

■ Features

- Wide Bandgap SiC MOSFET Technology.
- Low On-Resistance with High Blocking Voltage.
- Low Capacitances with High-Speed Switching.
- Low Reverse Recovery (Qrr).
- Easy to Parallel and Simple to Drive.
- Robust against Parasitic Turn on Even 0V Turn off Gate Voltage.

G2 MOSFET Technology

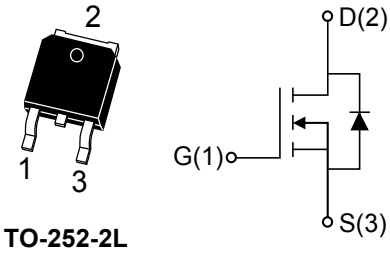
Parameter	Value	Unit
V_{DS}	1200	V
$R_{DS(on_typ@VGS=18V)}$	240	m Ω
$I_{D@VGS=18V,TC=25^{\circ}C}$	12.8	A

■ Benefits

- Reduced Switching Losses.
- Increased System Switching Frequency.
- Increased Power Density.
- Reduction of Heat Sink Requirements.
- Reduced EMI.

■ Application

- Switch Mode Power Supplies.
- High Voltage DC/DC Converters.
- Battery Chargers.
- Motor Drives.
- Pulsed Power Applications.



TO-252-2L



Maximum ratings($T_j=25^{\circ}C$, Unless otherwise specified)

Parameter	Symbol	Test Condition	Value	Unit
Drain to Source Voltage	$V_{DS,max}$	$V_{GS}=0V, I_D=500\mu A$	1200	V
Gate to Source Voltage	$V_{GS,max}$	Absolute Maximum Values	-10/+23	V
Recommended Operation Voltage of Gate to Source	$V_{GS,op}$	Recommended Operational Values	-5/+18	V
Continuous Drain Current	I_D	$V_{GS}=18V, TC=25^{\circ}C$	12.8	A
		$V_{GS}=18V, TC=100^{\circ}C$	8.8	A
Pulsed Drain Current	$I_{D(pulsed)}$	$V_{GS}=18V, TC=25^{\circ}C$	26	A
Power Dissipation	P_{tot}	$TC=25^{\circ}C, T_j=175^{\circ}C$	73.2	W
Operating and Storage Temperature	T_j, T_{stg}	—	-55 to+175	$^{\circ}C$



Thermal Characteristics

Parameter	Symbol	Value			Unit
		Min	Typ	Max	
Thermal Resistance from Junction to Case	$R_{\theta JC}$	—	2.05	—	$^{\circ}C/W$

Electrical Characteristics

Static Characteristics

Parameter	Symbol	Test Condition	Value			Unit
			Min	Typ	Max	
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS}=V_{DS}, I_D=1.4mA, T_j=25^{\circ}C$	2	2.8	4	V
		$V_{GS}=V_{DS}, I_D=1.4mA, T_j=175^{\circ}C$	—	2	—	V
Drain to Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=500\mu A$	1200	—	—	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{GS}=0V, V_{DS}=1200V, T_j=25^{\circ}C$	—	—	50	μA
Gate to Source Leakage Current	I_{GSS+}	$V_{GS}=23V, V_{DS}=0V, T_j=25^{\circ}C$	—	—	100	nA
	I_{GSS-}	$V_{GS}=-10V, V_{DS}=0V, T_j=25^{\circ}C$	—	—	100	nA
Drain to Source on Resistance	$R_{DS(on)}$	$V_{GS}=15V, I_D=5A, T_j=25^{\circ}C$	—	295	380	m Ω
		$V_{GS}=15V, I_D=5A, T_j=175^{\circ}C$	—	420	—	m Ω
		$V_{GS}=18V, I_D=5A, T_j=25^{\circ}C$	—	240	312	m Ω
		$V_{GS}=18V, I_D=5A, T_j=175^{\circ}C$	—	360	—	m Ω
Transconductance	g_{fs}	$V_{DS}=20V, I_{DS}=5A, T_j=25^{\circ}C$	—	2.9	—	S
		$V_{DS}=20V, I_{DS}=5A, T_j=175^{\circ}C$	—	2.8	—	S



Electrical Characteristics

Dynamic Characteristics

Parameter	Symbol	Test Condition	Value			Unit
			Min	Typ	Max	
Input Capacitance	C_{iss}	VGS=0V, VDS=1000V, f=1MHz, VAC=25mV	—	481	—	pF
Output Capacitance	C_{oss}		—	19.5	—	pF
Reverse Transfer Capacitance	C_{rss}		—	2.2	—	pF
Reverse Transfer Capacitance	E_{oss}	VGS=-5V/18V, VDS=800V, ID=5A, Tj=25°C	—	9.6	—	μJ
Gate-Source Charge	Q_{gs}		—	2.9	—	nC
Gate-Drain Charge	Q_{gd}		—	4.4	—	nC
Total Gate Charge	Q_g		—	17.5	—	nC
Gate Resistance	R_g	VAC=25mV, f=1MHz	—	7.2	—	Ω

Switching Characteristics

Parameter	Symbol	Test Condition	Value			Unit
			Min	Typ	Max	
Turn-On Delay Time	$t_{d(on)}$	VGS=-5V/18V, VDD=800V, ID=5A, RG(ext)=2.5Ω, RL=160Ω	—	5.5	—	ns
Rise Time	t_r		—	4.3	—	ns
Turn-Off Delay Time	$t_{d(off)}$		—	16.6	—	ns
Fall Time	t_f		—	5.1	—	ns
Turn-On Switching Energy	E_{on}	VDS=800V, VGS=-5V/18V	—	82	—	μJ
Turn-Off Switching Energy	E_{off}	ID=5A, RG(ext)=2.5Ω, L=100μH	—	12	—	μJ

Reverse Diode Characteristics

Parameter	Symbol	Test Condition	Value			Unit
			Min	Typ	Max	
Diode Forward Voltage	V_{SD}	VGS=-5V, ISD=2.5A, Tj=25°C	—	4.55	—	V
		VGS=-5V, ISD=2.5A, Tj=175°C	—	3.6	—	V
Continuous Diode Forward Current	I_S	VGS=0V, Tj=25°C	—	—	12.8	A
Reverse Recovery Time	t_{rr}	VGS=0V, ISD=5A, VR=800V, Tj=25°C	—	11.4	—	ns
Reverse Recovery Charge	Q_{rr}		—	16.2	—	nC
Peak Reverse Recovery Current	I_{rrm}		—	1.5	—	A



Typical Performance

Fig1. Output Characteristics $T_J = -55^\circ\text{C}$

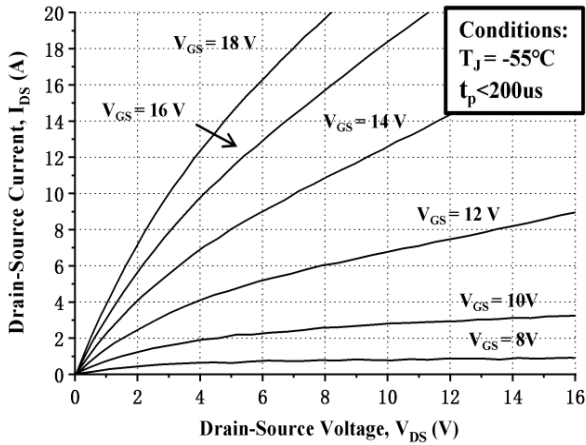


Fig2. Output Characteristics $T_J = 25^\circ\text{C}$

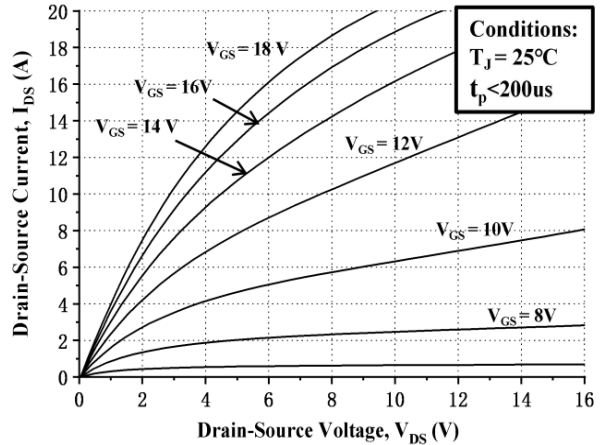


Fig3. Output Characteristics $T_J = 175^\circ\text{C}$

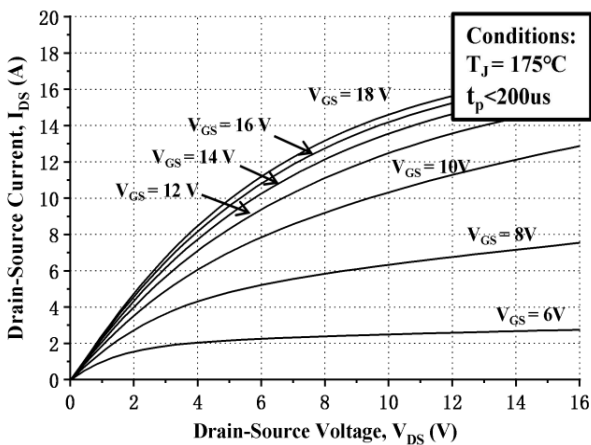


Fig4. Normalized On-Resistance vs. Temperature

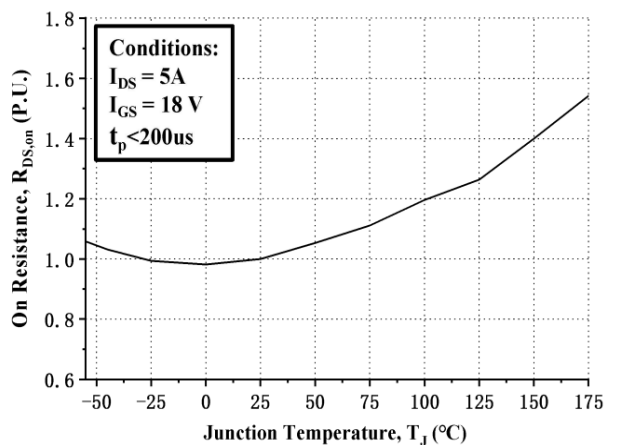


Fig5. On-Resistance vs. Drain Current For Various Temperatures

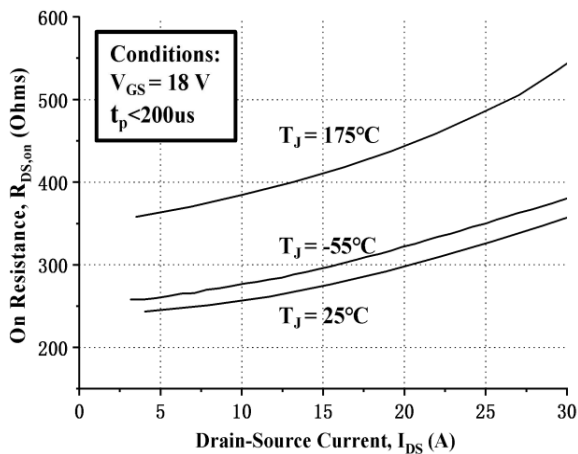
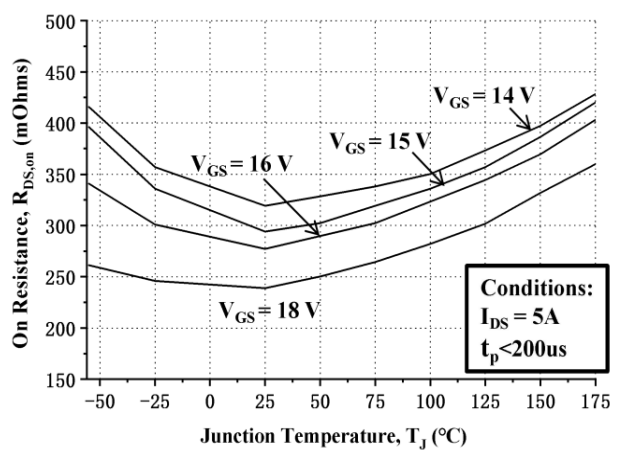


Fig6. On-Resistance vs. Temperature For Various Gate Voltage



Typical Performance

Fig7. Transfer Characteristic for Various Junction Temperatures

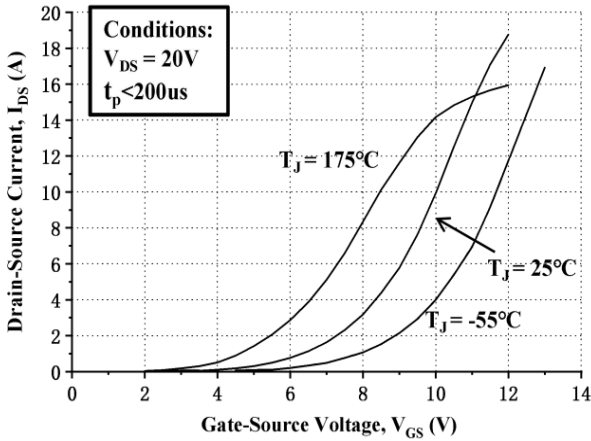


Fig8. Body Diode Characteristic at -55°C

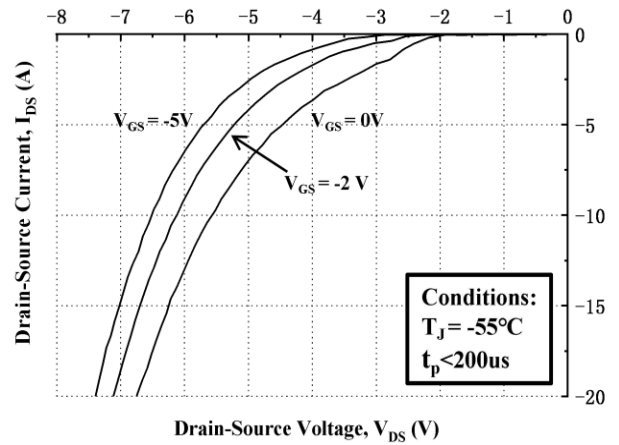


Fig9. Body Diode Characteristic at 25°C

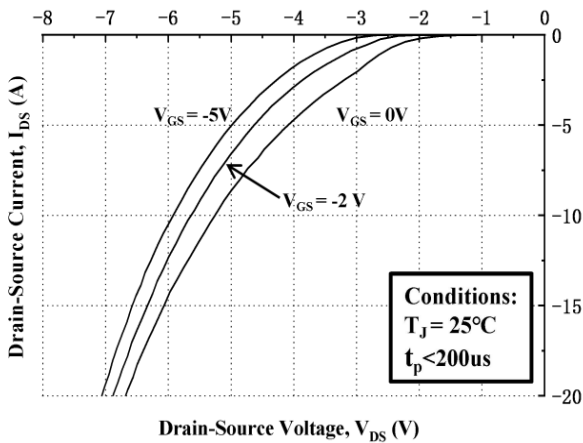


Fig10. Body Diode Characteristic at 175°C

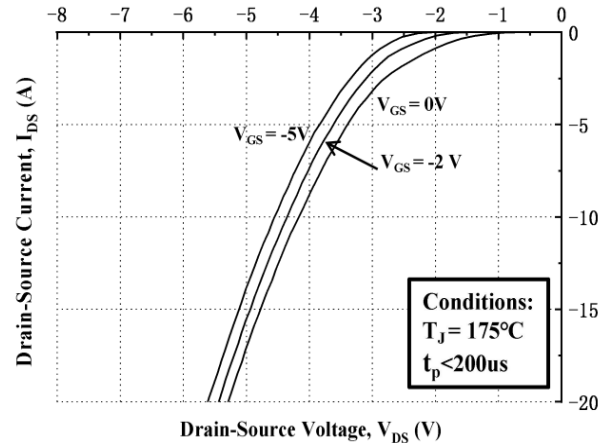


Fig11. Threshold Voltage vs. Temperature

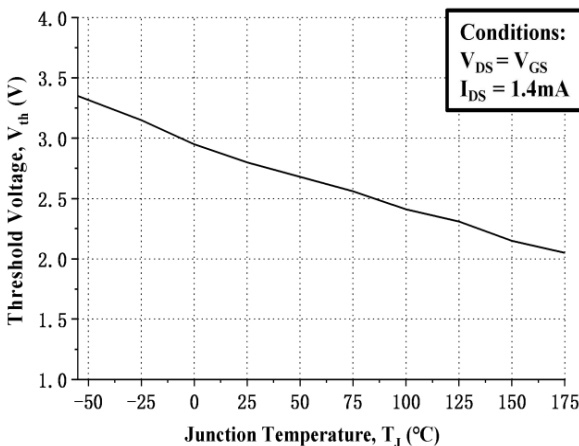
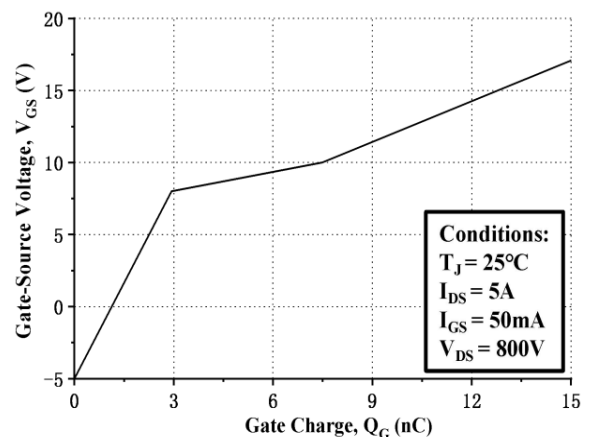


Fig12. Gate Charge Characteristics



Typical Performance

Fig13. 3rd Quadrant Characteristic at -55°C

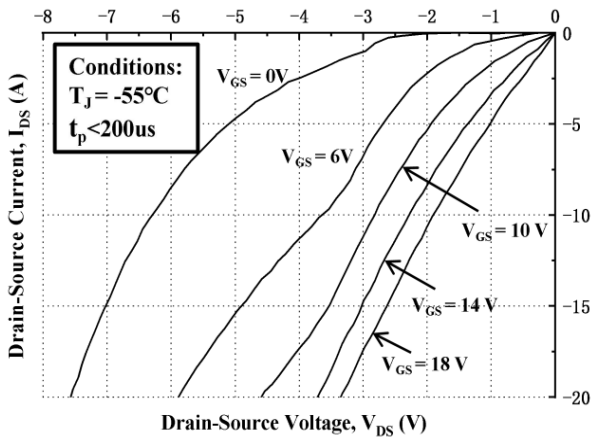


Fig14. 3rd Quadrant Characteristic at 25°C

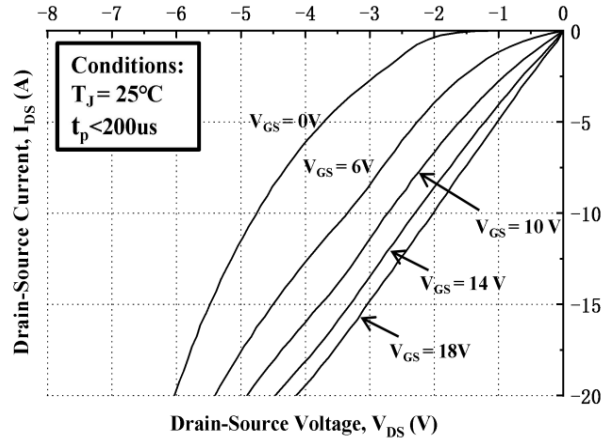


Fig15. 3rd Quadrant Characteristic at 175°C

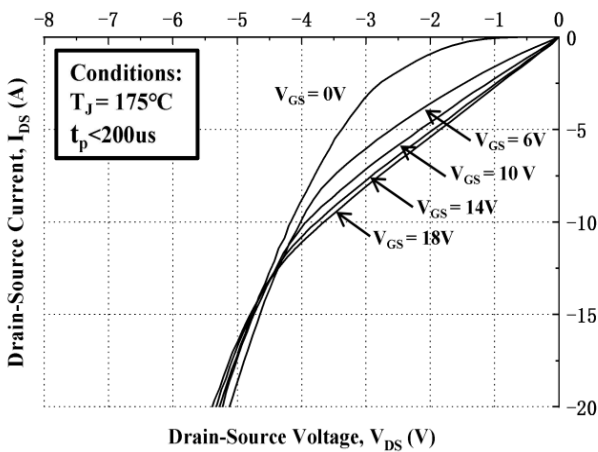


Fig16. Output Capacitor Stored Energy

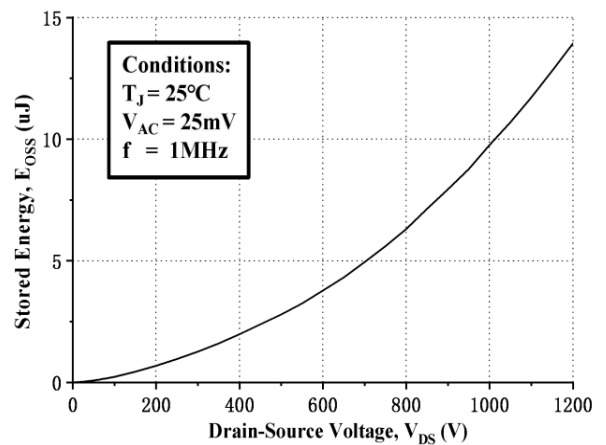


Fig17. Capacitances vs. Drain-Source Voltage (0-200V)

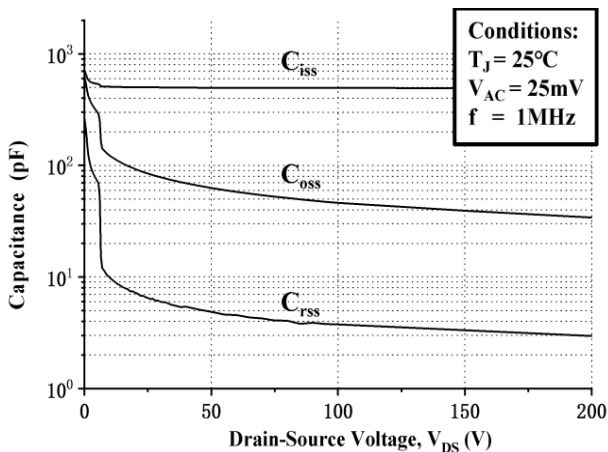
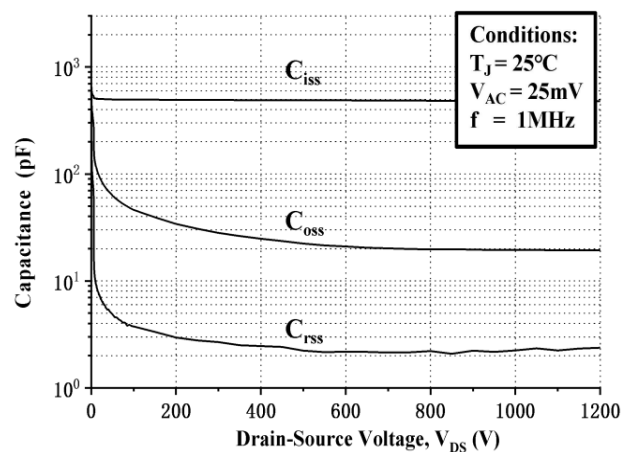


Fig18. Capacitances vs. Drain-Source Voltage (0-800V)



Typical Performance

Fig19. Continuous Drain Current vs. Case Temperature

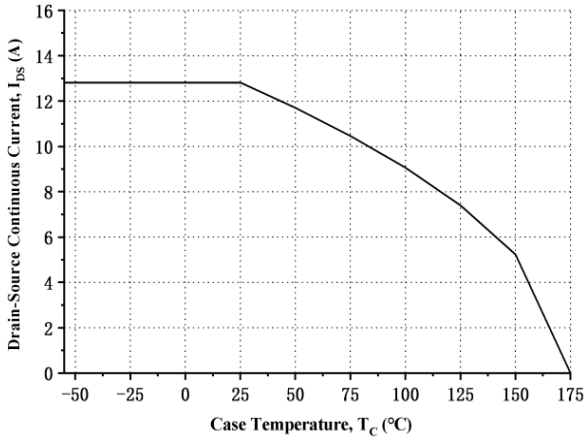


Fig20. Maximum Power Dissipation vs. Case Temperature

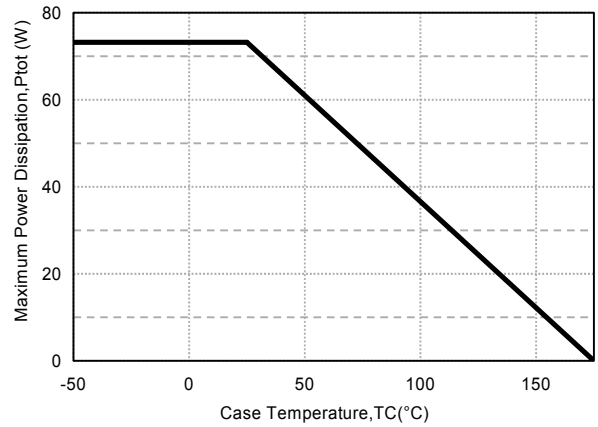


Fig21. Transient Thermal Impedance (Junction-Case)

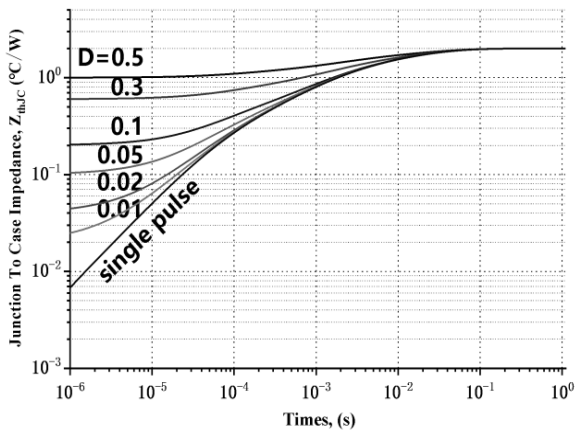
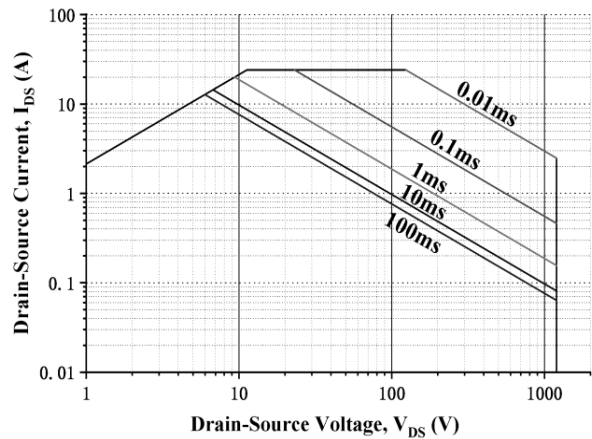
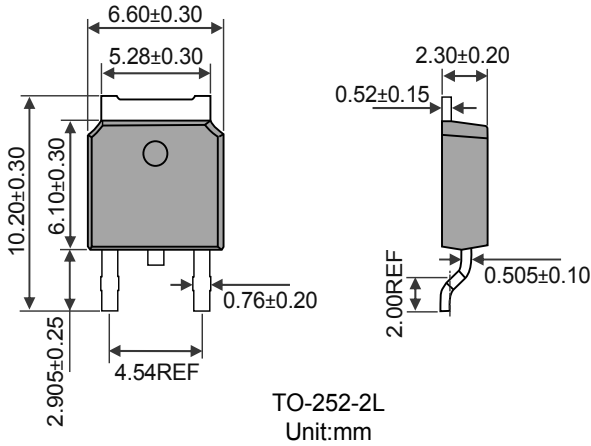


Fig22. Safe Operating Area

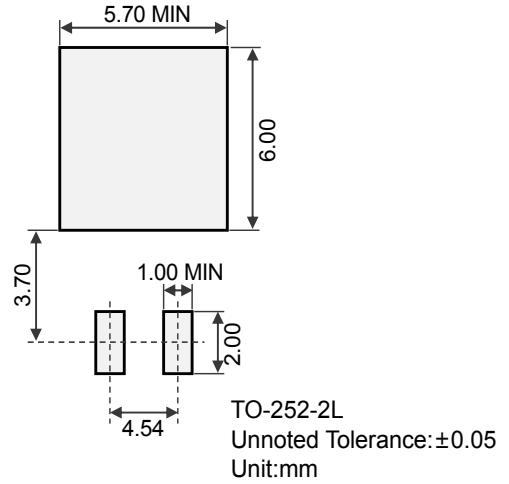


Package Outline Dimensions & Suggested Solder Pad Layout

Package Outline Dimensions



Suggested Solder Pad Layout



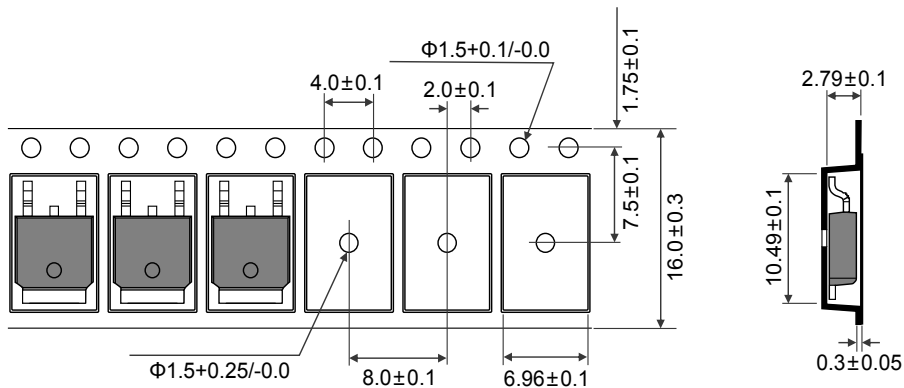
Marking Information



“MHCHXM”= Product Logo
 “Marking Code”= The Following
 “XXXX”= Date Code Marking

Marking Code	Part Number
C120N240S2	HXMC120N240S2

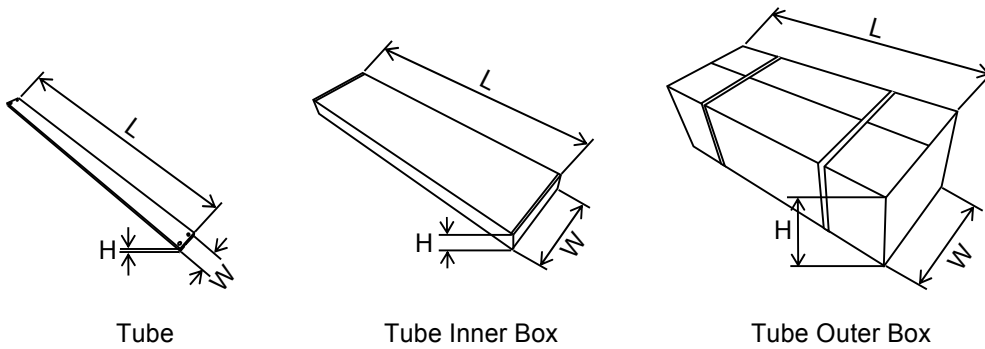
Reel Tape Dimensions (Dimensions in mm)



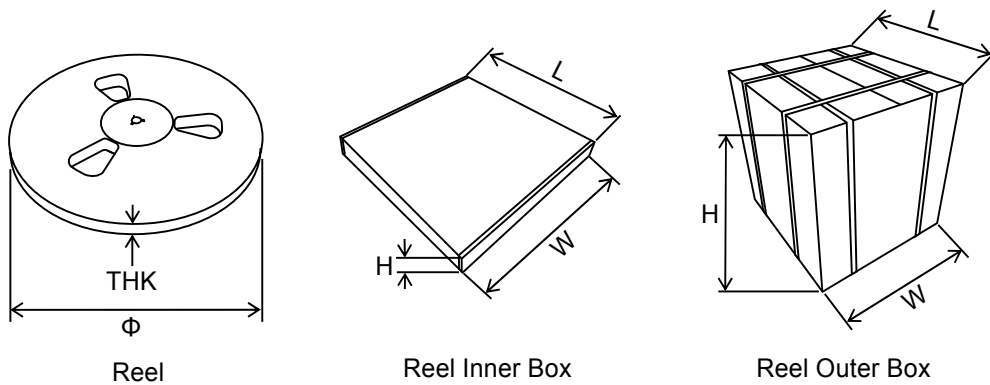
Packing Information

Packaging	Part Number	Quantity(pcs)	Size(mm)
Tube	Tube	80	L540×W20×H5
	Inner Box	4000	L570×W115×H55
	Outer Box	20000	L595×W320×H135
Reel	Reel	3000	Φ330×THK17
	Inner Box	3000	L350×W340×H25
	Outer Box	30000	L355×W300×H360

Packaging:Tube



Packaging:Reel



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