HXMC80N380S1

N-Channel SiC Power MOSFET

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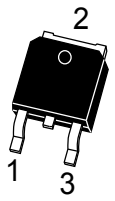
■ Features

- 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.

Parameter	Value	Unit
V_{DS}	800	V
$R_{DS(on)\_typ@VGS=18V}$	380	mΩ
$I_{D@VGS=15V,TC=25°C}$	9.3	A

■ Benefits

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



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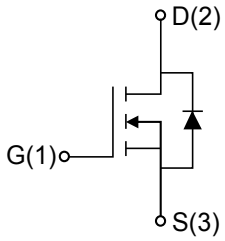


■ Application

- 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	800	V
Gate to Source Voltage	$V_{GS,max}$	Absolute Maximum Values	-10/+22	V
Recommended Operation Voltage of Gate to Source	$V_{GS.op}$	Recommended Operational Values	0/+18	V
Continuous Drain Current	I_D	VGS=15V,TC=25°C	9.3	A
		VGS=15V,TC=175°C	6.6	A
Pulsed Drain Current	$I_{D(pulsed)}$	VGS=15V,TC=25°C	19	A
Power Dissipation	P_{tot}	TC=25°C,Tj=175°C	52	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	$R_{\theta JC}$	—	2.9	—	°C/W

Electrical Characteristics

Static Characteristics

Parameter	Symbol	Test Condition	Value			Unit
			Min	Typ	Max	
Gate Threshold Voltage	$V_{GS(th)}$	VGS=VDS,ID=1.3mA, Tj=25°C	2.7	—	4.5	V
Drain to Source Breakdown Voltage	$V_{(BR)DSS}$	VGS=0V,ID=500μA	800	—	—	V
Zero Gate Voltage Drain Current	I_{DSS}	VGS=0V,VDS=800V, Tj=25°C	—	—	10	μA
Gate to Source Leakage Current	I_{GSS+}	VGS=22V,VDS=0V, Tj=25°C	—	—	250	nA
	I_{GSS-}	VGS=-10V,VDS=0V, Tj=25°C	—	—	-250	nA
Drain to Source on Resistance	$R_{DS(on)}$	VGS=15V,ID=3.6A, Tj=25°C	—	580	720	mΩ
		VGS=15V,ID=3.6A, Tj=175°C	—	460	—	mΩ
		VGS=18V,ID=3.6A, Tj=25°C	—	380	550	mΩ
		VGS=18V,ID=3.6A, Tj=175°C	—	430	—	mΩ

Electrical Characteristics

Dynamic Characteristics

Parameter	Symbol	Test Condition	Value			Unit
			Min	Typ	Max	
Input Capacitance	C_{iss}	VGS=0V,VDS=500V, f=100KHz,Tj=25°C	—	190	—	pF
Output Capacitance	C_{oss}		—	15	—	pF
Reverse Transfer Capacitance	C_{rss}		—	1.65	—	pF
Gate-Source Charge	Q_{gs}	VGS=0/15V,VDS=500V, ID=3.6A,Tj=25°C	—	9.5	—	nC
Gate-Drain Charge	Q_{gd}		—	3	—	nC
Total Gate Charge	Q_g		—	27	—	nC
Gate Resistance	R_g	VAC=25mV,f=1MHz	—	7.5	—	Ω

Switching Characteristics

Parameter	Symbol	Test Condition	Value			Unit
			Min	Typ	Max	
Turn-On Delay Time	$t_{d(on)}$	VGS=0/18V,VDD=500V, ID=3.6A, Rg=10Ω	—	15	—	ns
Rise Time	t_r		—	39	—	ns
Turn-Off Delay Time	$t_{d(off)}$		—	16	—	ns
Fall Time	t_f		—	69	—	ns

Reverse Diode Characteristics

Parameter	Symbol	Test Condition	Value			Unit
			Min	Typ	Max	
Diode Forward Voltage	V_{SD}	VGS=0V,ISD=2.1A, Tj=25°C	—	4.5	—	V
Continuous Diode Forward Current	I_S	VGS=0V,Tj=25°C	—	7	—	A
Reverse Recovery Time	t_{rr}	VGS=0V,ISD=3.6A, VR=500V,di/dt=850A/us, Tj=25°C	—	11	—	ns
Reverse Recovery Charge	Q_{rr}		—	35	—	nC
Peak Reverse Recovery Current	I_{rrm}		—	5.5	—	A

Typical Performance

Fig1. Output Characteristics Tj=25°C

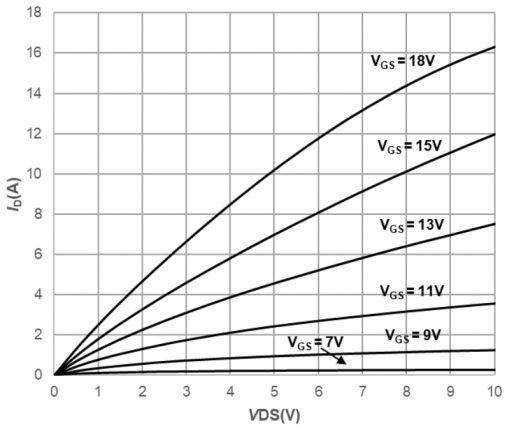


Fig2. Output Characteristics Tj=175°C

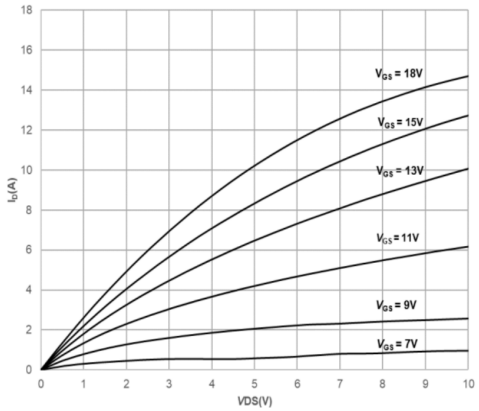


Fig3. Output Characteristics Tj= -40°C

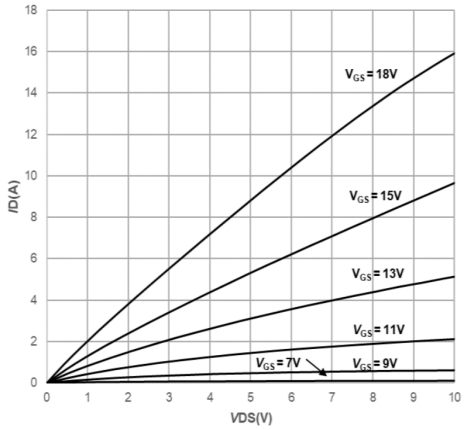


Fig4. Typical Transfer Characteristics

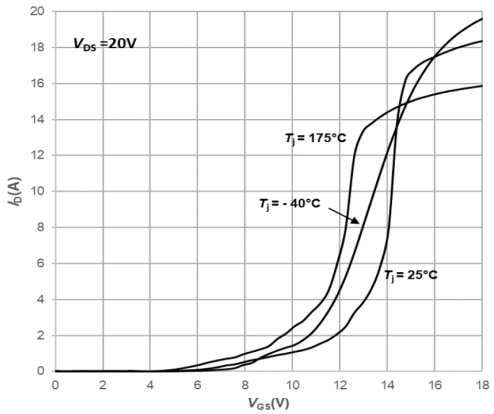


Fig5. Normalized On-Resistance vs. Temperature

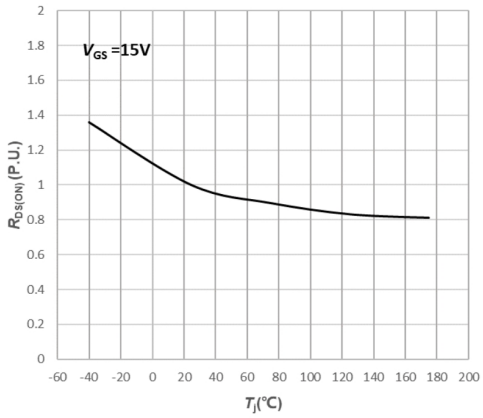
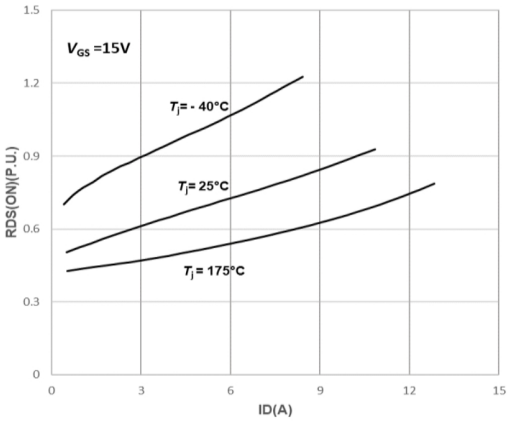


Fig6. Normalized On-Resistance vs. Drain Current For Various Temperatures



Typical Performance

Fig7. Normalized Threshold Voltage vs. Temperature

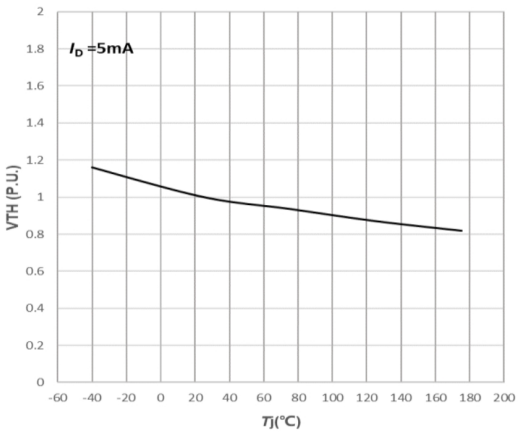


Fig8. Capacitances vs. Drain-Source Voltage (0-200V)

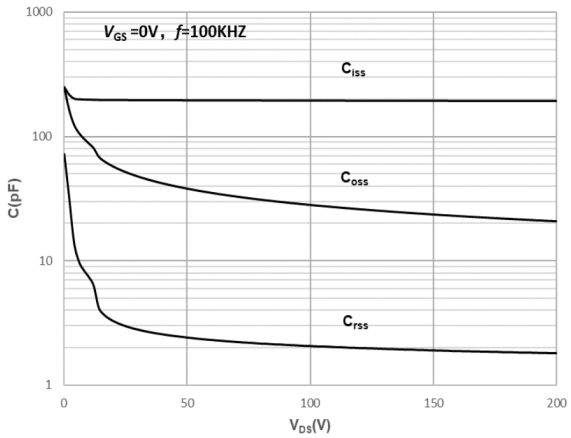


Fig9. Capacitances vs. Drain-Source Voltage (0-600V)

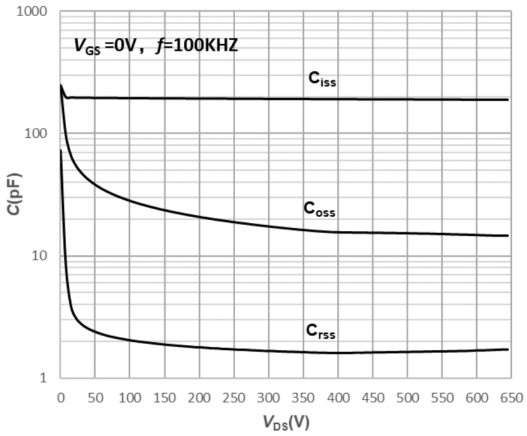


Fig10.Maximum Power Dissipation vs. Case Temperature

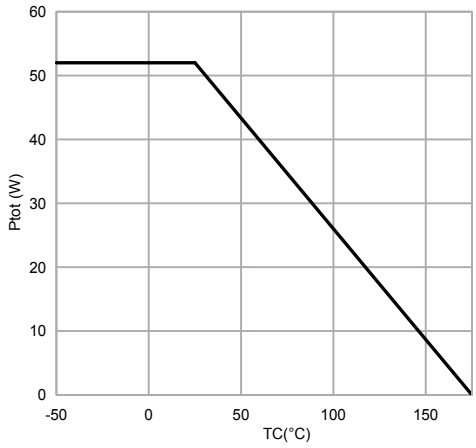
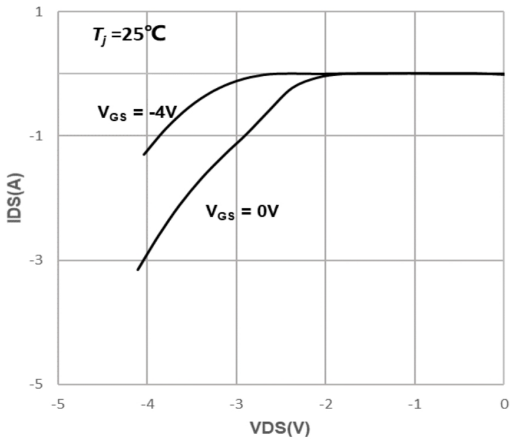
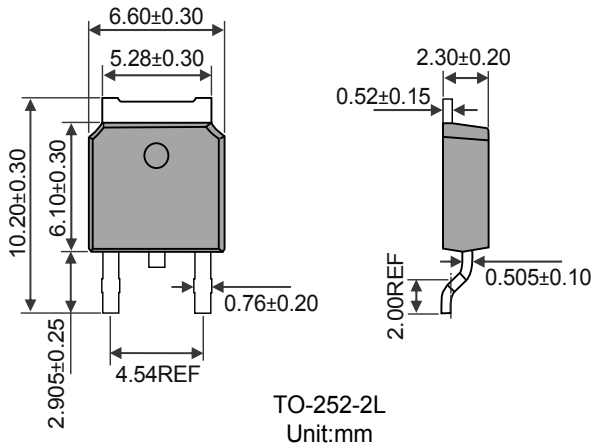


Fig11. Body Diode Characteristics



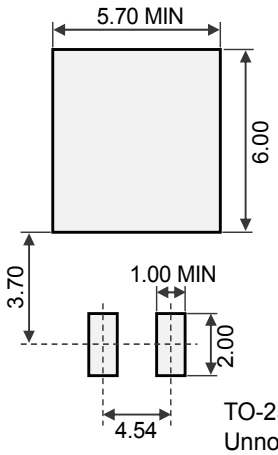
Package Outline Dimensions & Suggested Solder Pad Layout

Package Outline Dimensions



TO-252-2L
Unit:mm

Suggested Solder Pad Layout



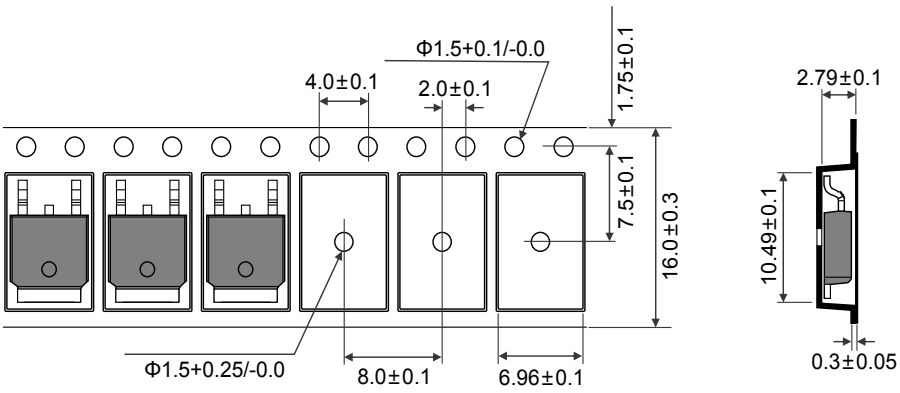
TO-252-2L
Unnoted Tolerance:±0.05
Unit:mm

Marking Information

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

Marking Code	Part Number
C80N380S1	HXMC80N380S1

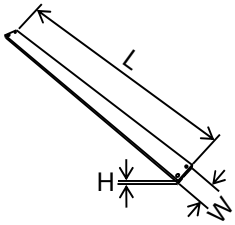
Reel Tape Dimensions (Dimensions in mm)



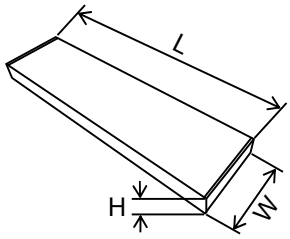
Packing Information

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

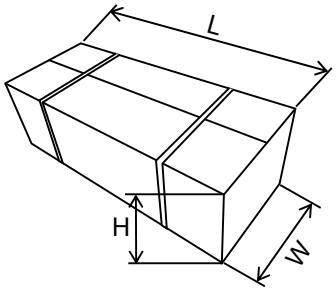
Packaging:Tube



Tube

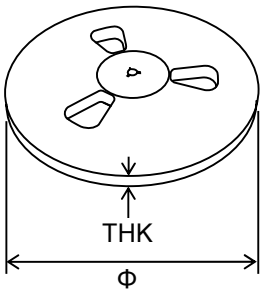


Tube Inner Box

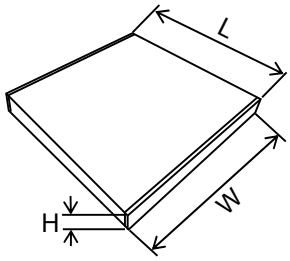


Tube Outer Box

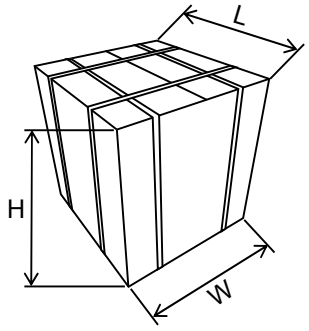
Packaging:Reel



Reel



Reel Inner Box



Reel Outer Box

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