

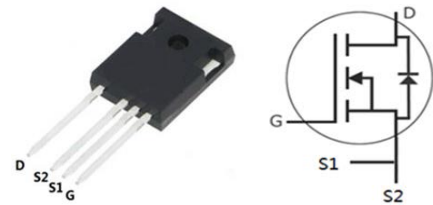
**Product Features**

- Silicon Carbide Device
- Low On-Resistance
- High Speed Switching
- Low Capacitance
- Easy to Parallel and Simple to Drive
- Higher System Efficiency and Reduced Cooling Requirements
- Increased System Power Density and Switching Frequency

**Applications**

- Renewable Energy
- EV Charging
- Server Power Supplies
- High Voltage DC/DC converters

Part Number	Package	Marking
650V-20mΩ B2	TO-247-4L	T.B.D


**Absolute Maximum Ratings (T<sub>c</sub>=25°C)**

Parameter	Symbol	Value	Units
Drain-Source DC Voltage	V <sub>DSS</sub>	650	V
Gate-Source Voltage	V <sub>GS MAX</sub>	-8/+22	V
	V <sub>GS OP</sub>	-4/+18	V
Drain Current Continuous	I <sub>D</sub>	92	A
	I <sub>D</sub> *	64	A
Drain Current Pulsed	I <sub>DM</sub>	257	A
Total Power Dissipation	P <sub>D</sub> **	312	W
Operating Junction Temperature	T <sub>j</sub>	175	°C
Storage Temperature	T <sub>STG</sub>	-55~175	°C

Remake: Absolute maximum ratings are those values beyond which the device could be permanently damaged.

\*:V<sub>GS</sub>=18V, T<sub>c</sub>=100°C ; \*\*:T<sub>j</sub>=175°C

Electrical Characteristics,  $T_C=25^{\circ}\text{C}$  unless otherwise specified (  $T_J=25^{\circ}\text{C}$ 下 )

Parameter	Symbol	Test Conditions	Min	Max	Type	Units
<b>Off Characteristics</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=100\mu A$	650			V
Drain-Source Leakage Current	$I_{DSS}$	$V_{DS}=650V, V_{GS}=0V$		100	1	$\mu A$
Gate-Source Leakage Current	$I_{GSS}$	$V_{DS}=0V, V_{GS}=22V$		250	10	nA
	$I_{SGS}$	$V_{DS}=0V, V_{GS}=-8V$		-250	-10	nA
<b>On Characteristics</b>						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS}=V_{DS}, I_D=15mA$	1.8	4.0	2.6	V
Static Drain-Source On-state Resistance	$R_{DS(on)}$	$V_{GS}=18V, I_D=50A$		30	20	$m\Omega$
		$V_{GS}=18V, I_D=50A, T_J=175^{\circ}\text{C}$			28	$m\Omega$
<b>Dynamic Characteristics</b>						
Input Capacitance	$C_{ISS}$	$V_{GS}=0V, V_{DS}=600V, f=1MHz$			3180	pF
Output Capacitance	$C_{OSS}$				281	pF
Reverse Transfer Capacitance	$C_{rSS}$				33	pF
<b>Switching Characteristics</b>						
Total Gate Charge	$Q_g$	$V_{GS}=-4V/18V, V_{DS}=400V, I_D=40A$			187	nC
Gate-Source Charge	$Q_{gs}$				49	nC
Gate-Drain Charge	$Q_{gd}$				31	nC
Internal Gate Resistance	$R_G$	$f=1MHz$			3.2	$\Omega$
Turn-On Delay Time	$t_{d(on)}$	$V_{DS}=400V, I_D=40A, R_{gext}=2.5\Omega, R_L=20\Omega, V_{GS}=-4V/18V$			17	ns
Turn-On Rise Time	$t_r$				15	ns
Turn-Off Delay Time	$t_{d(off)}$				65	ns
Turn-Off Fall Time	$t_f$				14	ns
Turn-On Switching Energy	$E_{ON}$	$V_{DS}=400V, I_D=40A, R_{gext}=2.5\Omega, L=100\mu H$			520	$\mu J$
Turn-Off Switching Energy	$E_{OFF}$				700	$\mu J$
<b>Source-Drain Diode Electrical Characteristics</b>						
Continuous Forward Current		$I_S$		92		A
Diode Forward Voltage	$V_{SD}$	$V_{GS}=-4V, I_S=25A$			4.2	V
		$V_{GS}=-4V, I_S=25A, T_J=175^{\circ}\text{C}$			3.9	
Reverse Recovery Time	$t_{rr}$	$V_R=400V, I_{SD}=40A$			26	ns
Reverse Recovery Charge	$Q_{rr}$				58	nC
Peak Reverse Recovery Current	$I_{rrm}$				3.4	A

Thermal Characteristics

Package	Parameter	Symbol	Type	Units
TO-247-4L	Thermal Resistance from Junction to Case	$R_{thJC}$	0.48	$^{\circ}C/W$
	Thermal Resistance from Junction to Ambient	$R_{thJA}$	40	$^{\circ}C/W$

Characteristics Curve

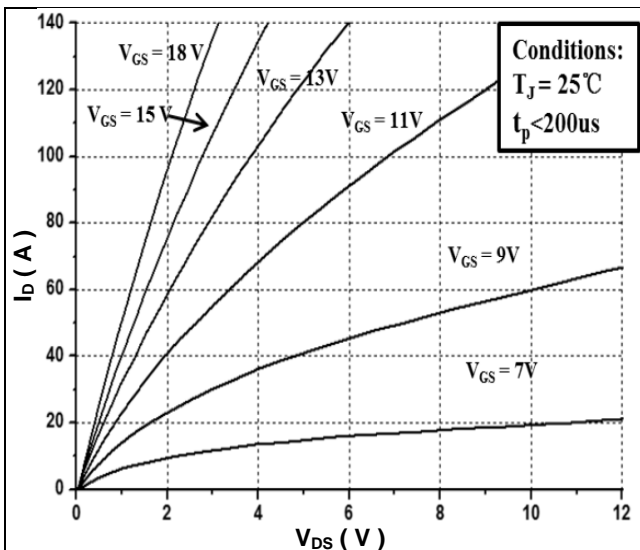


Figure 1. Output Characteristics at 25°C

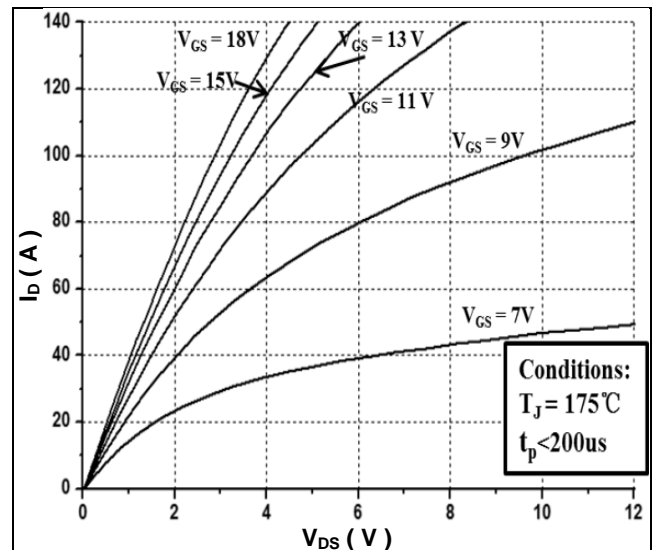


Figure 2. Output Characteristics at 175°C

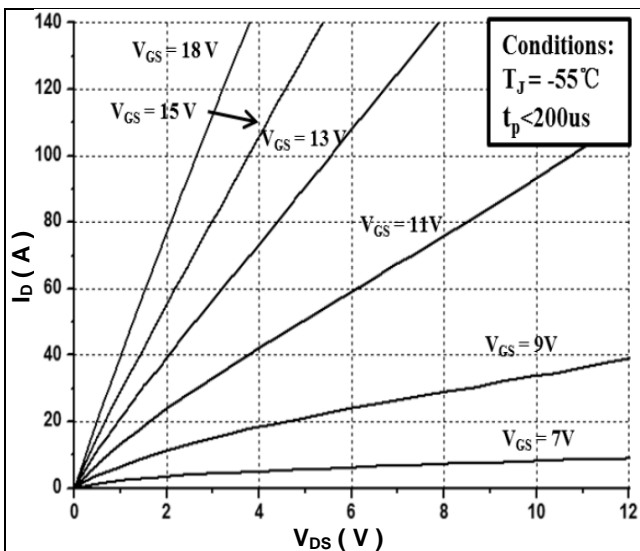


Figure 3. Output Characteristics at -55°C

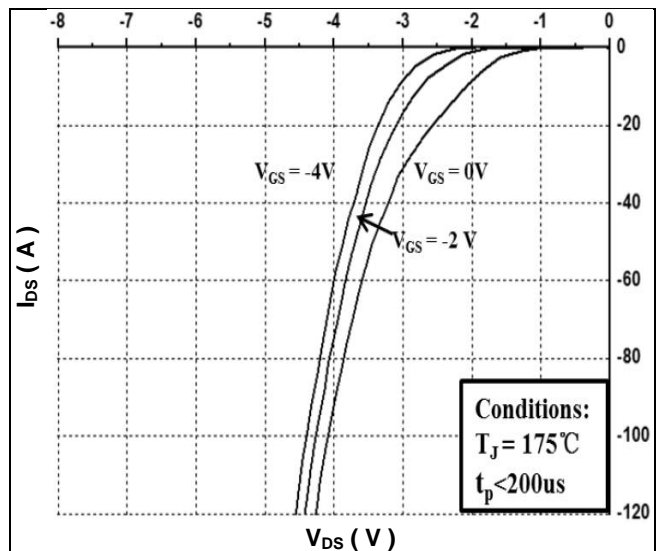


Figure 4. Body Diode Forward Characteristics at 175°C

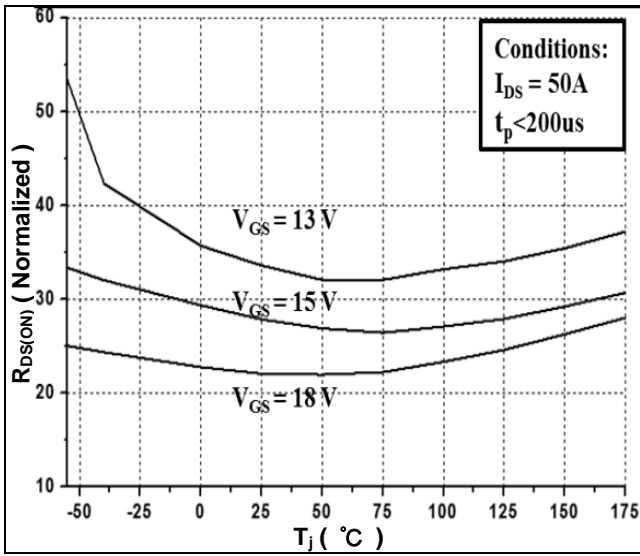


Figure 5. ON Resistance vs. Junction Temperature

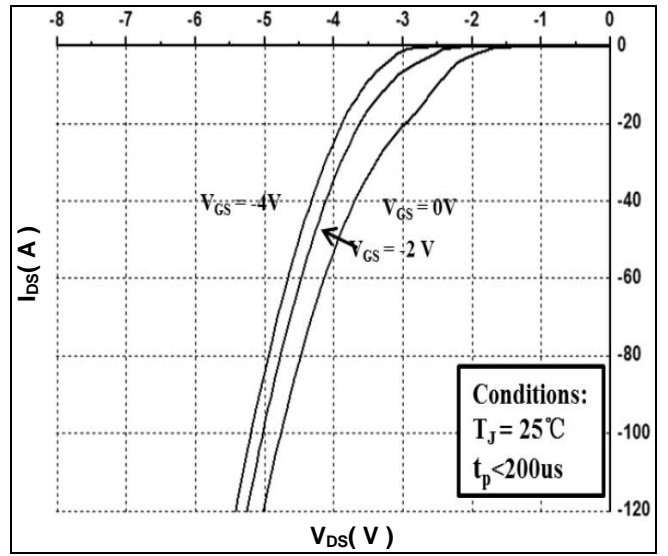


Figure 6. Body Diode Forward Characteristics

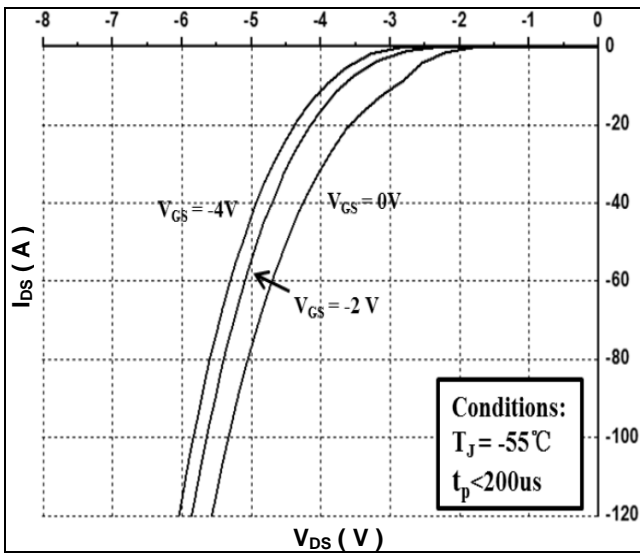


Figure 7. Body Diode Forward Characteristics at -55°C

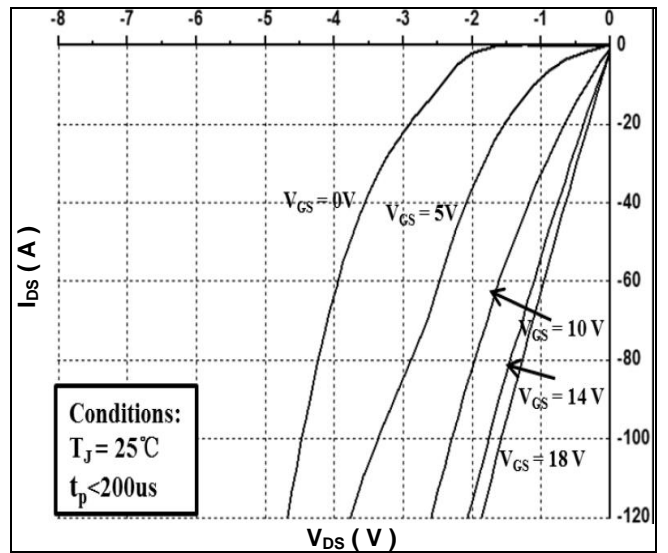


Figure 8. 3<sup>rd</sup> Quadrant Characteristic

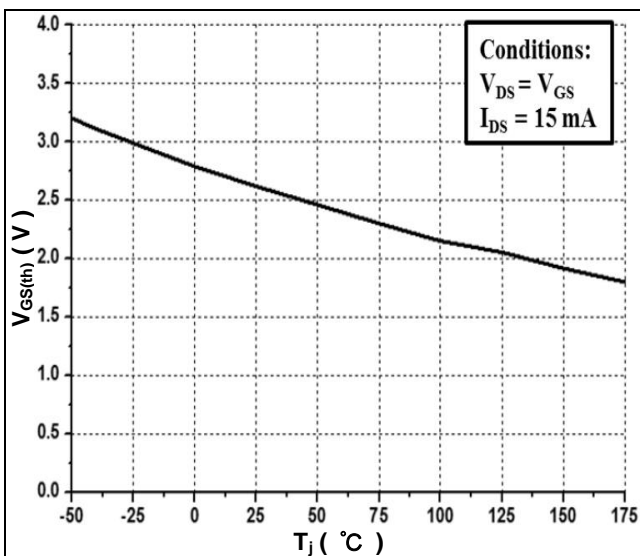


Figure 9. Threshold Voltage vs. Junction Temperature

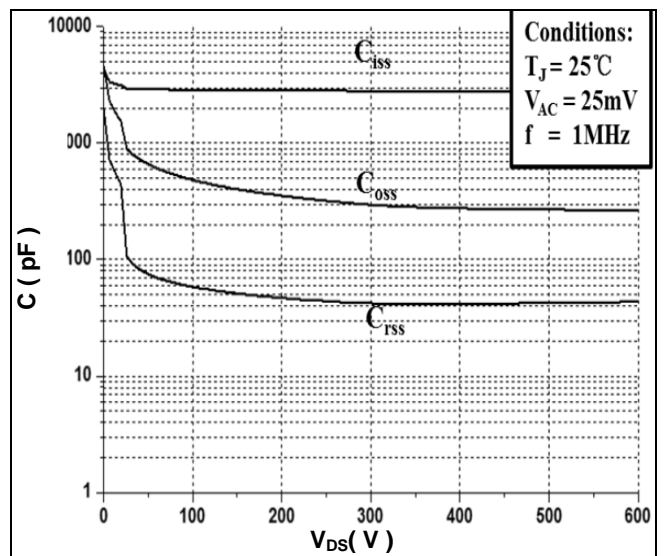


Figure 10. Capacitances vs. Drain-Source Voltage

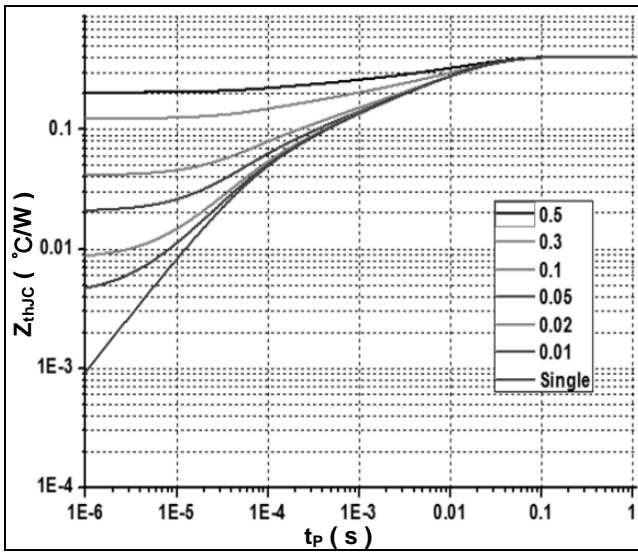


Figure 11. Transient Thermal Impedance vs. Junction Temperature

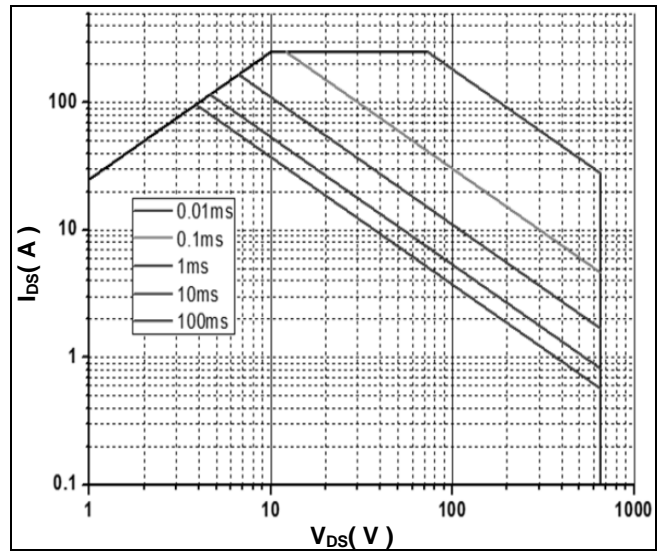


Figure 12. Safe Operating Area

Package Outline TO-247-4L

Symbol	Min.(mm)	Nom(mm)	Max.(mm)
A	4.6	5.0	5.4
A1	2.1	2.4	2.7
A2	1.85	2.0	2.15
b	1.05	1.2	1.35
b1	1.0	1.3	1.6
b2	2.35	2.65	2.95
c	0.5	0.6	0.7
D	22.34	22.54	22.74
D1	16.0	16.5	17.0
D2	0.97	1.17	1.37
e	2.34	2.54	2.74
e1	4.88	5.08	5.28
E	15.6	15.8	16.0
E1	13.5	14.0	14.5
E2	4.8	5.0	5.2
L	18.08	18.38	18.68
L1	2.38	2.58	2.78
p	3.5	3.6	3.7
p1	6.6	7.2	7.6
Q	6.0	6.15	6.3
S	6.0	6.15	6.3

