N-Channel 650V-60mΩ / TO-263-7L B2

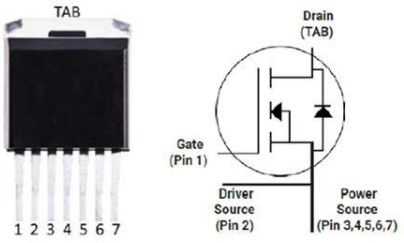
Product Features

- 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-60mΩ B2	TO-263-7L	T.B.D



Absolute Maximum Ratings (T_C=25℃)

Parameter	Symbol	Value	Units
Drain-Source DC Voltage	V_{DSS}	650	V
Gate-Source Voltage	$V_{GS\ MAX}$	-8/+22	V
	$V_{GS\ OP}$	-4/+18	V
Drain Current Continuous	I_D	29	A
	I_D*	20	A
Drain Current Pulsed	I_{DM}	99	A
Total Power Dissipation	P_D**	150	W
Operating Junction Temperature	T_j	175	℃
Storage Temperature	T_{STG}	-55~175	℃

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

*:V_{GS}=18V, Tc=100℃ ； .**:Tj=175℃

Electrical Characteristics, T_C=25℃ unless otherwise specified (T_J=25℃下)

Parameter	Symbol	Test Conditions	Min	Max	Type	Units
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V, I_D=100μA	650			V
Drain-Source Leakage Current	I_{DSS}	V_{DS}=650V, V_{GS}=0V		50	1	μA
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
On Characteristics						
Gate Threshold Voltage	$V_{GS(th)}$	V_{GS}=V_{DS}, I_D=5mA	1.8	4.0	2.6	V
Static Drain-Source On-state Resistance	$R_{DS(on)}$	V_{GS}=18V, I_D=13.2A		79	60	mΩ
		V_{GS}=18V,I_D=13.2A,T_J=175℃			75	mΩ
Dynamic Characteristics						
Input Capacitance	C_{iSS}	V_{GS}=0V, V_{DS}=400V, f=1MHz			830	pF
Output Capacitance	C_{OSS}				82	pF
Reverse Transfer Capacitance	C_{rSS}				14	pF
Switching Characteristics						
Total Gate Charge	Q_g	V_{GS}=-4V/18V, V_{DS}=400V, I_D=13.2A			50	nC
Gate-Source Charge	Q_{gS}				13	nC
Gate-Drain Charge	Q_{gd}				12	nC
Internal Gate Resistance	R_G	f=1MHz			6	Ω
Turn-On Delay Time	$t_{d(on)}$	V_{DS}=400V, I_D=13.2A, R_{gext}=2.5Ω,R_L=30Ω, V_{GS}=-4V/18V			8	ns
Turn-On Rise Time	t_r				9	ns
Turn-Off Delay Time	$t_{d(off)}$				21	ns
Turn-Off Fall Time	t_f				8	ns
Turn-On Switching Energy	E_{ON}	V_{DS}=400V, I_D=13.2A, R_{gext}=2.5Ω,L=200μH			140	μJ
Turn-Off Switching Energy	E_{OFF}				52	μJ
Source-Drain Diode Electrical Characteristics						
Continuous Forward Current	I_S			23		A
Diode Forward Voltage	V_{SD}	V_{GS}=-4V, I_S=6.6A			4.2	V
		V_{GS}=-4V, I_S=6.6A,T_J=175℃			3.8	
Reverse Recovery Time	t_{rr}	V_R=400V, I_{SD}=13.2A			28	ns
Reverse Recovery Charge	Q_{rr}				47	nC
Peak Reverse Recovery Current	I_{rrm}				3	A

Thermal Characteristics

Package	Parameter	Symbol	Type	Units
TO-263-7L	Thermal Resistance from Junction to Case	R_{thJC}	0.99	℃/W
	Thermal Resistance from Junction to Ambient	R_{thJA}	40	℃/W

Characteristics Curve

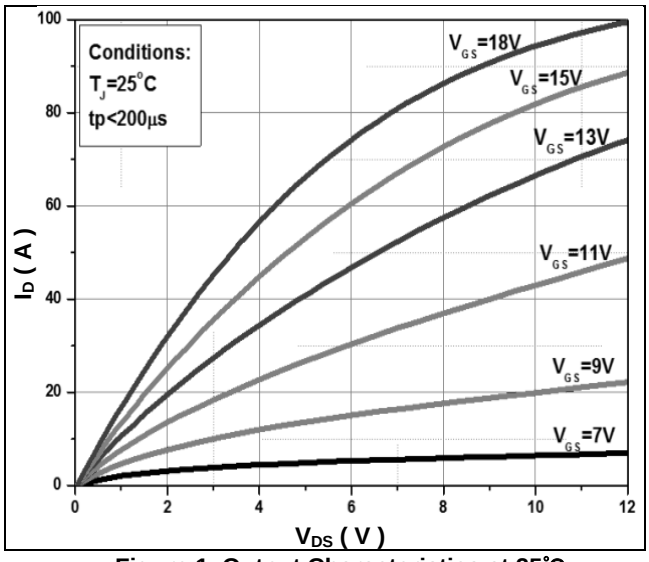


Figure 1. Output Characteristics at 25℃

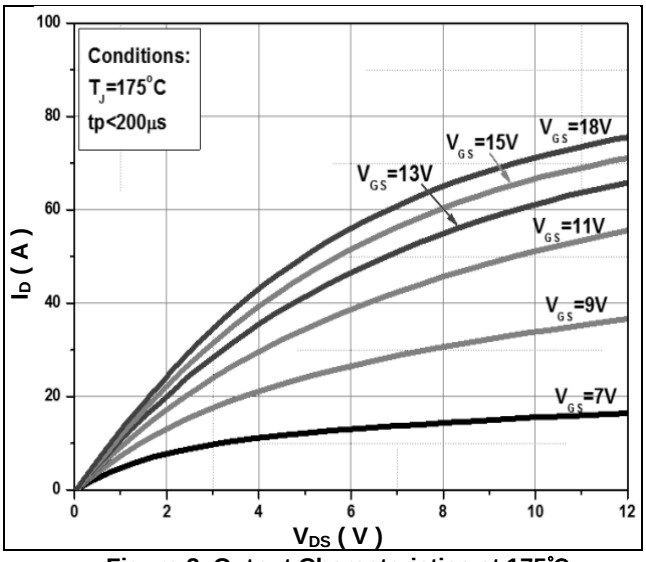


Figure 2. Output Characteristics at 175℃

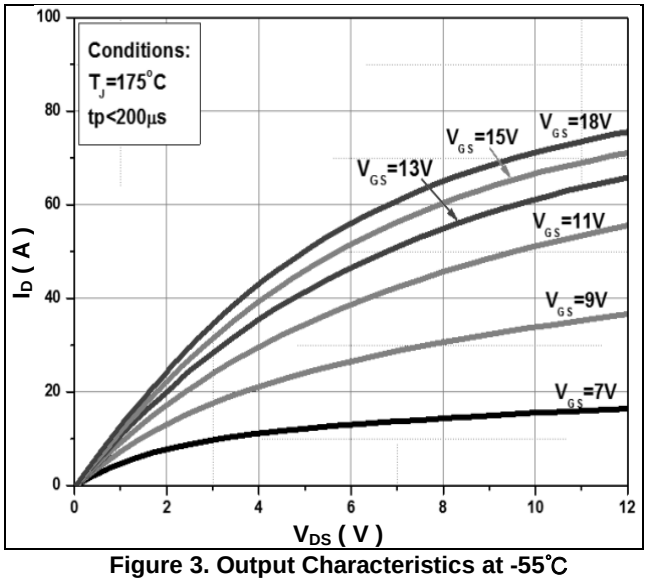


Figure 3. Output Characteristics at -55℃

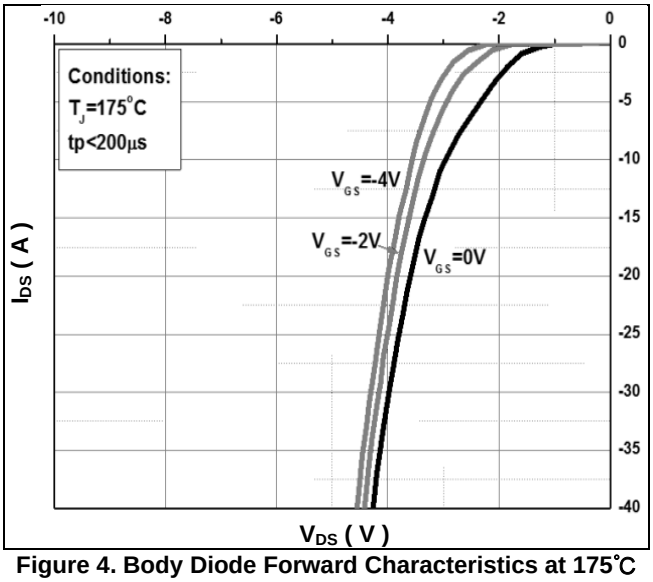


Figure 4. Body Diode Forward Characteristics at 175℃

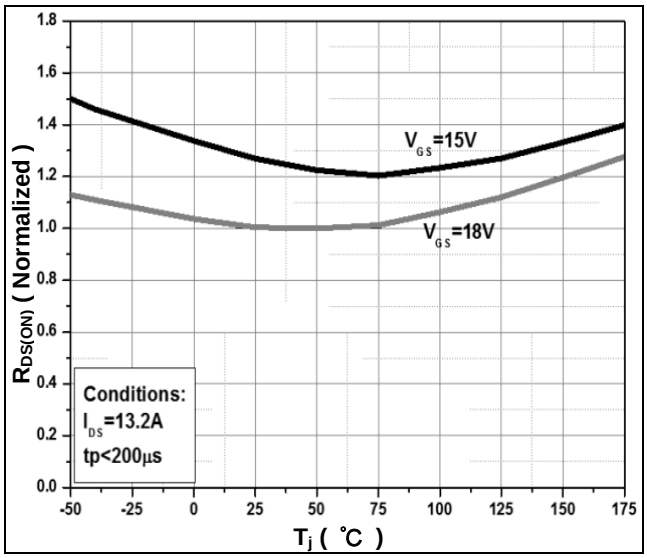


Figure 5. ON Resistance vs. Junction Temperature

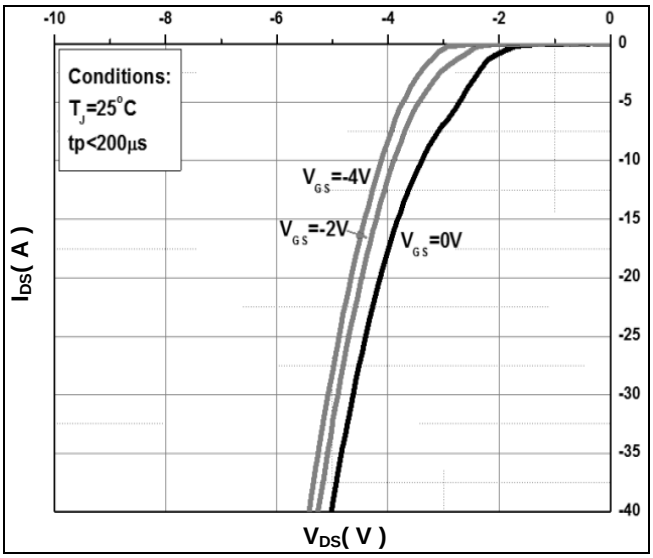


Figure 6. Body Diode Forward Characteristics

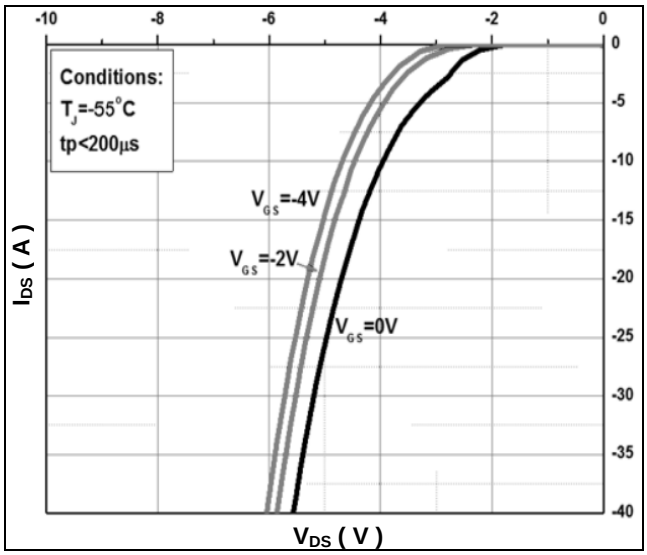


Figure 7. Body Diode Forward Characteristics at -55℃

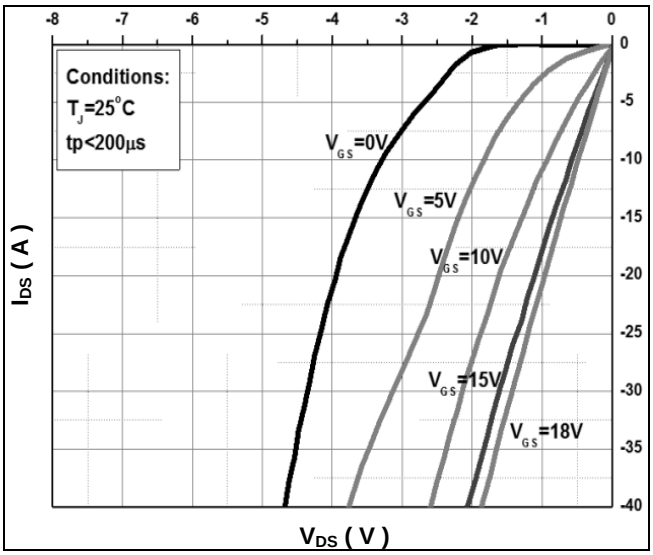


Figure 8. 3rd Quadrant Characteristic

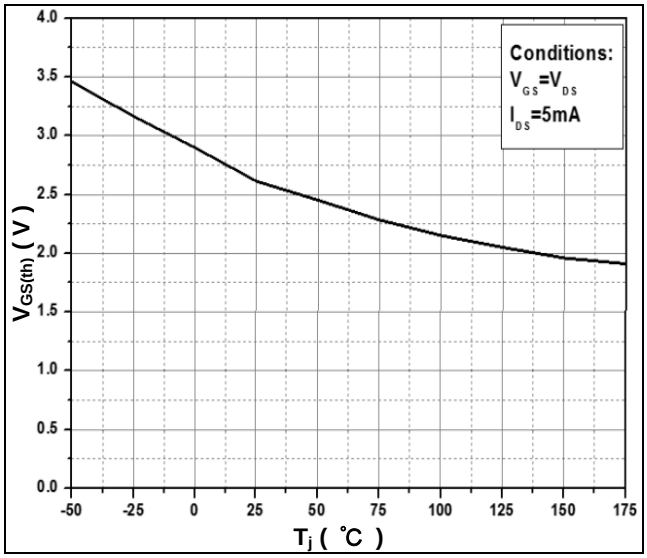


Figure 9. Threshold Voltage vs. Junction Temperature

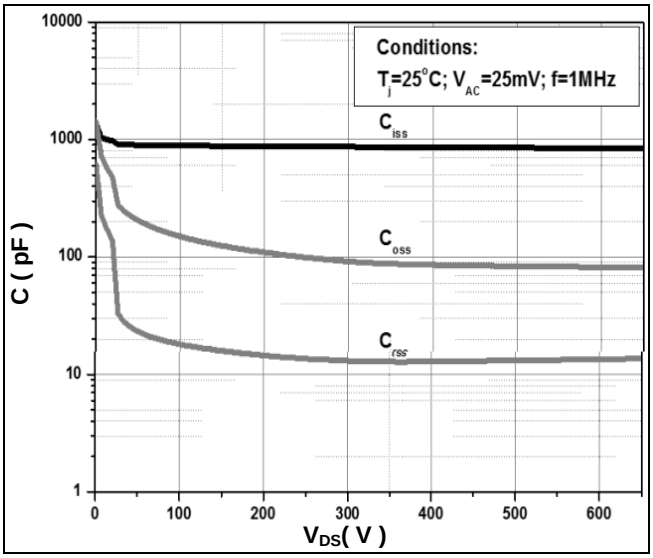


Figure 10. Capacitances vs. Drain-Source Voltage

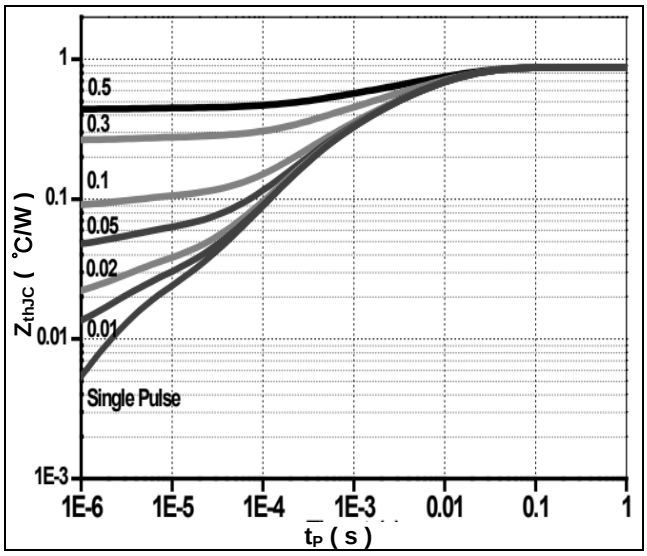


Figure 11. Transient Thermal Impedance vs. Junction Temperature

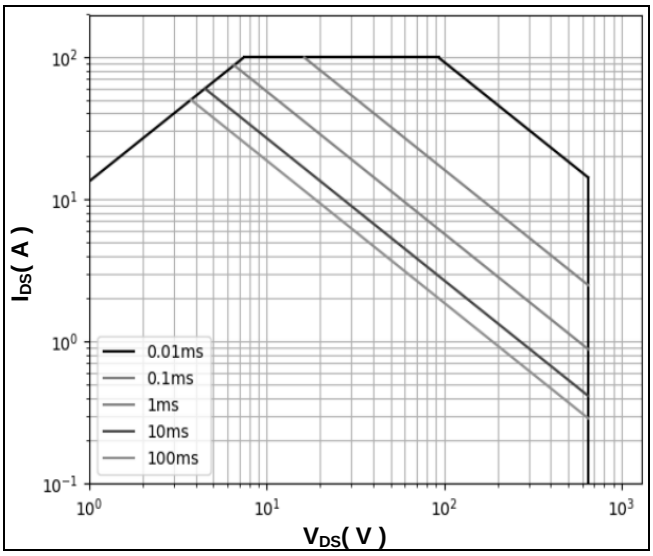
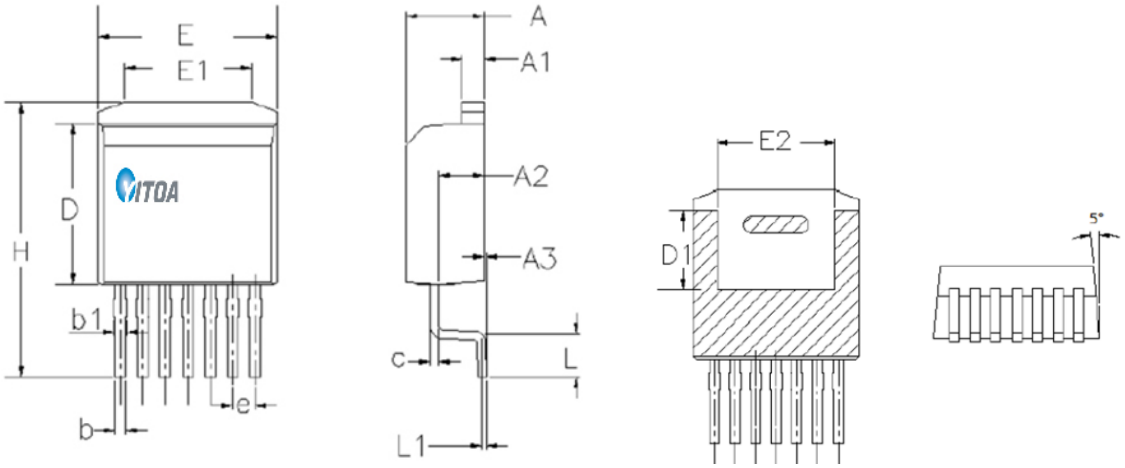


Figure 12. Safe Operating Area

Package Outline TO-263-7L



Symbol	Min.(mm)	Nom(mm)	Max.(mm)
A	4.3	4.43	4.56
A1	1.2	1.3	1.4
A3	0	0.13	0.25
b	0.5	0.6	0.7
b1	0.6	0.7	0.9
c	0.45	0.5	0.6
D	8.93	9.08	9.23
D1	4.65	4.8	4.95
e		1.27	
E	10.08	10.18	10.28
E1	6.5	7.0	7.5
E2	6.82	7.22	7.62
H	15.0	15.5	16.0
L	1.9	2.2	2.5