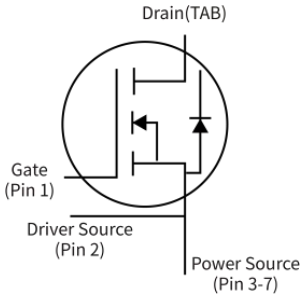
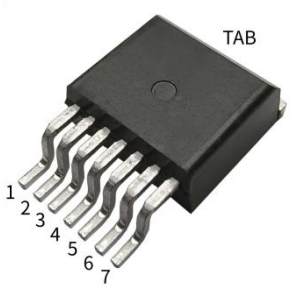
Silicon Carbide Power MOSFET

Parameter	Value	Unit
V_{DS}	1700	V
I_D	6.8	A
$R_{DS(ON)}$	800	mΩ
Q_G	16	nC





TO-263-7L

Features

- High Speed Switching with Low Capacitances
- High Blocking Voltage with Low $R_{DS(on)}$
- Low impedance package with driver source pin
- Easy to parallel and simple to drive

Applications

- EV Charging
- High Voltage DC/DC Converters
- Switched-Mode Power Supply(SMPS)
- Power Factor Correction(PFC)

Absolute Maximum Ratings (at T_J=25℃ unless otherwise specified)

Parameter	Symbol	Value	Unit
Drain-source Voltage	V_{DS}	1700	V
Gate-source Voltage	V_{GSmax}	-10/+25	V
Gate-Source Voltage	V_{GSop}	-5/+20	V
Drain Current (continuous;Tc=25°C)	I_D	6.8	A
Drain Current (continuous;Tc=100°C)		4.8	
Drain Current (pulsed)	I_{DM}	17	A
Power Dissipation (Tc=25°C)	P_D	75	W
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55 to +175	°C
Thermal Resistance from Junction to Case	$R_{\theta JC}$	2.0	°C/W
Thermal Resistance From Junction to Ambient	$R_{\theta JA}$	40	

Electrical Characteristics

Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Static characteristics (at T_C=25°C unless otherwise specified)						
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}=20V; V_{DS}=0V	-	-	100	nA
Gate Threshold Voltage	$V_{GS(th)}$	V_{GS}=V_{DS}; I_{DS}=500uA	2.0	-	4.0	V
Static Drain-Source on Resistance	$R_{DS(on)}$	V_{GS}=20V; I_D=2A	-	0.8	1.0	Ω
		V_{GS}=20V; I_D=2A; T_J=150°C	-	1.2	-	
Dynamic characteristics (at T_C=25°C unless otherwise specified)						
Input Capacitance	C_{iss}	V_{GS}=V_{DS} ; V_{DS}=1000V; f=1MHz;	-	142	-	pF
Output Capacitance	C_{oss}		-	12	-	
Reverse Transfer Capacitance	C_{rss}		-	2.6	-	
Turn-on Energy	E_{on}	V_{DS}=1200V; V_{GS}=-3.5/18V; I_D=2A; R_G=2Ω; Load=0.1mH;	-	37	-	uJ
Turn-off Energy	E_{off}		-	25	-	
Total Gate Charge	Q_G	V_{DS}=1200V; V_{GS}=-5/20V; I_D=2A	-	16	-	nC
Gate-Source Charge	Q_{GS}		-	1.8	-	
Gate-Drain Charge	Q_{GD}		-	12	-	
Internal Gate Resistor	R_{Gint}	f=1MHz; V_{AC}=25mV	-	48	-	Ω
Turn-on Delay Time	$t_{d(on)}$	V_{DS}=1200V; V_{GS}=-3.5/18V; I_D=2A; R_G=2Ω; Load=0.1mH;	-	12	-	ns
Rise Time	t_r		-	35	-	
Turn-off Delay Time	$t_{d(off)}$		-	9	-	
Fall Time	t_f		-	43	-	

Reverse SiC Diode Characteristics(at T_J=25℃ unless otherwise specified)

Parameter	Symbol	Conditions	Values			Units
			Min.	Typ.	Max.	
Diode Forward Voltage	V_{FSD}	V_{GS}=0V; I_F=2A	-	3.7	-	V
Continuous Diode Forward Current	I_S	V_{GS}=0V; T_C=25°C	-	-	6.8	A

Typical Characteristics

Figure 1. Typical Output Characteristics at T_j=25℃

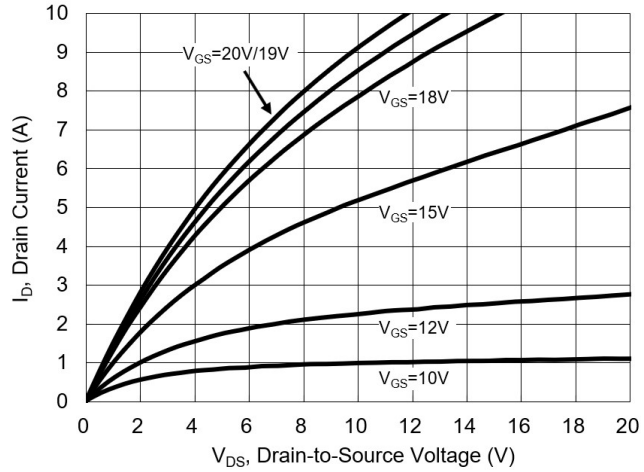


Figure 2. Typical Output Characteristics at T_j=150℃

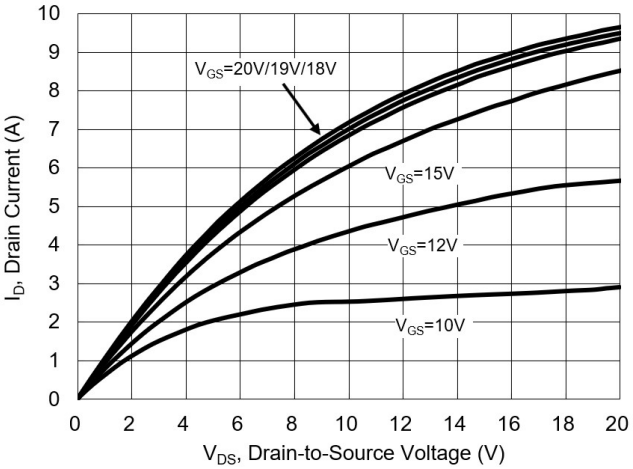


Figure 3. Typical Drain-to-Source ON Resistance vs. Gate Voltage

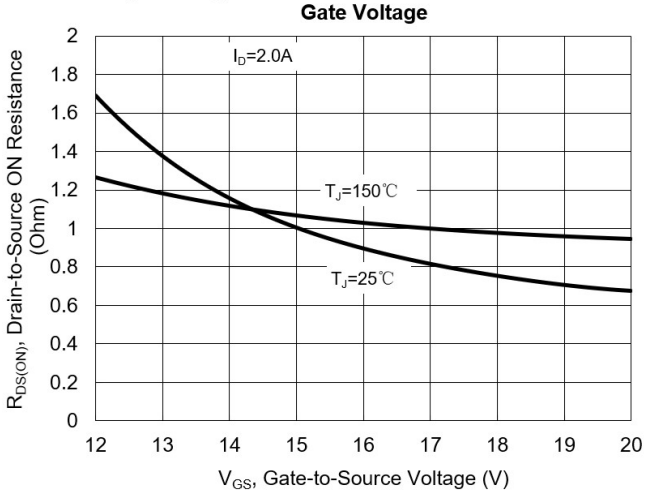


Figure 4. Typical Transfer Characteristics

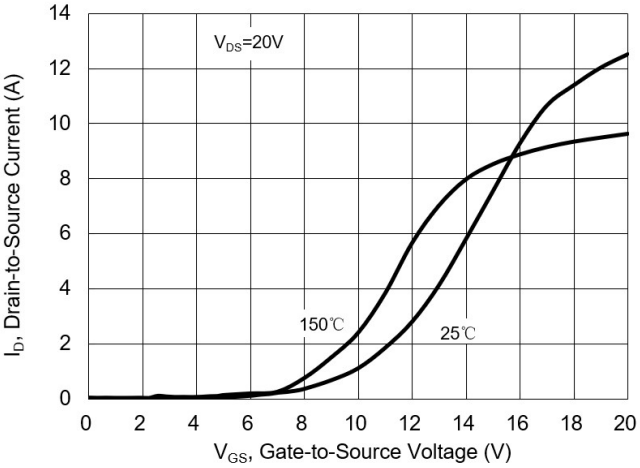


Figure 5. Typical Drain-to-Source ON Resistance T_j=25℃

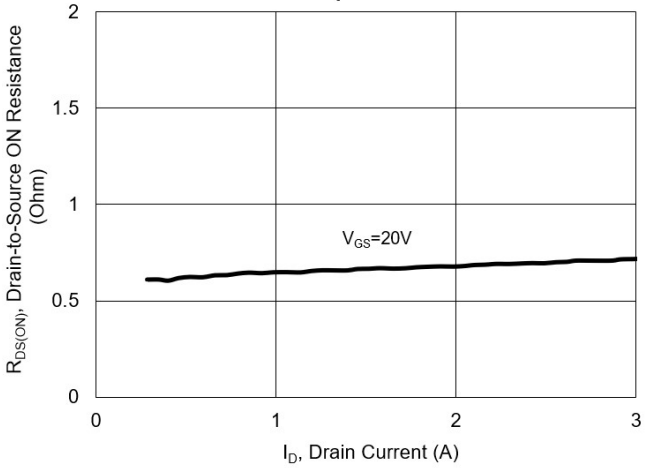


Figure 6. Typical Drain-to-Source ON Resistance T_j=150℃

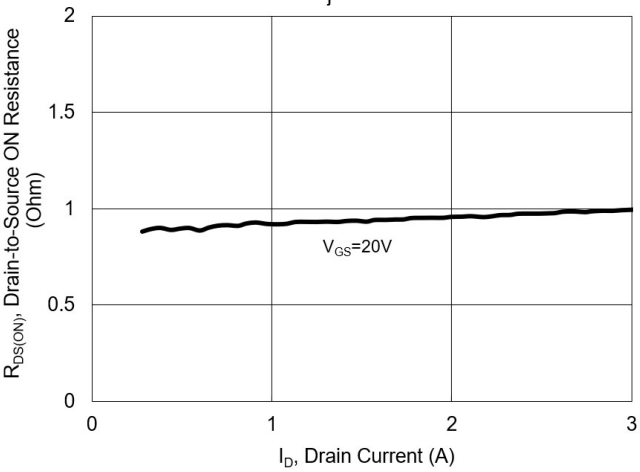


Figure 7. Typical Body Diode Characteristics at T_j=25℃

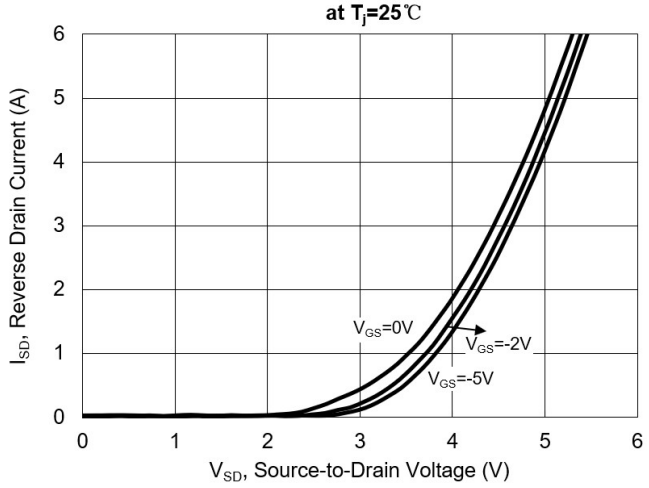


Figure 8. Typical Body Diode Characteristics at T_j=150℃

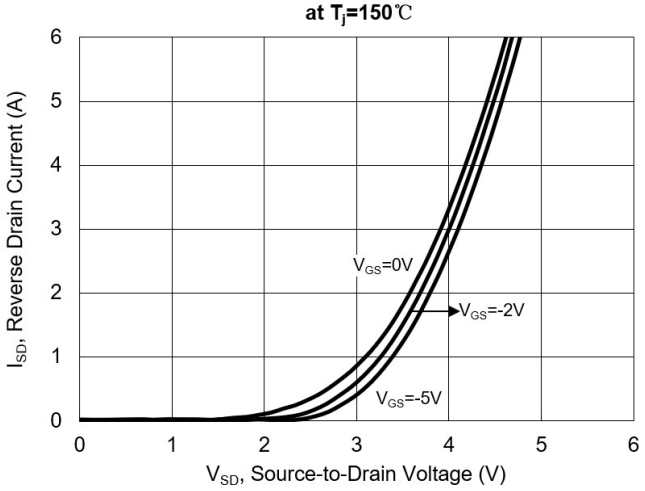


Figure 9. 3rd Quadrant Characteristics at T_j=25℃

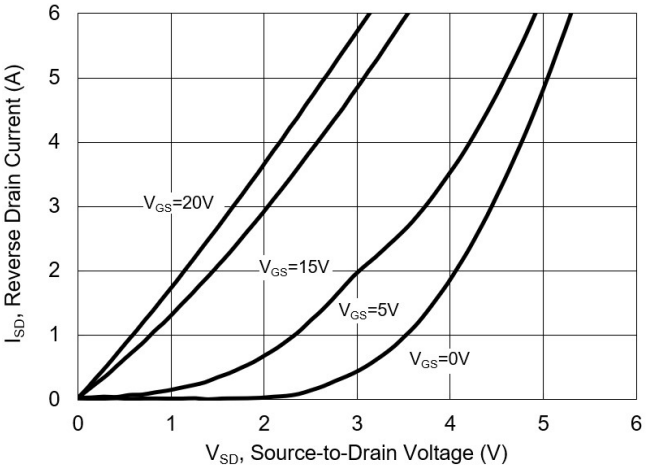


Figure 10. 3rd Quadrant Characteristics at T_j=150℃

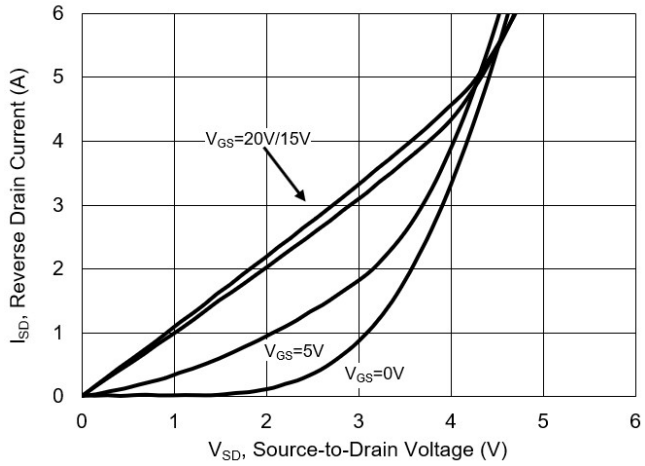


Figure 11. Typical Drain-to-Source On Resistance vs. Junction Temperature

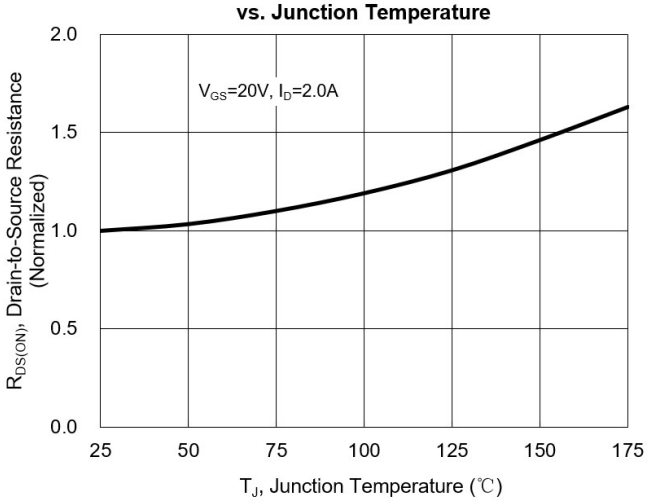


Figure 12.Typical Breakdown Voltage vs. Junction Temperature

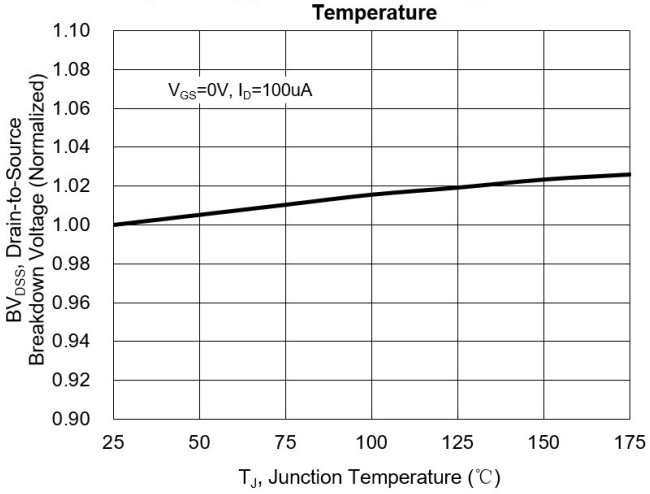


Figure 13.Typical Threshold Voltage vs. Junction Temperature

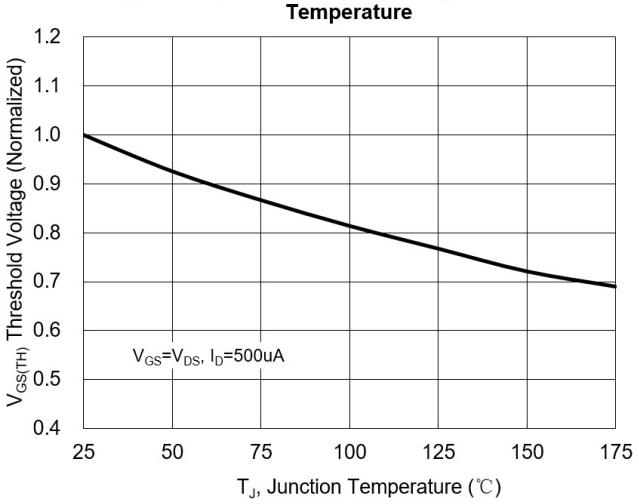


Figure 14. Typical Capacitance vs. Drain-to-Source Voltage

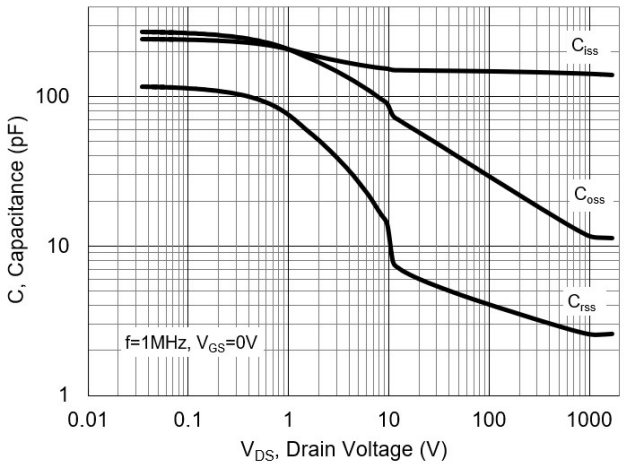


Figure 15. Typical Gate Charge vs. Gate-to-Source Voltage

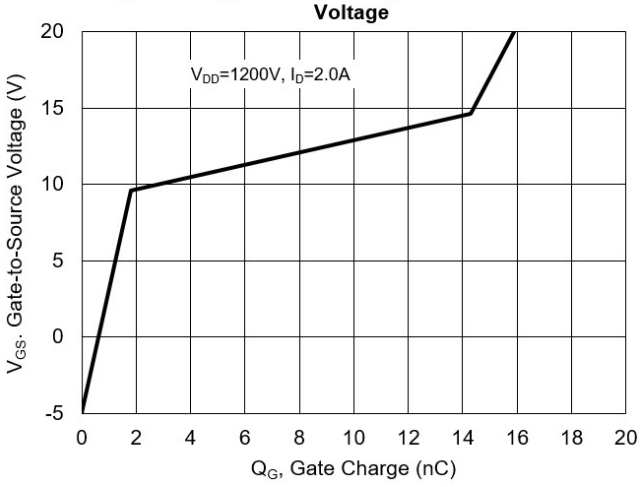


Figure 16. Thermal Impedance Junction-to-Case

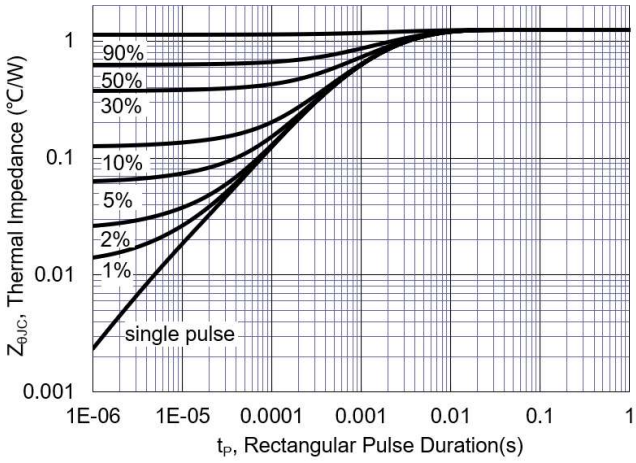


Figure 17. Maximum Peak Current Capability

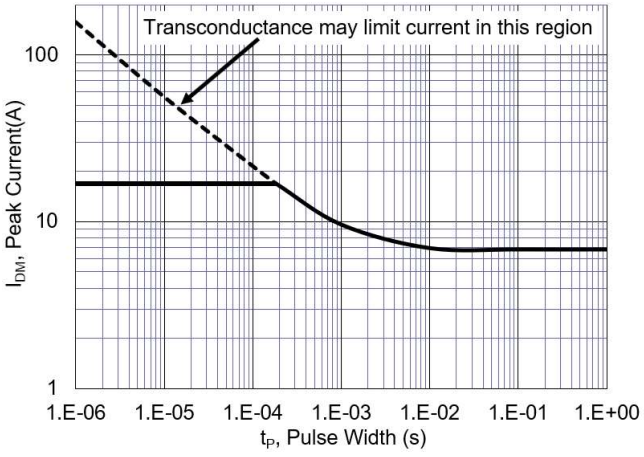


Figure 18. Maximum Power Dissipation vs. Case Temperature

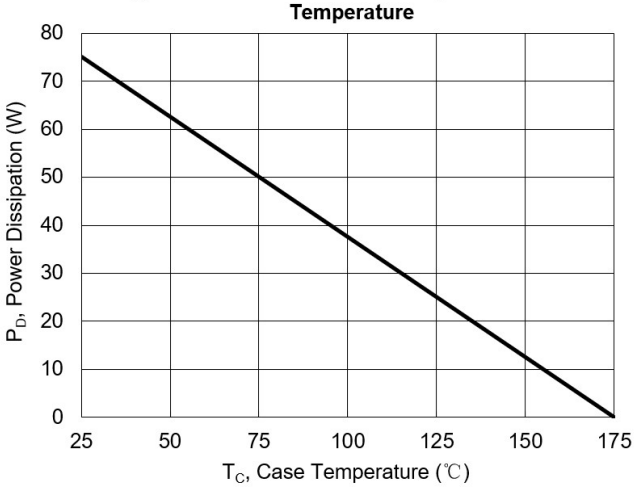


Figure 19. Maximum Continuous Drain Current vs Case Temperature

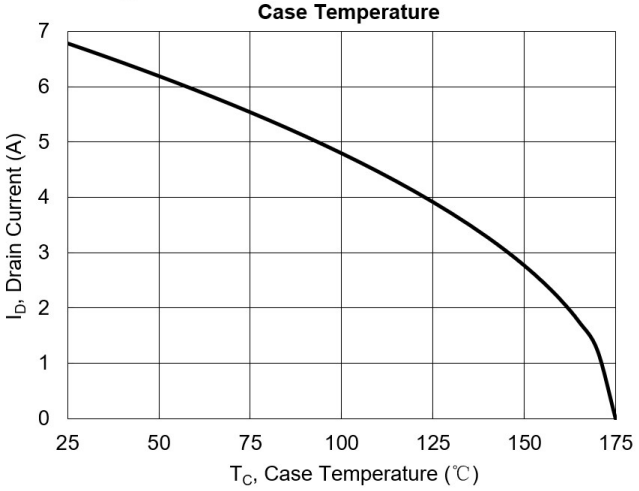
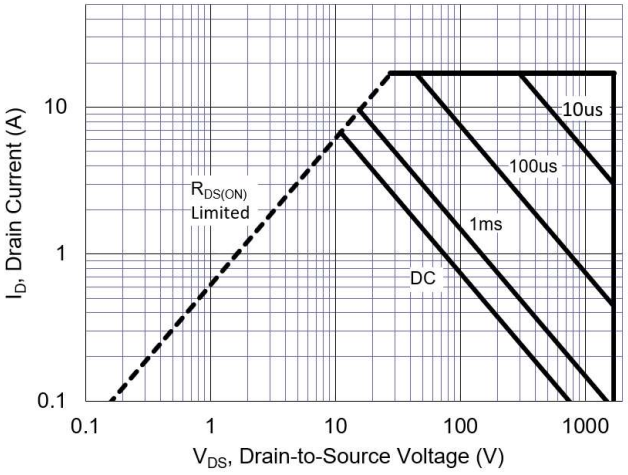


Figure 20. Maximum Forward Safe Operation Area



Package Outlines(Unit:mm)

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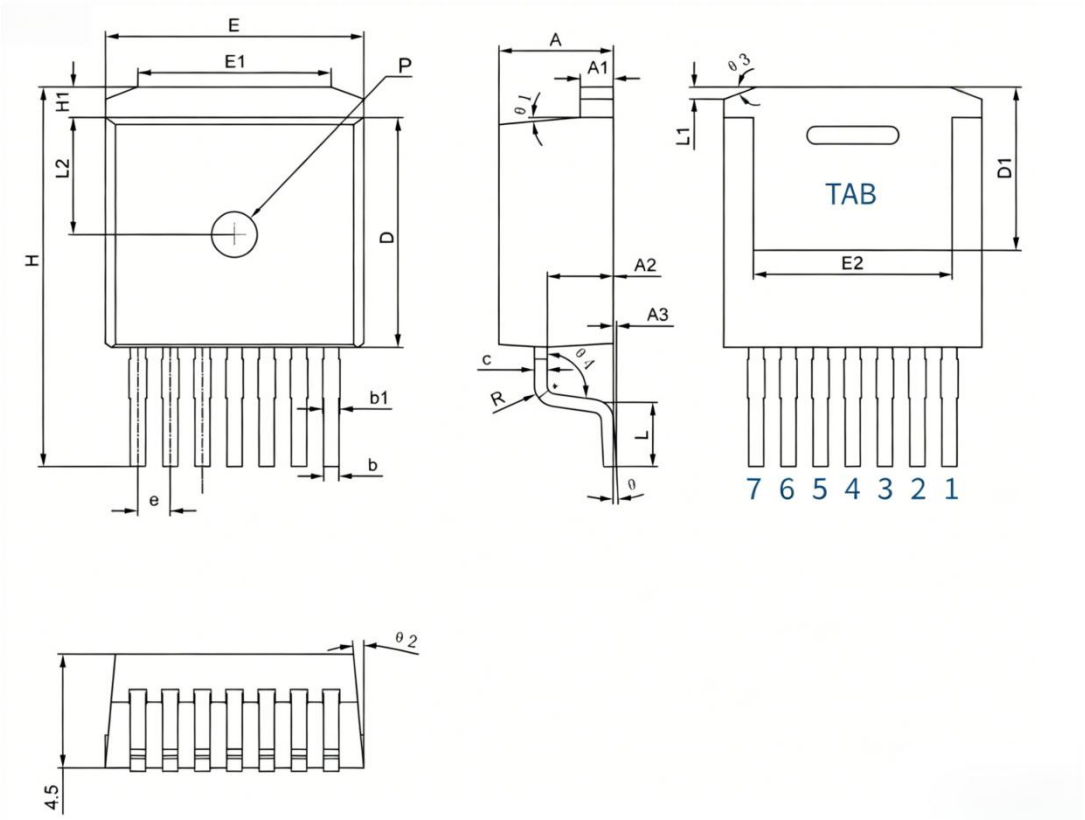

Symbol	Millimeters			Symbol	Millimeters		
	Min.	Type.	Max.		Min.	Type.	Max.
A	4.40	4.50	4.60	**e**	1.17	1.27	1.37
A1	1.25	1.30	1.40	**H**	14.75	15.00	15.25
A2	2.45	2.60	2.70	**H1**	1.10	1.20	1.30
A3	0.05	0.13	0.20	**L**	2.35	2.55	2.75
b	0.50	0.60	0.70	**L1**	0.37	0.57	0.77
b1	0.60	0.70	0.85	**L2**	4.48	4.63	4.78
c	0.45	0.50	0.60	**θ**	0°	3°	5°
D	8.88	9.08	9.28	**θ1**	3°	5°	7°
D1	6.25	6.45	6.65	**θ2**	3°	5°	7°
E	9.88	10.18	10.28	**θ3**	15°	20°	25°
E1	6.67	7.07	7.47	**R**	0.75	0.80	0.85
E2	7.67	7.82	7.97	**P**	1.70	1.80	1.90

Pin	Symbol	Description
1	G	Gate
2	KS	Driver Source
3-7	S	Power Source
TAB	D	Drain

Note:

1. All metal surfaces are Sn plated (matte), except area of cut.
2. Burr or mold flash size (0.5 mm) is not included in the dimensions.

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