness
- Easy to Parallel and Simple to Drive

Applications

- Motor Drive
- Solar Inverters
- High Voltage DC/DC Converters
- Switched-Mode Power Supply(SMPS)
- Pulsed Power Applications

Absolute Maximum Ratings (at $T_C=25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Value	Unit
Drain-source Voltage	V_{DS}	1700	V
Gate-source Voltage (Absolute maximum values)	V_{GSax}	-10/+23	V
Gate-source Voltage (Recommended operational values)	V_{GSop}	-5/+18	
Drain Current (continuous; $T_C=25^\circ\text{C}$) $V_{GS}=18\text{V}$	I_D	152	A
Drain Current (continuous; $T_C=100^\circ\text{C}$) $V_{GS}=18\text{V}$		105	
Drain Current (pulsed)	I_{DM}	337	A
Power Dissipation ($T_C=25^\circ\text{C}$, $T_J=175^\circ\text{C}$)	P_D	680	W
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55 to +175	$^\circ\text{C}$
Solder Temperature (1.6mm (0.063") from case for 10s)	T_L	260	$^\circ\text{C}$
Thermal Resistance From Junction to Ambient	$R_{\theta JA}$	0.22	$^\circ\text{C/W}$

Electrical Characteristics (T_c = 25°C unless otherwise specified)

Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Static characteristics						
Drain-Source Breakdown Voltage	B _{VDS}	V _{GS} =0V; I _D =100uA	1700	-	-	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =1700V; V _{GS} =0V	-	-	100	μA
Gate-Body Leakage Current	I _{GSS+}	V _{GS} =23V; V _{DS} =0V	-	-	250	nA
Gate-Body Leakage Current	I _{GSS-}	V _{GS} =-10V; V _{DS} =0V	-	-	250	nA
Gate Threshold Voltage	V _{GS(th)}	V _{GS} =V _{DS} ; I _D =30mA; T _J =25°C	2.0	2.9	4.0	V
		V _{GS} =V _{DS} ; I _D =30mA; T _J =175°C	-	2.1	-	
Static Drain-Source on Resistance	R _{DS(on)}	V _{GS} =18V; I _D =75A; T _J =25°C	-	15	21	mΩ
		V _{GS} =18V; I _D =75A; T _J =175°C	-	27	-	
Transconductance	G _{fs}	V _{GS} =20V; I _D =75A;	-	58	-	S
Dynamic characteristics						
Input Capacitance	C _{iss}	V _{DS} =1000V; V _{GS} =0V T _J =25°C; f=100KHz	-	6233	-	pF
Output Capacitance	C _{oss}		-	242	-	
Reverse Transfer Capacitance	C _{rss}		-	23	-	
Total Gate Charge	Q _G	V _{DD} =1200V; V _{GS} =-5/18V; I _D =75A; T _J =25°C	-	253	-	nC
Gate-Source Charge	Q _{GS}		-	64	-	
Gate-Drain Charge	Q _{GD}		-	45	-	
Internal Gate Resistor	R _{Gint}	f=1MHz; V _{AC} =25mV	-	2.0	-	Ω

Reverse SiC Diode Characteristics(at T_c=25°C unless otherwise specified)

Parameter	Symbol	Conditions	Values			Units
			Min.	Typ.	Max.	
Diode Forward Voltage	V _{FSD}	V _{GS} =-5V; I _F =37.5A	-	3.9	-	V
		V _{GS} =-5V; I _F =37.5A; T _J =175°C	-	3.6	-	
Continuous Diode Forward Current	I _S	V _{GS} =-5V; T _C =25°C	-	-	152	A
Reverse Recovery Time	t _{RR}	V _R =1000V; I _F =75A; T _J =25°C	-	34	-	ns
Reverse Recovery Charge	Q _{RR}		-	342	-	nC
Peak Reverse Recovery Current	I _{RRM}		-	17	-	A

Typical Characteristics

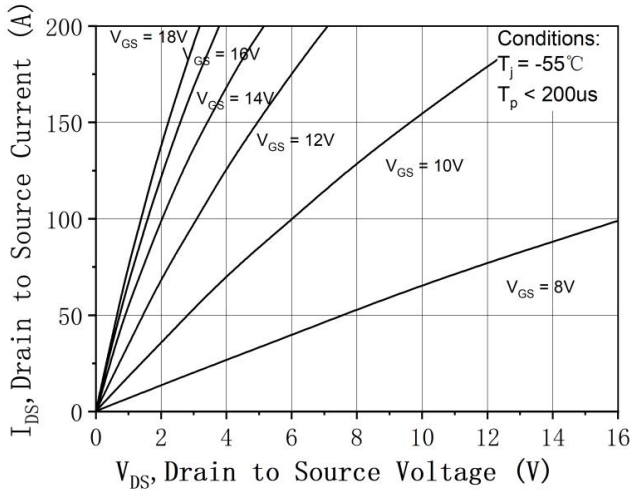


Figure 1. Output Characteristics $T_J = -55^\circ\text{C}$

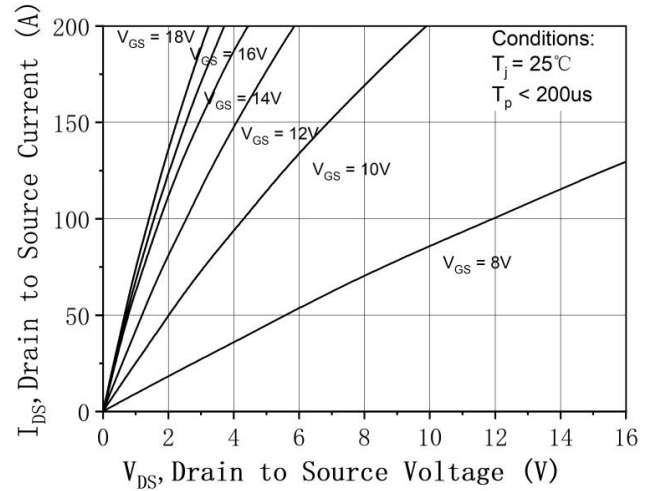


Figure 2. Output Characteristics $T_J = 25^\circ\text{C}$

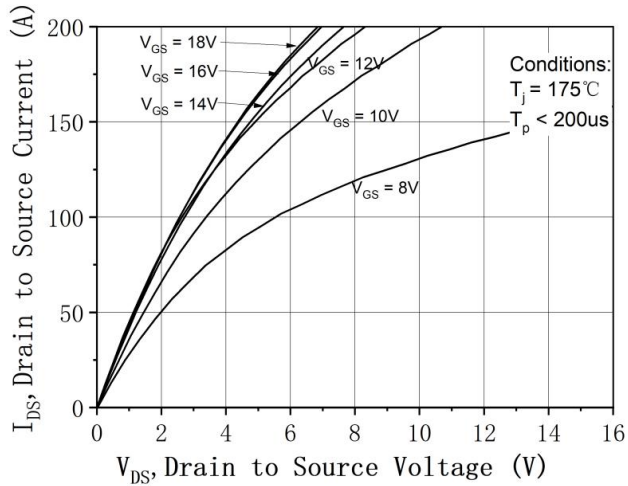


Figure 3. Output Characteristics $T_J = 175^\circ\text{C}$

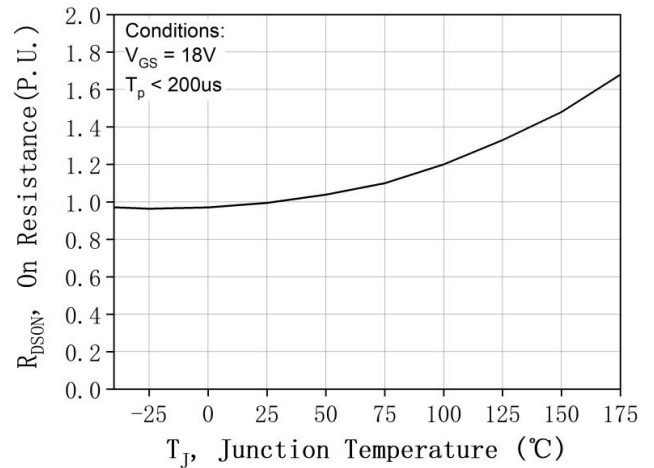


Figure 4. Normalized On-Resistance vs. Temperature

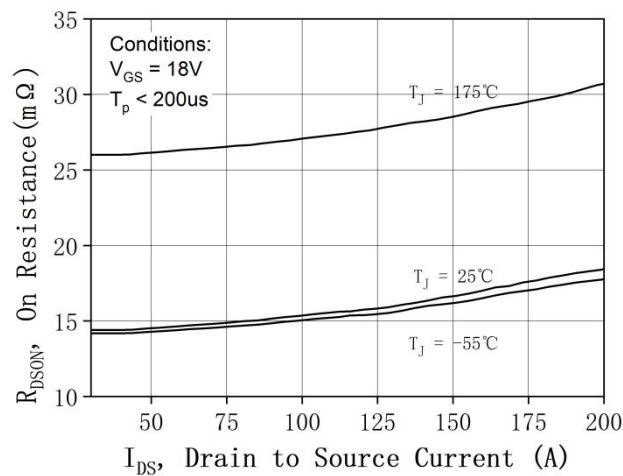


Figure 5. On-Resistance vs. Drain Current For Various Temperatures

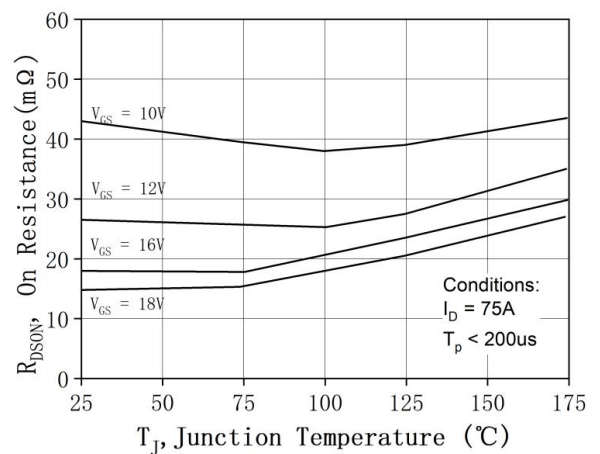


Figure 6. On-Resistance vs. Temperature For Various Gate Voltage

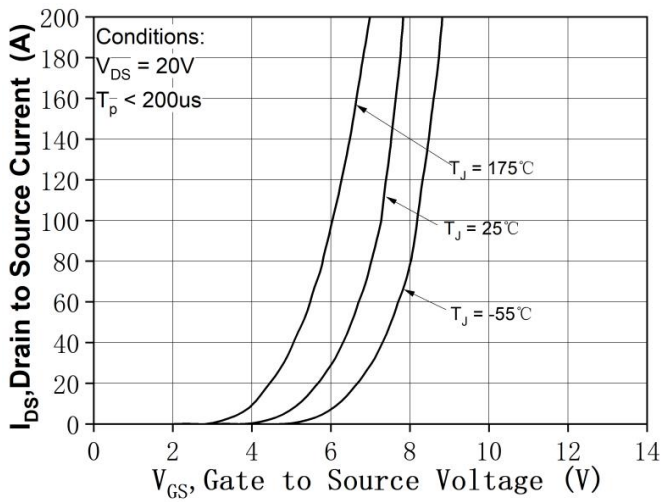


Figure 7. Transfer Characteristic for Various Junction Temperatures

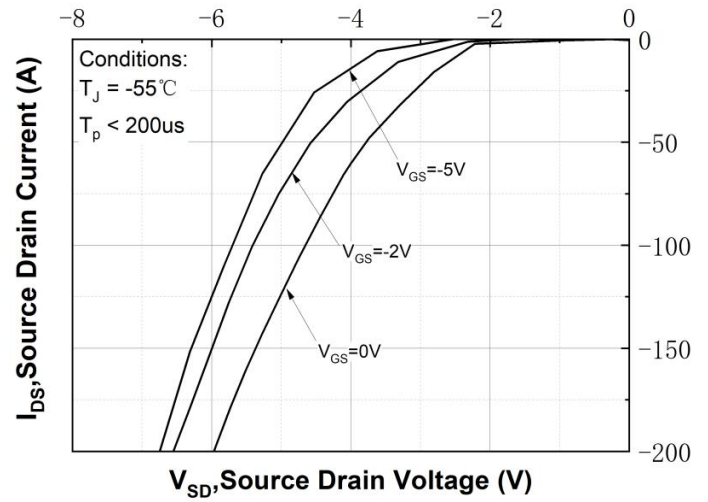


Figure 8. Body Diode Characteristic at $T_J = -55\text{ }^{\circ}\text{C}$

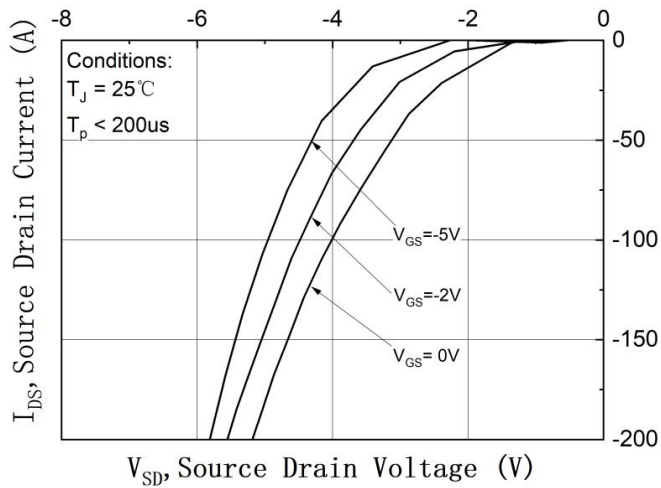


Figure 9. Body Diode Characteristic at $T_J = 25\text{ }^{\circ}\text{C}$

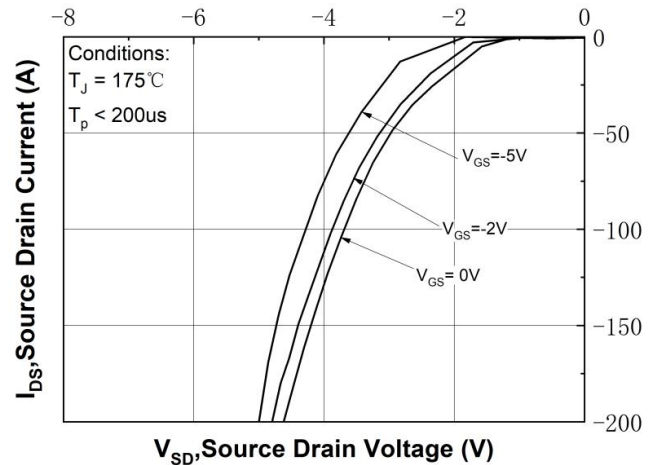


Figure 10. Body Diode Characteristic at $T_J = 175\text{ }^{\circ}\text{C}$

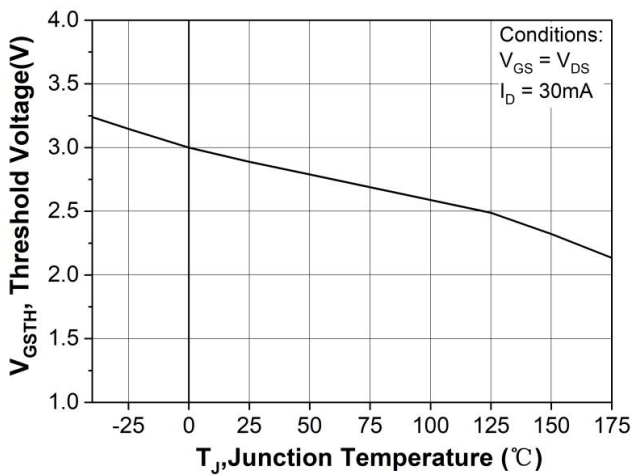


Figure 11. Threshold Voltage vs. Temperature

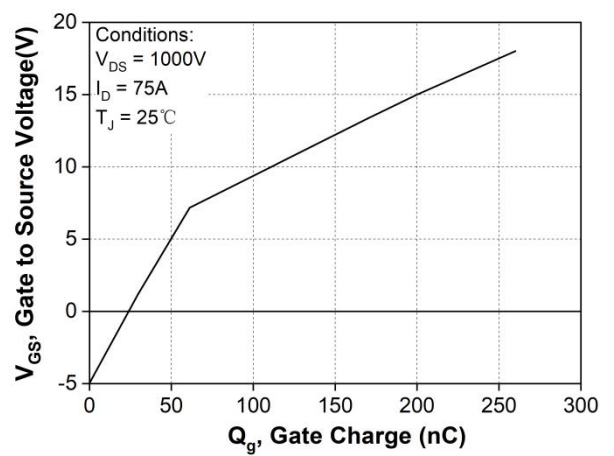


Figure 12. Gate Charge Characteristic

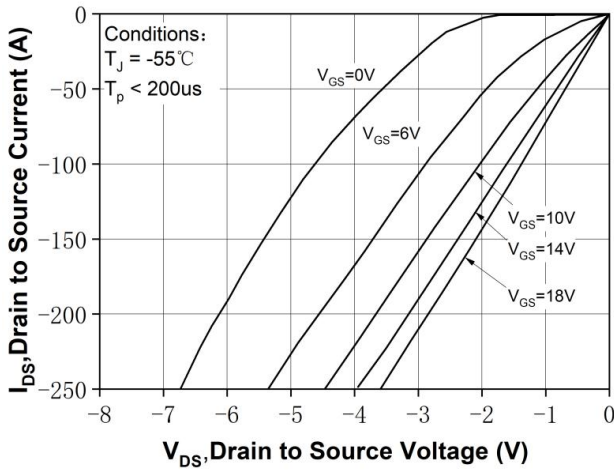


Figure 13. 3rd Quadrant Characteristic at $T_J = -55\text{ }^{\circ}\text{C}$

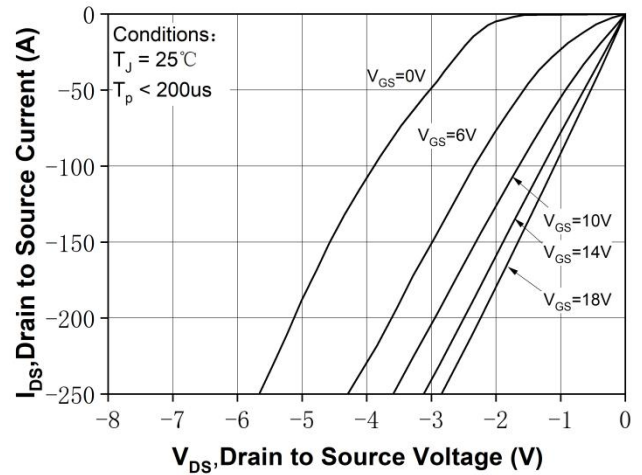


Figure 14. 3rd Quadrant Characteristic at $T_J = 25\text{ }^{\circ}\text{C}$

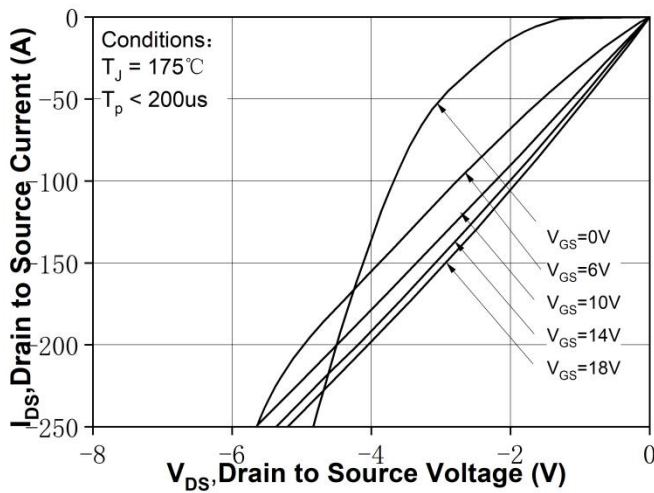


Figure 15. 3rd Quadrant Characteristic at $T_J = 175\text{ }^{\circ}\text{C}$

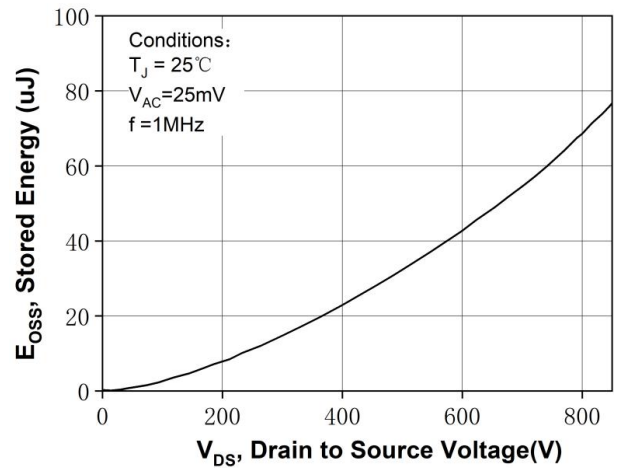


Figure 16. Output Capacitor Stored Energy

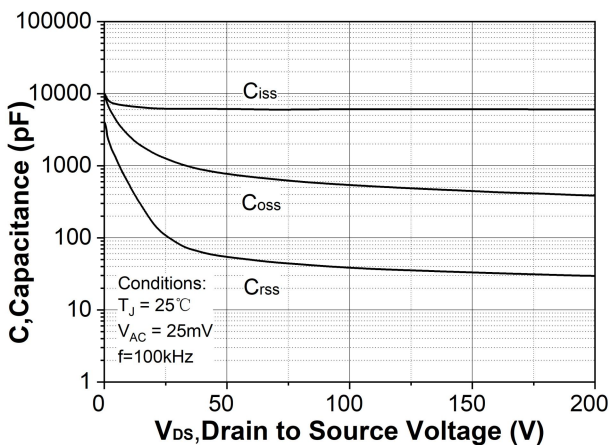


Figure 17. Capacitances vs. Drain-Source Voltage (0 - 200V)

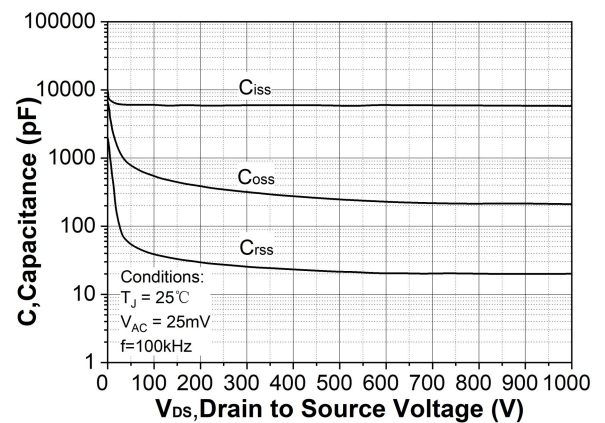


Figure 18. Capacitances vs. Drain-Source Voltage (0 - 1000V)

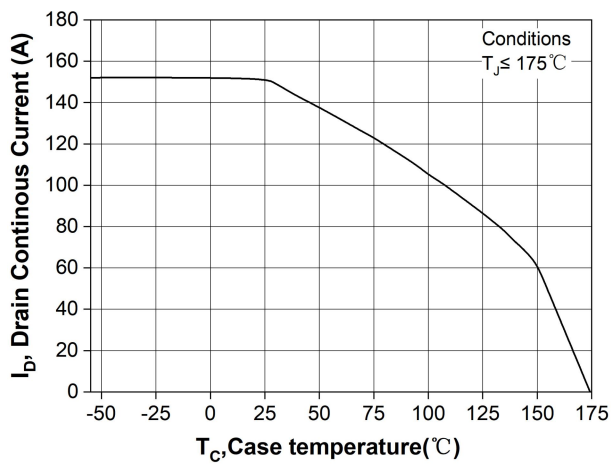


Figure 19. Continuous Drain Current Derating vs. Case Temperature

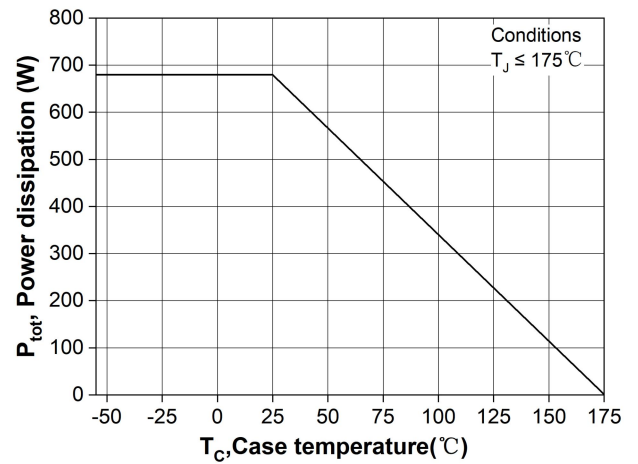


Figure 20. Maximum Power Dissipation Derating vs. Case Temperature

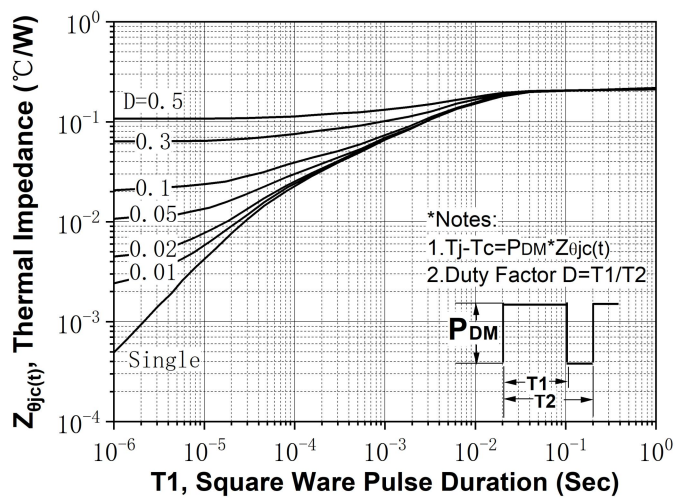


Figure 21. Transient Thermal Impedance (Junction - Case)

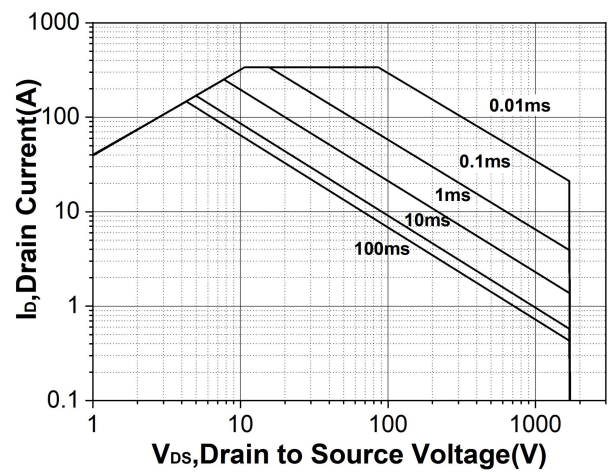
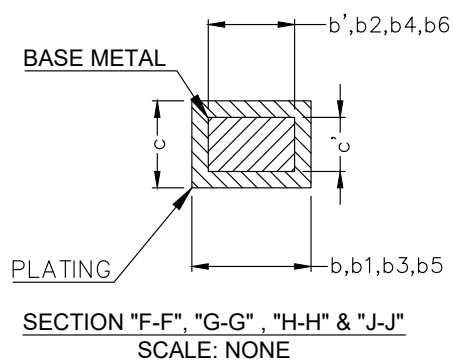
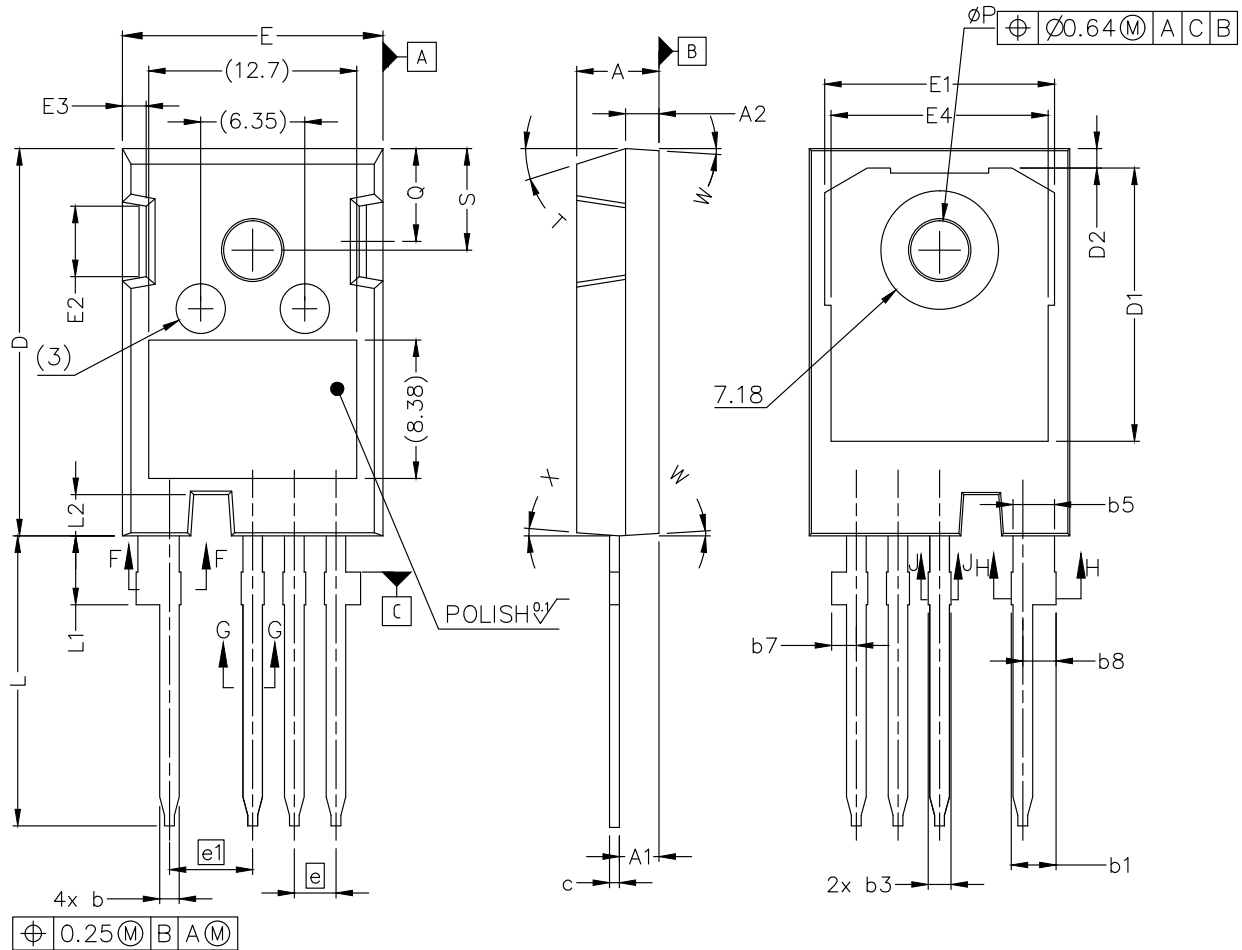


Figure 22. Safe Operating Area

Package Outline(Unit:mm)

TO-247-4L



SYM	MILLIMETERS	
	MIN	MAX
A	4.83	5.21
A1	2.29	2.54
A2	1.91	2.16
b'	1.07	1.28
b	1.07	1.33
b1	2.39	2.94
b2	2.39	2.84
b3	1.07	1.60
b4	1.07	1.50
b5	2.39	2.69
b6	2.39	2.64
b7	1.30	1.70
b8	1.80	2.20

c'	0.55	0.65
c	0.55	0.68
D	23.30	23.60
D1	16.25	17.65
D2	0.95	1.25
E	15.75	16.13
E1	13.10	14.15
E2	3.68	5.10
E3	1.00	1.90
E4	12.38	13.43
e	2.54 BSC	
e1	5.08 BSC	
N*	4	
L	17.31	17.82
L1	3.97	4.37
L2	2.35	2.65
øP	3.51	3.65
Q	5.49	6.00
S	6.04	6.30
T	17.5° REF.	
W	3.5 ° REF.	
X	4° REF.	

***Important Usage Information and Disclaimer**

The specifications of Zhuhai Hypersemi Co., Ltd. products are not guarantees of product characteristics. They reflect typical performance expected in standard applications, which may vary with specific uses. Users must conduct prior testing for their applications and make necessary adjustments.

Users are responsible for the safety of applications utilizing our products and must implement adequate safety measures to prevent physical injury, fire, or other risks in case of product failure. It is the user's duty to ensure that application designs comply with all applicable laws and standards. Our products must not be used in any applications where a product failure could reasonably result in personal injury, unless specifically authorized in a signed document by Zhuhai Hypersemi Co., Ltd.

No representations or warranties are made regarding the accuracy or completeness of this information, including any claims of non-infringement of third-party intellectual property rights. Zhuhai Hypersemi Co., Ltd. assumes no liability for any applications or uses of its products and does not grant any licenses to its intellectual property rights or those of others. We also make no claims regarding non-infringement of third-party intellectual property rights that may arise from applications.

Due to technical requirements, our products may contain hazardous substances. For details, please contact your nearest sales office. This document replaces all previous information and may be updated. We reserve the right to make changes.