HXMC120N240S2

N-Channel SiC Power MOSFET

www.jshxm.com

■ Features

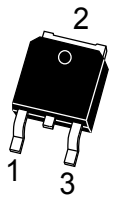
- Wide Bandgap SiC MOSFET Technology.
- Low On-Resistance with High Blocking Voltage.
- Low Capacitances with High-Speed Switching.
- Low Reverse Recovery (Qrr).
- Easy to Parallel and Simple to Drive.
- Robust against Parasitic Turn on Even 0V Turn off Gate Voltage.

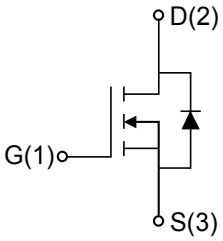
G2 MOSFET Technology

Parameter	Value	Unit
V_{DS}	1200	V
$R_{DS(on)\_typ@VGS=18V}$	240	mΩ
$I_{D@VGS=18V,TC=25°C}$	12.8	A

■ Benefits

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





TO-252-2L

■ Application

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

RoHS Reach

Maximum ratings(Tj=25°C, Unless otherwise specified)

Parameter	Symbol	Test Condition	Value	Unit
Drain to Source Voltage	$V_{DS,max}$	VGS=0V,ID=500μA	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	VGS=18V,TC=25°C	12.8	A
		VGS=18V,TC=100°C	8.8	A
Pulsed Drain Current	$I_{D(pulsed)}$	VGS=18V,TC=25°C	26	A
Power Dissipation	P_{tot}	TC=25°C,Tj=175°C	73.2	W
Operating and Storage Temperature	T_j,T_{stg}	—	-55 to+175	°C

Thermal Characteristics

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

Electrical Characteristics

Static Characteristics

Parameter	Symbol	Test Condition	Value			Unit
			Min	Typ	Max	
Gate Threshold Voltage	$V_{GS(th)}$	VGS=VDS,ID=1.4mA, Tj=25°C	2	2.8	4	V
		VGS=VDS,ID=1.4mA, Tj=175°C	—	2	—	V
Drain to Source Breakdown Voltage	$V_{(BR)DSS}$	VGS=0V,ID=500μA	1200	—	—	V
Zero Gate Voltage Drain Current	I_{DSS}	VGS=0V,VDS=1200V, Tj=25°C	—	—	50	μA
Gate to Source Leakage Current	I_{GSS+}	VGS=23V,VDS=0V, Tj=25°C	—	—	100	nA
	I_{GSS-}	VGS=-10V,VDS=0V, Tj=25°C	—	—	100	nA
Drain to Source on Resistance	$R_{DS(on)}$	VGS=15V,ID=5A, Tj=25°C	—	295	380	mΩ
		VGS=15V,ID=5A, Tj=175°C	—	420	—	mΩ
		VGS=18V,ID=5A, Tj=25°C	—	240	312	mΩ
		VGS=18V,ID=5A, Tj=175°C	—	360	—	mΩ
Transconductance	g_{fs}	VDS=20V, IDS=5A, Tj=25°C	—	2.9	—	S
		VDS=20V, IDS=5A, Tj=175°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}		—	9.6	—	μJ
Gate-Source Charge	Q_{gs}	VGS=-5V/18V,VDS=800V, ID=5A,Tj=25°C	—	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 ID=5A,RG(ext)=2.5Ω,L=100μH	—	82	—	μJ
Turn-Off Switching Energy	E_{off}		—	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 Tj=-55°C

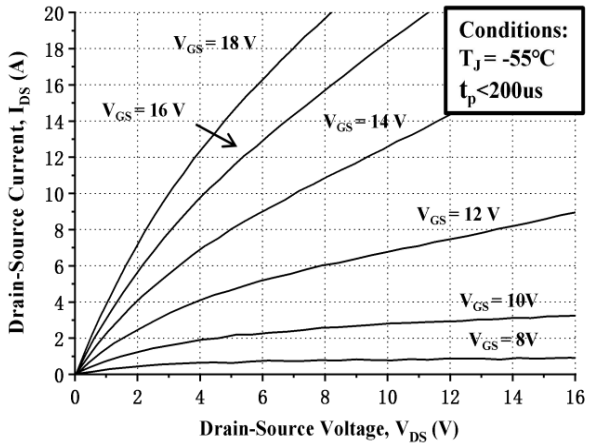


Fig2. Output Characteristics Tj=25°C

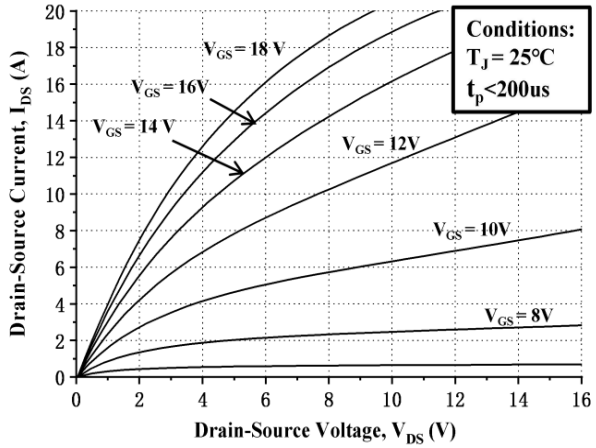


Fig3. Output Characteristics Tj=175°C

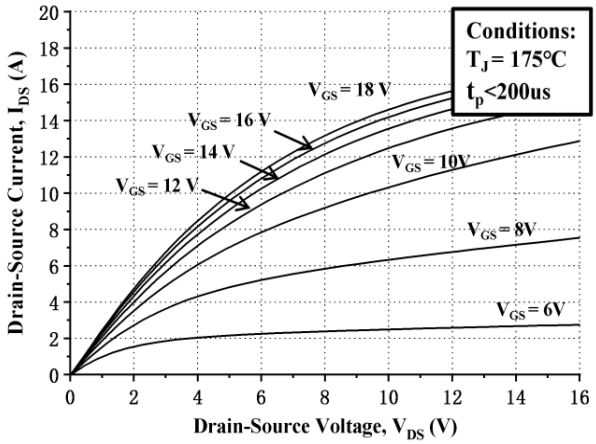


Fig4. Normalized On-Resistance vs. Temperature

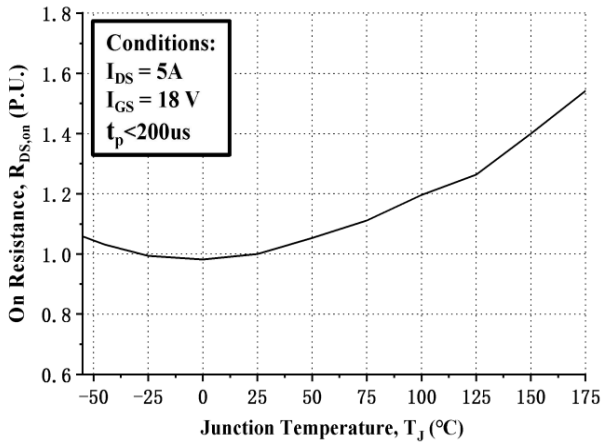


Fig5. On-Resistance vs. Drain Current For Various Temperatures

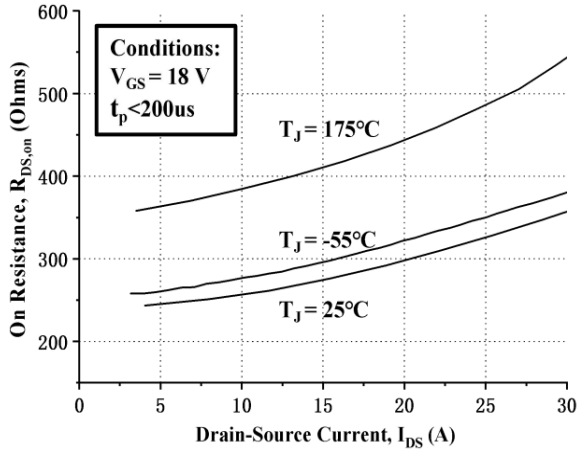
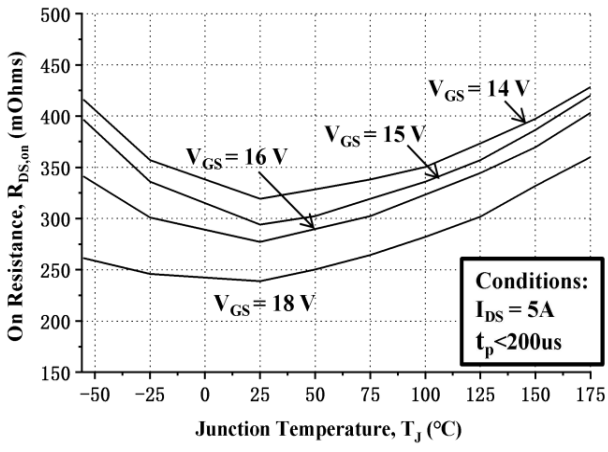


Fig6. On-Resistance vs. Temperature For Various Gate Voltage



Typical Performance

Fig7. Transfer Characteristic for Various Junction Temperatures

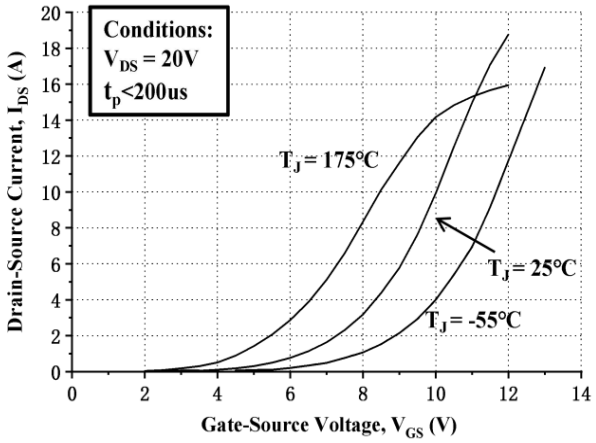


Fig8. Body Diode Characteristic at -55°C

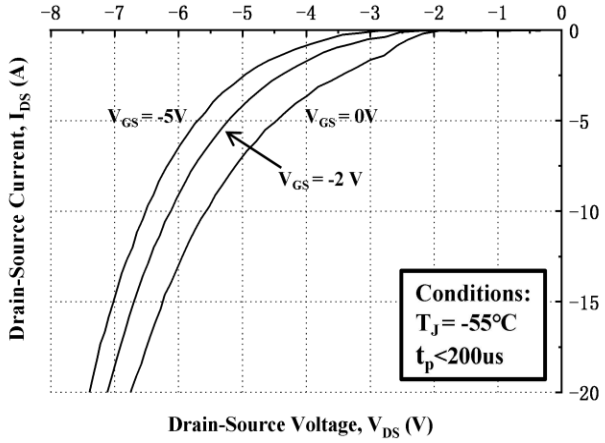


Fig9. Body Diode Characteristic at 25°C

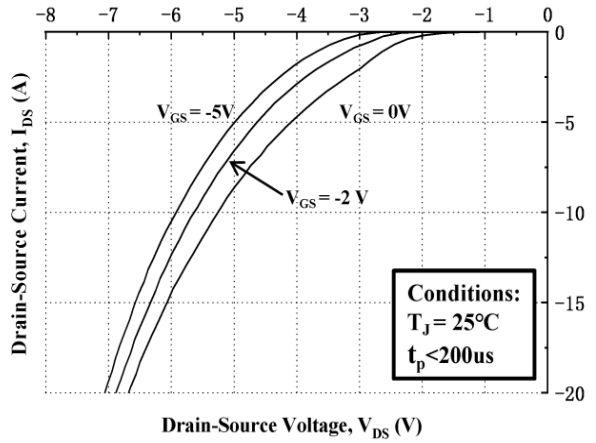


Fig10. Body Diode Characteristic at 175°C

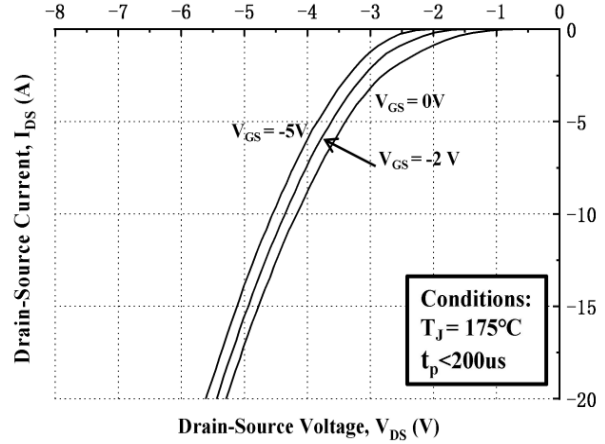


Fig11. Threshold Voltage vs. Temperature

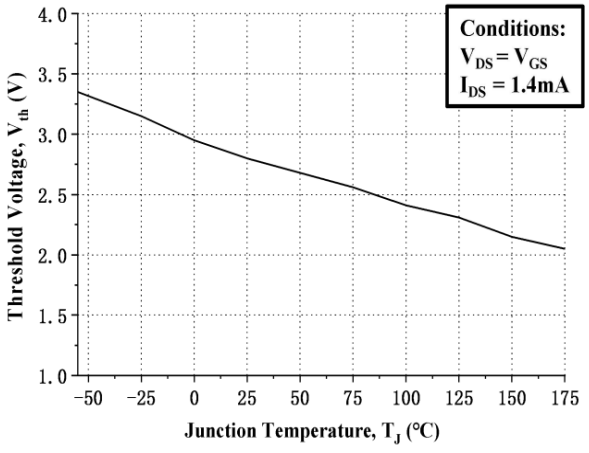
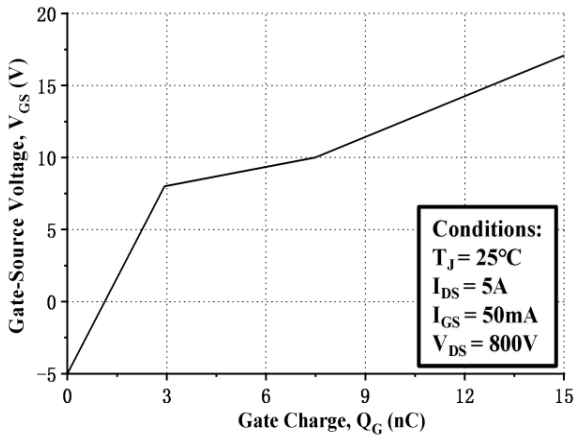


Fig12. Gate Charge Characteristics



Typical Performance

Fig13. 3rd Quadrant Characteristic at -55°C

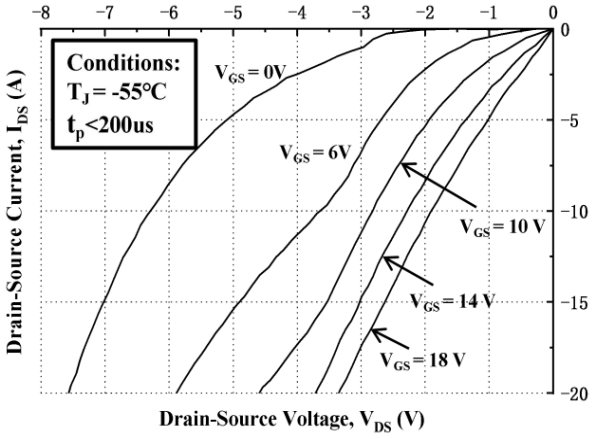


Fig14. 3rd Quadrant Characteristic at 25°C

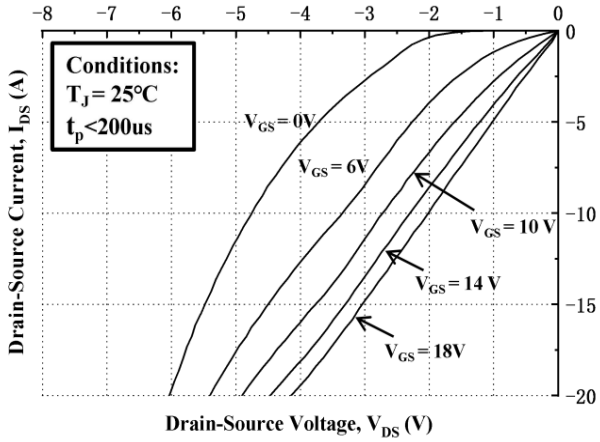


Fig15. 3rd Quadrant Characteristic at 175°C

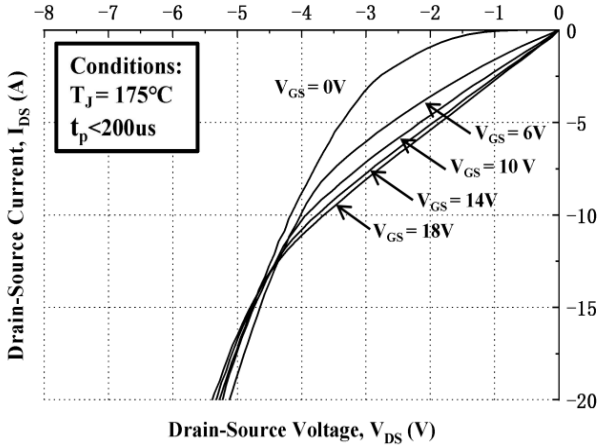


Fig16. Output Capacitor Stored Energy

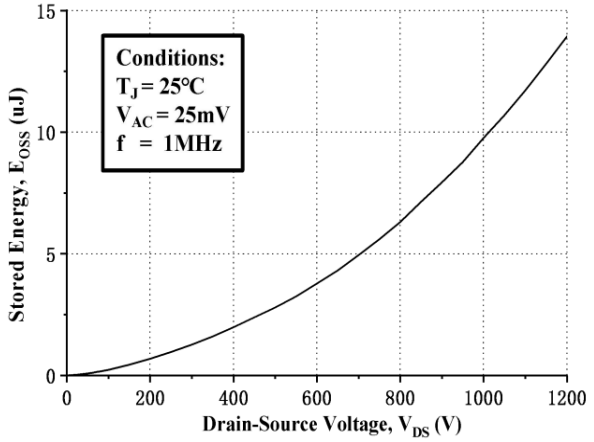


Fig17. Capacitances vs. Drain-Source Voltage (0-200V)

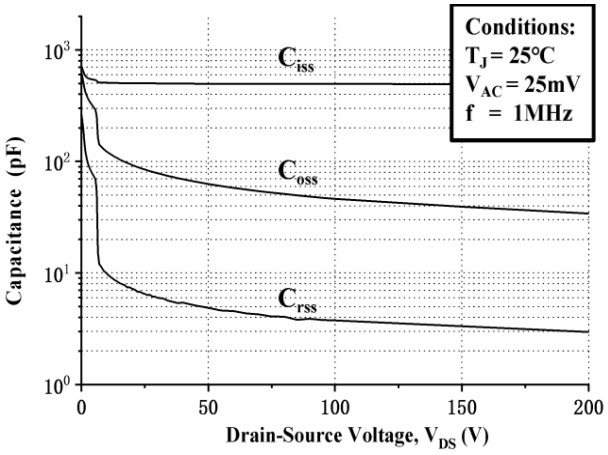
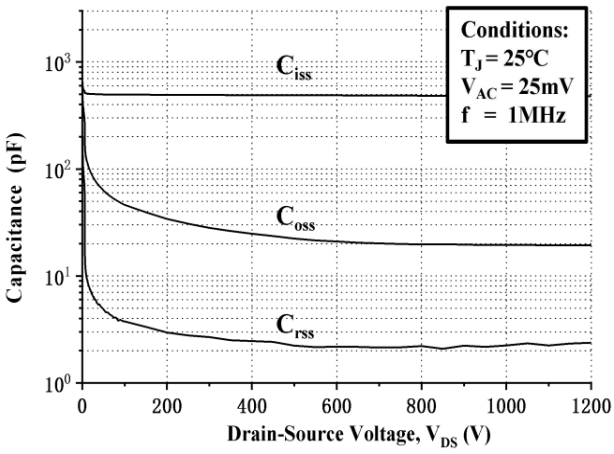


Fig18. Capacitances vs. Drain-Source Voltage (0-800V)



Typical Performance

Fig19.Continuous Drain Current vs. Case Temperature

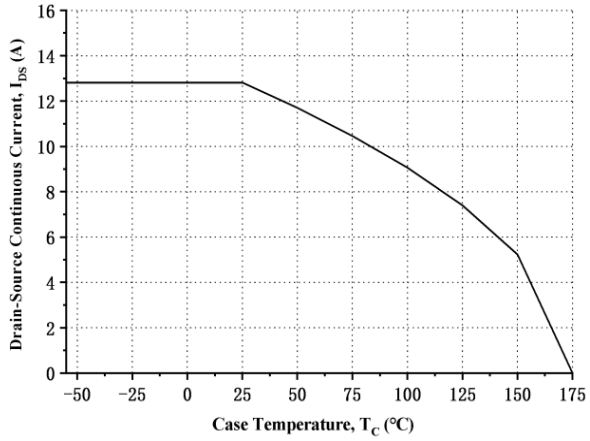


Fig20.Maximum Power Dissipation vs. Case Temperature

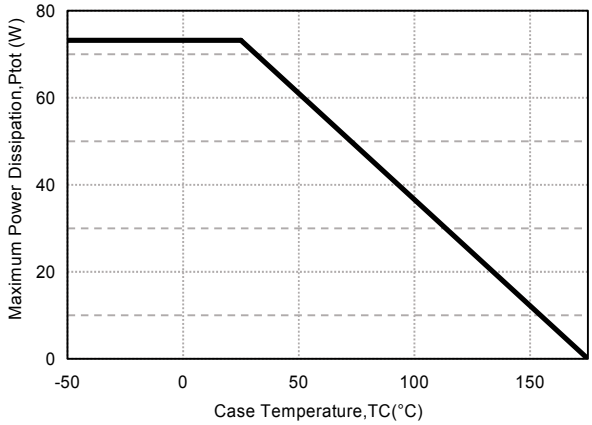


Fig21.Transient Thermal Impedance (Junction-Case)

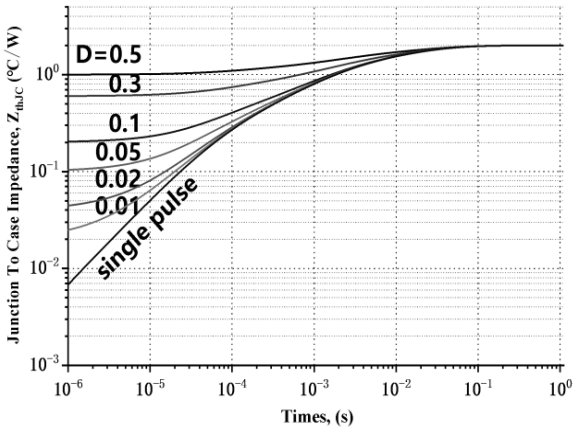
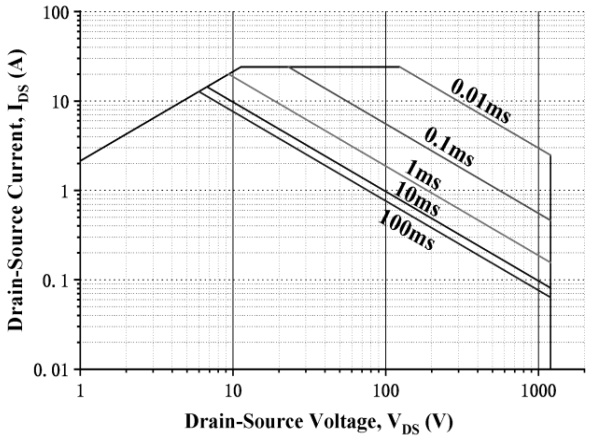
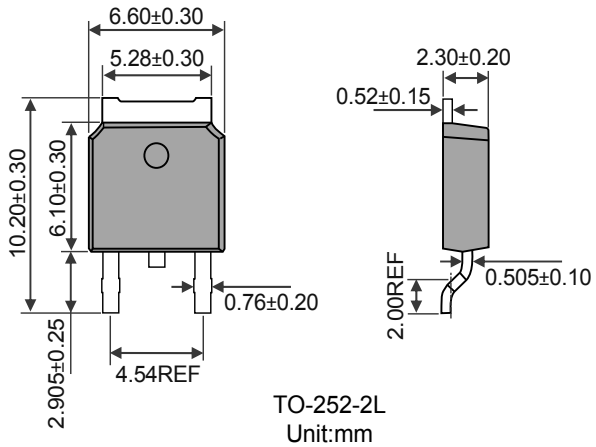


Fig22.Safe Operating Area



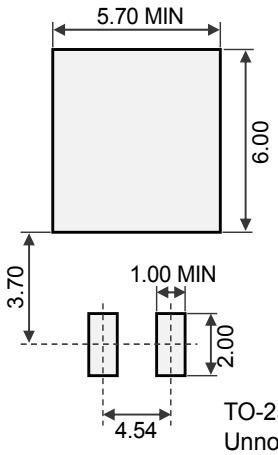
Package Outline Dimensions & Suggested Solder Pad Layout

Package Outline Dimensions



TO-252-2L
Unit:mm

Suggested Solder Pad Layout



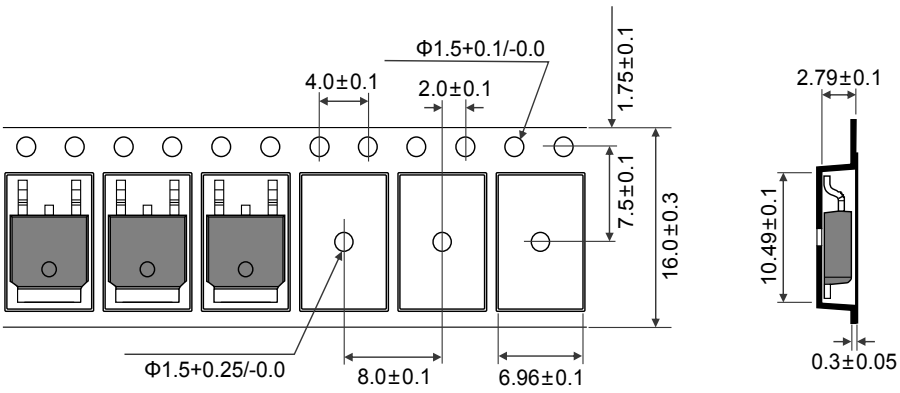
TO-252-2L
Unnoted Tolerance:±0.05
Unit:mm

Marking Information

"MHCHXM"= Product Logo
"Marking Code"= The Following
"XXXX"= Date Code Marking

Marking Code	Part Number
C120N240S2	HXMC120N240S2

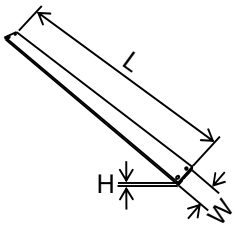
Reel Tape Dimensions (Dimensions in mm)



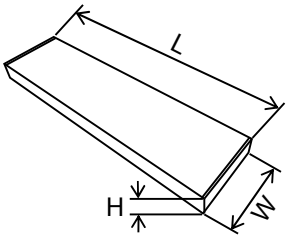
Packing Information

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

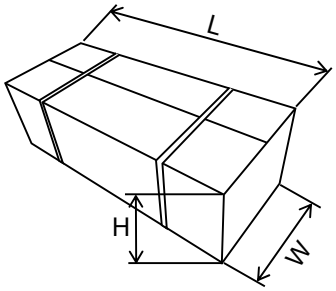
Packaging:Tube



Tube

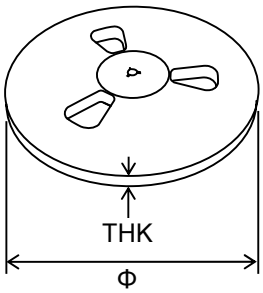


Tube Inner Box

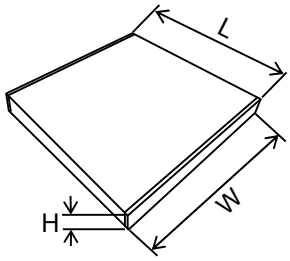


Tube Outer Box

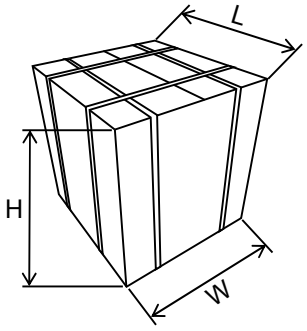
Packaging:Reel



Reel



Reel Inner Box



Reel Outer Box

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1.Above specification may be changed without notice. MHCHXM will reserve authority on material change for above specification.

2.The graphs shown in this datasheet are representing typical data only and do not show guaranteed values.

3.When using this product, please observe the absolute maximum ratings and the instructions for use outlined in these specification sheets. MHCHXM assumes no responsibility for any damage resulting from use of the product which does not comply with the absolute maximum ratings and the instructions included in these specification sheets.

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