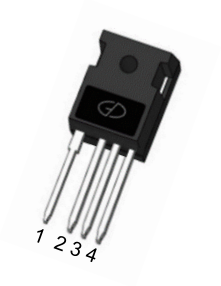
75A,1200V N-Channel Silicon Carbide Power MOSFET

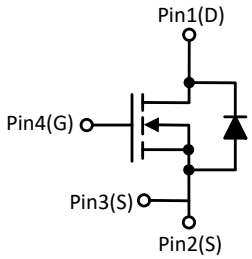
Features

- High blocking voltage
- Low on-resistance with high junction temperature
- High-speed switching with low capacitances
- Fast intrinsic diode with low reverse recovery (Qrr)
- RoHS compliant



Applications

- Switch Mode Power Supplies
- DC/DC converters
- Solar Inverters
- Battery Chargers
- Motor Drives



Absolute Maximum Ratings (@T_j=25°C unless otherwise noted)

Parameter		Symbol	Ratings	Unit
Drain-Source Voltage		V_{DS}	1200	V
Gate Source Voltage		V_{GS}	-5/+20	V
Drain Current Continuous	T_C=25°C	I_D	75	A
Drain Current Pulse		I_{DM}	150	A
Power Dissipation(T_C=25°C)		P_D	330	W
Operating Temperature/ Storage Temperature		T_J/T_{STG}	-55 ~ +175	°C

Thermal Characteristics

Parameter	Symbol	Typ	Unit
Thermal Resistance ,Junction-to-Ambient	$R_{\theta JA}$	--	°C/W
Thermal Resistance Junction-to-Case	$R_{\theta JC}$	0.39	°C/W

Electrical Characteristics ($@T_j$=25°C unless otherwise noted)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS}=0V，I_D=100μA	1200	--	--	V
Gate Leakage Current	I_{GSS}	V_{GS}=20V	--	10	250	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=1200V，V_{GS}=0V	--	11	100	μA
Gate Threshold Voltage	$V_{GS(TH)}$	V_{DS}=V_{GS}，I_D=10mA	2	--	4	V
Drain-Source On-state Resistance	$R_{DS(on)}$	V_{GS}=20V，I_D=40A	--	40	55	mΩ
Total Gate Charge	Q_g	V_{GS}=-5/+20V，V_{DS}=800V，I_D=40A	--	99	--	nC
Gate- Source Charge	Q_{gs}		--	32	--	nC
Gate- Drain Charge	Q_{gd}		--	29	--	nC
Tum-on Delay Time	$t_{d(on)}$	V_{GS}=-5/+20V，V_{DS}=800V，I_D=40A，R_G=2.5Ω，	--	13	--	ns
Turn-on Rise Time	t_r		--	30	--	ns
Turn-off Delay Time	$t_{d(off)}$		--	27	--	ns
Turn-off Fall Time	t_f		--	12	--	ns
Input Capacitance	C_{iss}	V_{GS}=0V，V_{DS}=1000V，f=1.0MHz,V_{AC}=25mV	--	2193	--	pF
Output Capacitance	C_{oss}		--	153	--	pF
Reverse Transfer Capacitance	C_{rss}		--	8	--	pF

Reverse Diode Characteristics ($@T_j$=25°C unless otherwise noted)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Continuous Diode Forward Current	I_{SD}		--	--	75	A
Diode Forward Voltage	V_{SD}	I_S=20A，V_{GS}=0V	4	--	--	V
Reverse Recovery Time	t_{rr}	I_S = 20A，V_{GS}=-5V，V_{DS}=800V di/dt =2100 A/μs，	--	28	--	ns
Reverse Recovery Charge	Q_{rr}		--	232	--	nC

Ratings and Characteristics Curves

(T_A = 25℃ unless otherwise noted)

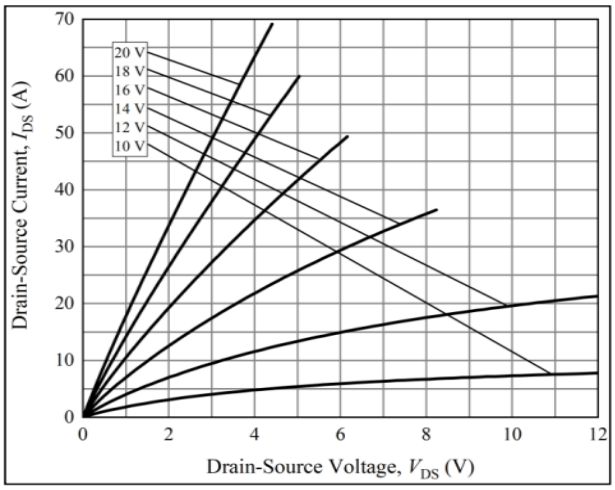


Figure 1. Typical Output Characteristics at TJ = -55 ℃

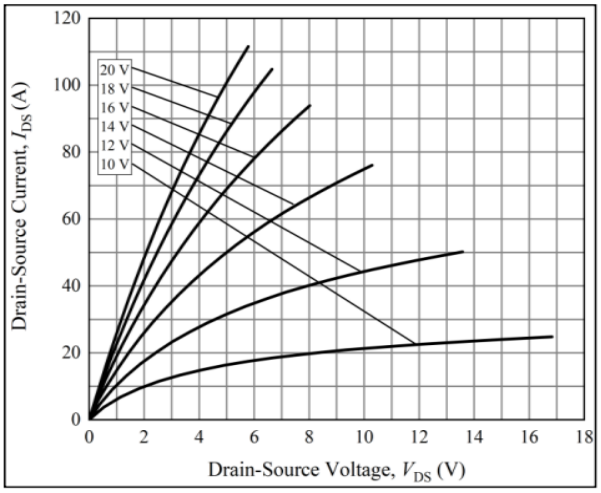


Figure 2. Typical Output Characteristics at TJ = 25 ℃

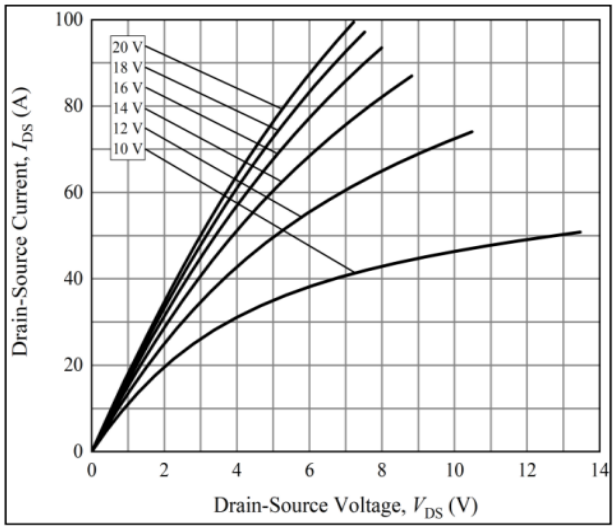


Figure 3. Typical Output Characteristics at TJ = 175 ℃

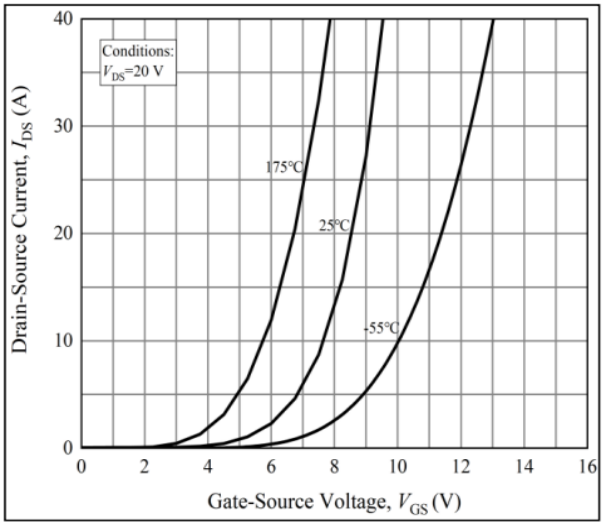


Figure 4. Typical Transfer Characteristics for Various Temperature

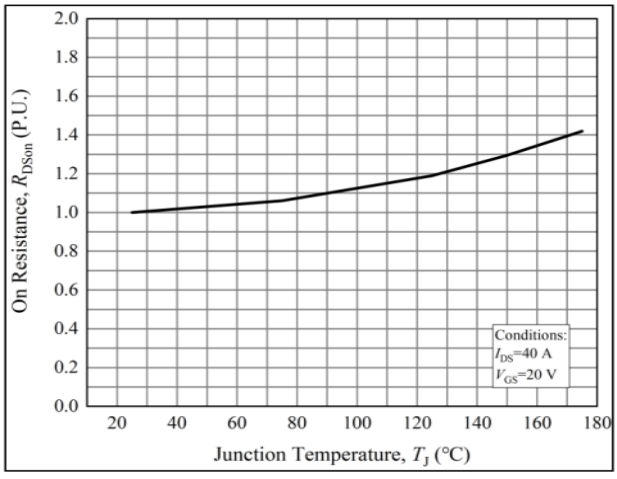


Figure 5. Normalized On-Resistance vs. Temperature

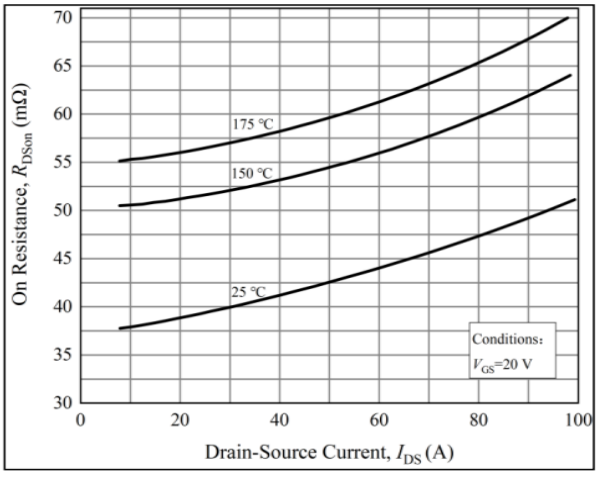


Figure 6. On-Resistance vs. Drain Current for Various Temperatures

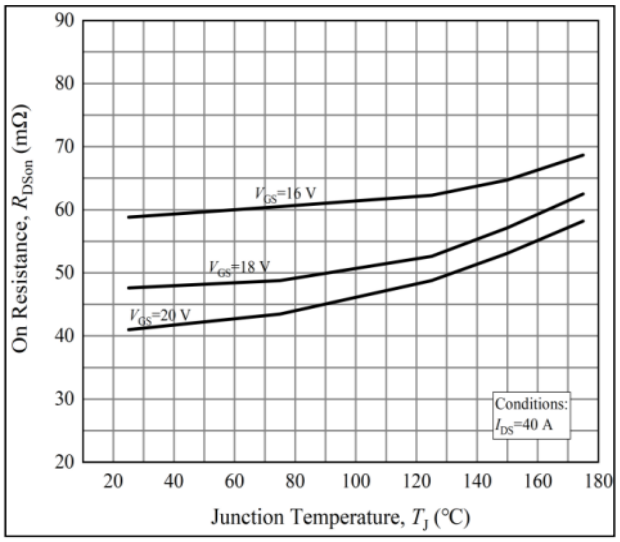


Figure 7. On-Resistance vs. Temperature for Gate

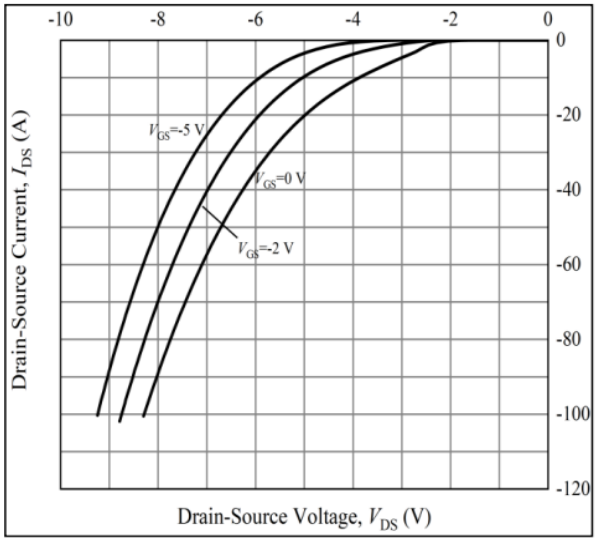


Figure8. Typical Body Diode Characteristics at TJ = -55 ℃

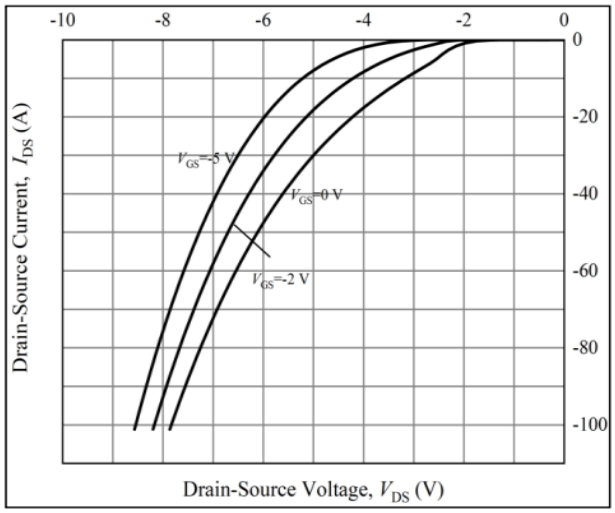


Figure 9. Typical Body Diode Characteristics at TJ = 25 ℃

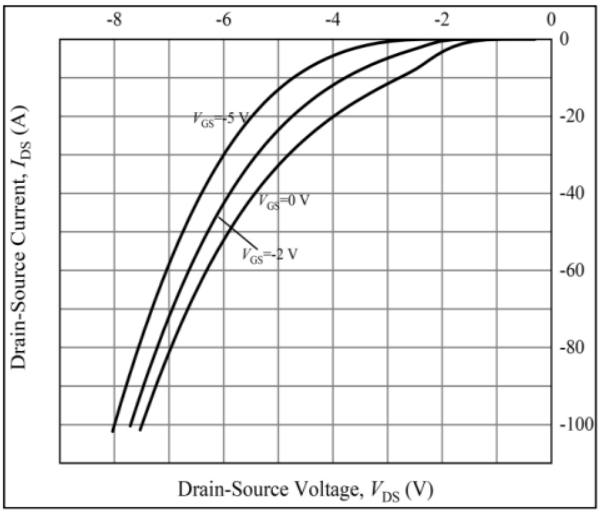


Figure 10. Typical Body Diode Characteristics at TJ = 175 ℃

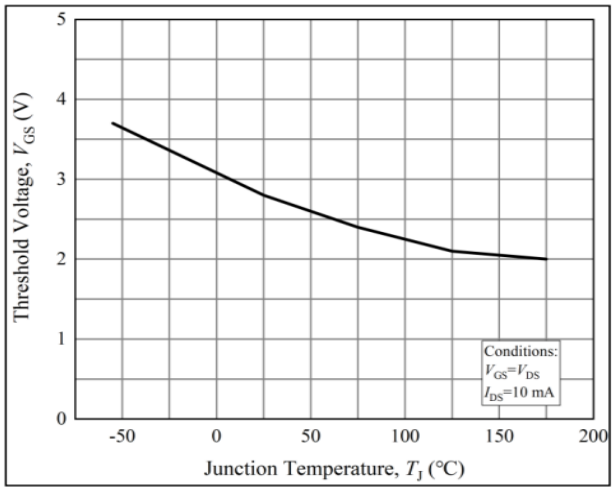


Figure 11. Typical Threshold Voltage vs. Temperature

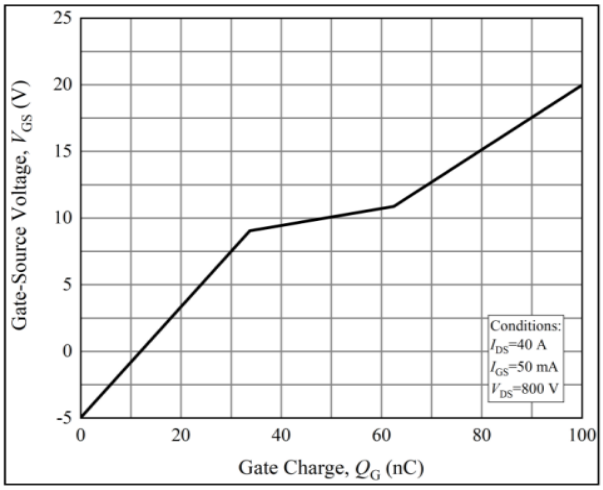


Figure 12. Typical Gate Charge Characteristics at TJ = 25 ℃

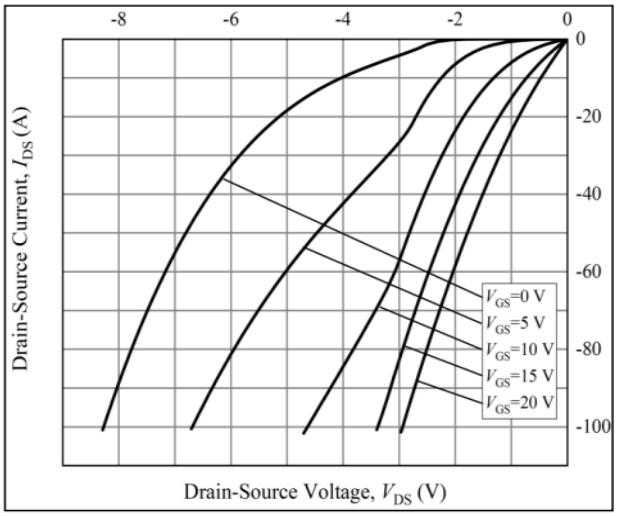


Figure 13. Typical 3rd Quadrant Characteristics at TJ = -55 ℃

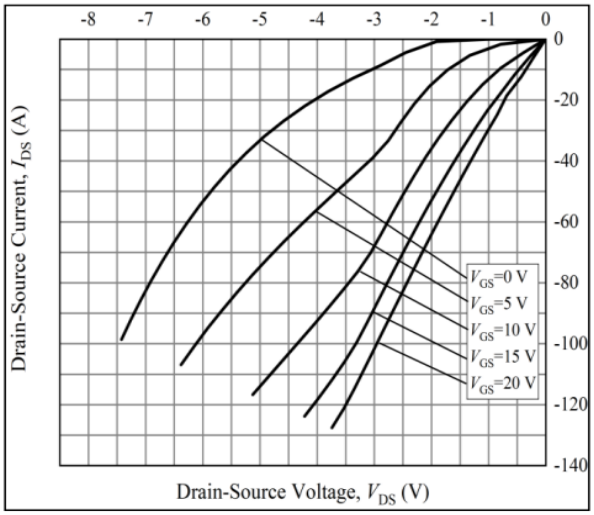


Figure 14. Typical 3rd Quadrant Characteristics at TJ = 25 ℃

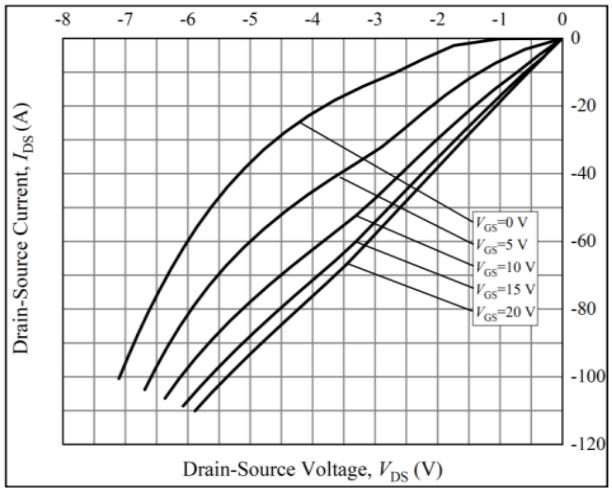


Figure 15. Typical 3rd Quadrant Characteristics at TJ = 175 ℃

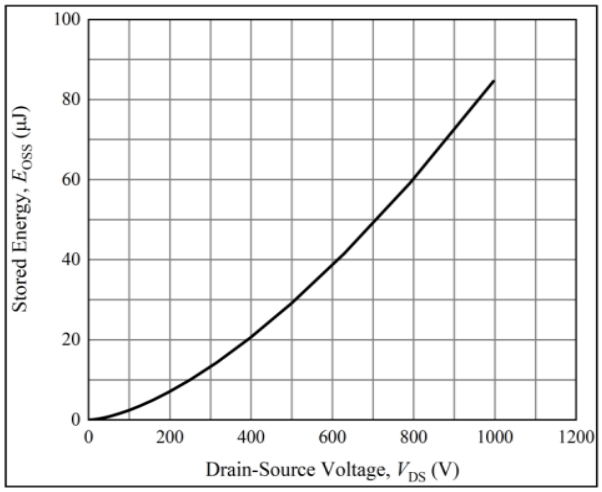


Figure 16. Typical Output Capacitor Stored Energy

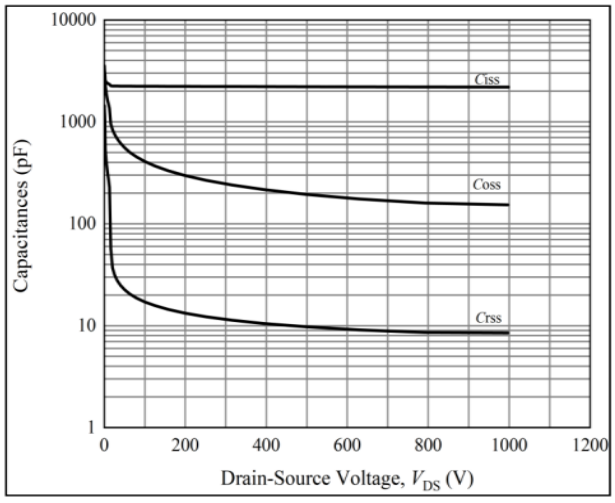


Figure 17. Typical Capacitances vs. Drain-Source Voltage

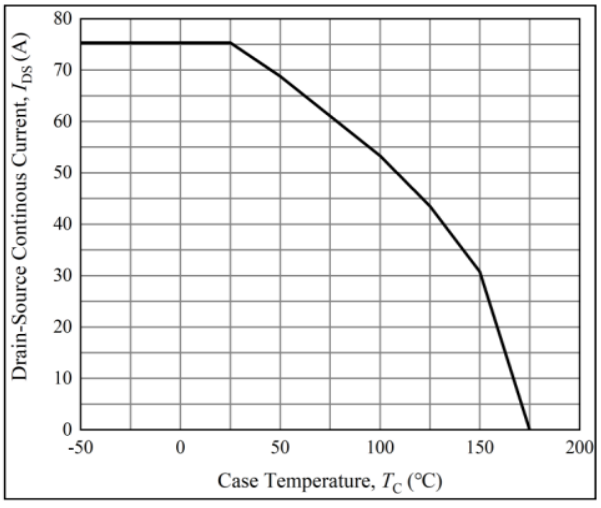


Figure 18. Continuous I_{DS} Current Derating Curve

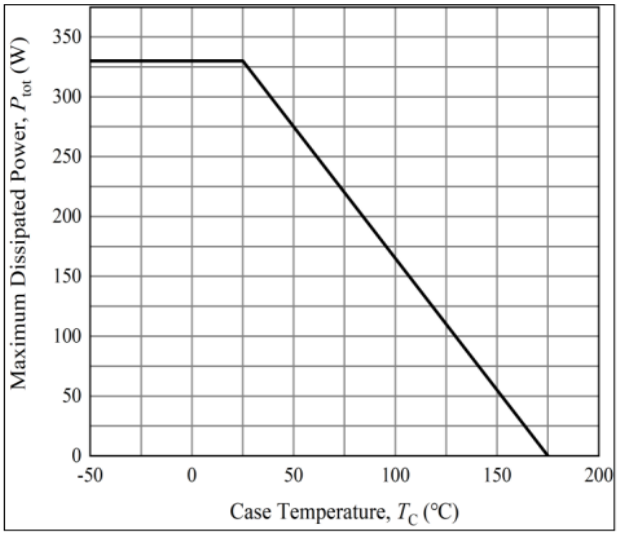


Figure 19. Power Dissipation Derating Curve

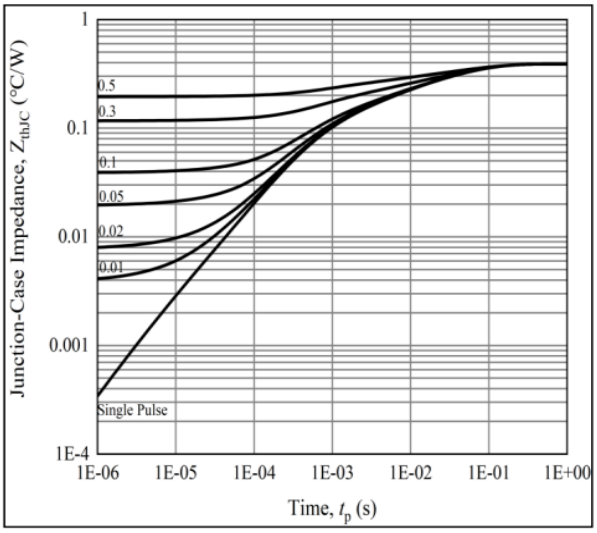


Figure 20. Typical Transient Thermal Impedance (Junction – Case) with Duty Cycle

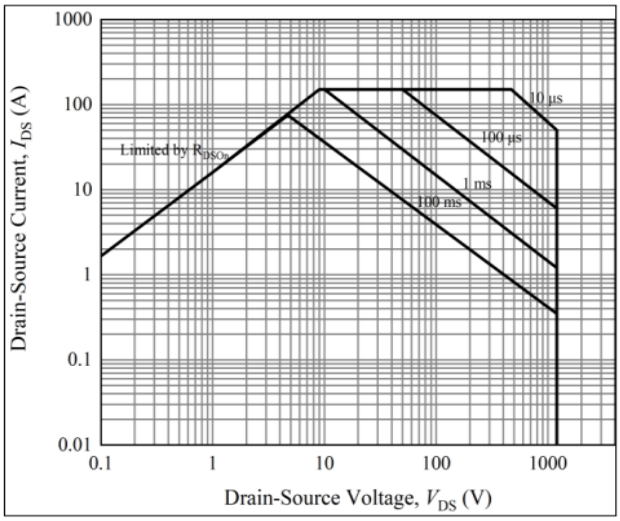
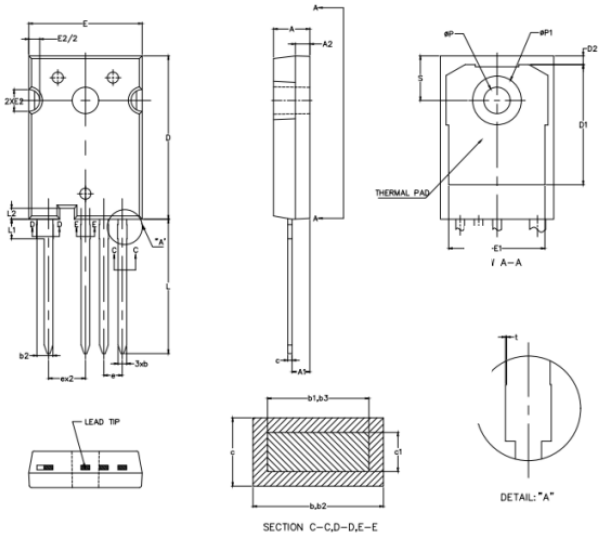


Figure 21. Safe Operate Area

Package Outline Dimensions (Unit: millimeters)

TO-247-4L



TO-247-4L					
	Min.	Max.		Min.	Max.
A	4.9	5.1	D1	16.25	16.85
A1	2.31	2.51	D2	1.05	1.35
A2	1.9	2.1	E	15.75	15.9
b	1.16	1.26	E1	13.26	-
b1	1.15	2.22	E2	2.9	3.1
b2	2.16	2.26	e	2.54BSC	
b3	2.15	2.22	L	18.3	18.6
c	0.59	0.66	L1	-	2.8
c1	0.58	0.62	L2		1.5
D	22.4	22.6	ΦP	3.5	3.7
S	6.05	6.25	ΦP1		7.4
t	0	0.15			

Revision History

Document Version	Date of release	Description of changes
Rev.A	2023.02.08	Preliminary Datasheet

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