

### ■ 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.

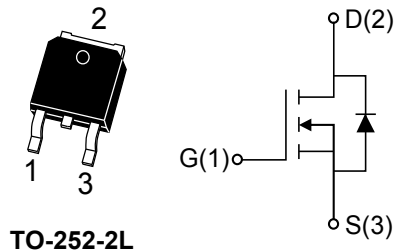
Parameter	Value	Unit
$V_{DS}$	800	V
$R_{DS(on)}_{typ@VGS=18V}$	93	mΩ
$I_{D@VGS=15V,TC=25^{\circ}C}$	28	A

### ■ 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.



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

Parameter	Symbol	Test Condition	Value	Unit
Drain to Source Voltage	$V_{DS,max}$	$V_{GS}=0V, I_D=500\mu A$	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	$I_D$	$V_{GS}=15V, TC=25^{\circ}C$	28	A
		$V_{GS}=15V, TC=100^{\circ}C$	22	A
Pulsed Drain Current	$I_{D(pulsed)}$	$V_{GS}=15V, TC=25^{\circ}C$	56	A
Power Dissipation	$P_{tot}$	$TC=25^{\circ}C, T_j=175^{\circ}C$	50	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	$R_{\theta JC}$	—	3	—	$^{\circ}C/W$

## Electrical Characteristics

### Static Characteristics

Parameter	Symbol	Test Condition	Value			Unit
			Min	Typ	Max	
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS}=V_{DS}, I_D=5.2mA, T_j=25^{\circ}C$	2.7	—	4.5	V
Drain to Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=500\mu A$	800	—	—	V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{GS}=0V, V_{DS}=800V, T_j=25^{\circ}C$	—	—	10	$\mu A$
Gate to Source Leakage Current	$I_{GSS+}$	$V_{GS}=22V, V_{DS}=0V, T_j=25^{\circ}C$	—	—	250	nA
	$I_{GSS-}$	$V_{GS}=-10V, V_{DS}=0V, T_j=25^{\circ}C$	—	—	-250	nA
Drain to Source on Resistance	$R_{DS(on)}$	$V_{GS}=15V, I_D=12A, T_j=25^{\circ}C$	—	125	170	m $\Omega$
		$V_{GS}=15V, I_D=12A, T_j=175^{\circ}C$	—	110	—	m $\Omega$
		$V_{GS}=18V, I_D=12A, T_j=25^{\circ}C$	—	93	130	m $\Omega$
		$V_{GS}=18V, I_D=12A, T_j=175^{\circ}C$	—	90	—	m $\Omega$



## 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	—	739	—	pF
Output Capacitance	$C_{oss}$		—	58	—	pF
Reverse Transfer Capacitance	$C_{rss}$		—	4.5	—	pF
Gate-Source Charge	$Q_{gs}$	VGS=0/15V, VDS=500V, ID=12A, Tj=25°C	—	33	—	nC
Gate-Drain Charge	$Q_{gd}$		—	13	—	nC
Total Gate Charge	$Q_g$		—	13	—	nC
Gate Resistance	$R_g$	VAC=25mV, f=1MHz	—	3.5	—	$\Omega$

### Switching Characteristics

Parameter	Symbol	Test Condition	Value			Unit
			Min	Typ	Max	
Turn-On Delay Time	$t_{d(on)}$	VGS=0/15V, VDD=500V, ID=12A, Rg=2 $\Omega$	—	16	—	ns
Rise Time	$t_r$		—	48	—	ns
Turn-Off Delay Time	$t_{d(off)}$		—	21	—	ns
Fall Time	$t_f$		—	34	—	ns

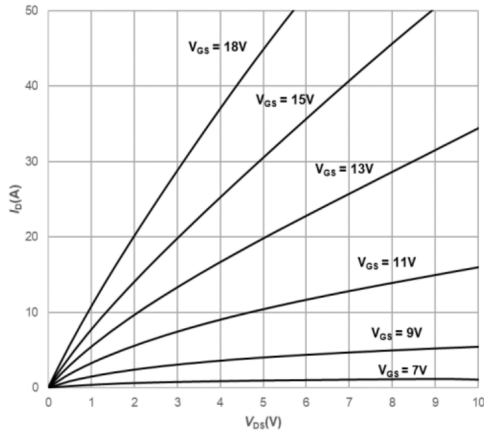
### Reverse Diode Characteristics

Parameter	Symbol	Test Condition	Value			Unit
			Min	Typ	Max	
Diode Forward Voltage	$V_{SD}$	VGS=0V, ISD=6A, Tj=25°C	—	4	—	V
Continuous Diode Forward Current	$I_S$	VGS=0V, Tj=25°C	—	6	—	A
Reverse Recovery Time	$t_{rr}$	VGS=0V, ISD=12A, VR=500V, di/dt=1200A/us, Tj=25°C	—	14	—	ns
Reverse Recovery Charge	$Q_{rr}$		—	56	—	nC
Peak Reverse Recovery Current	$I_{rrm}$		—	6.5	—	A

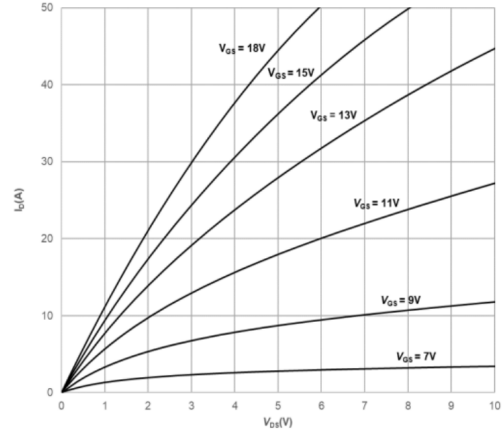


**Typical Performance**

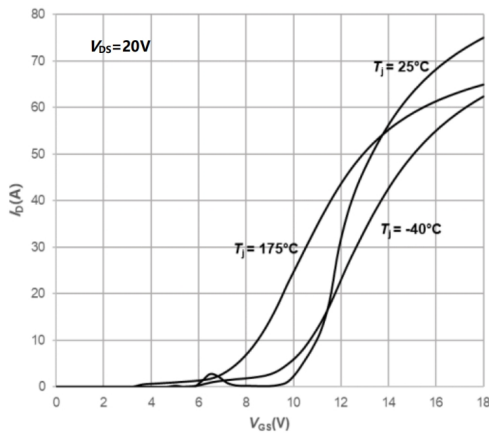
**Fig1. Output Characteristics  $T_j=25^\circ\text{C}$**



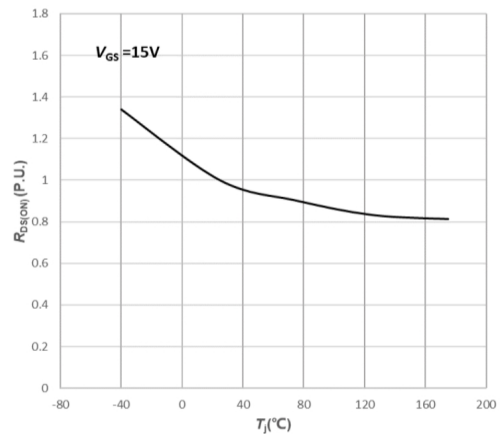
**Fig2. Output Characteristics  $T_j=175^\circ\text{C}$**



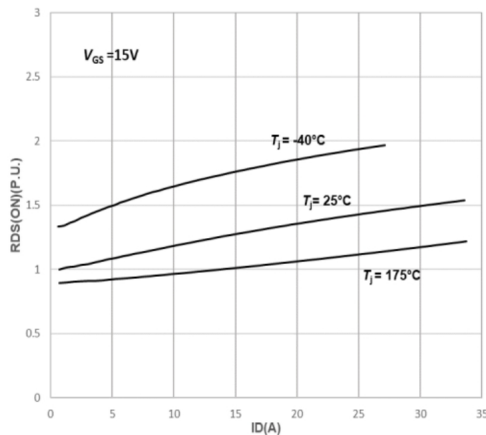
**Fig3. Typical Transfer Characteristics**



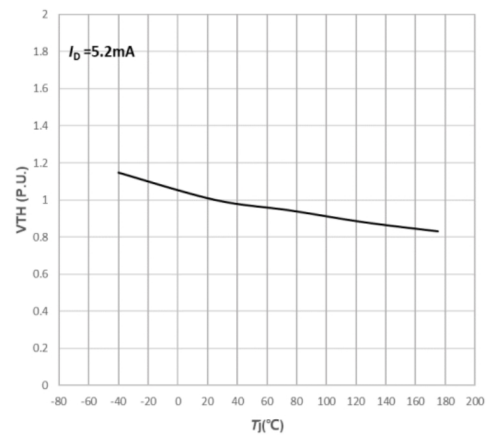
**Fig4. Normalized On-Resistance vs. Temperature**



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

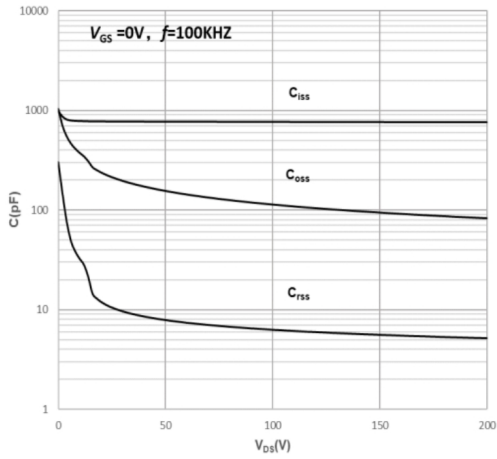


**Fig6. Normalized Threshold Voltage vs. Temperature**

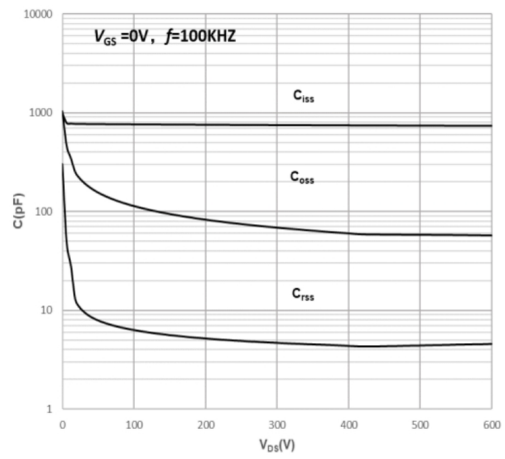


**Typical Performance**

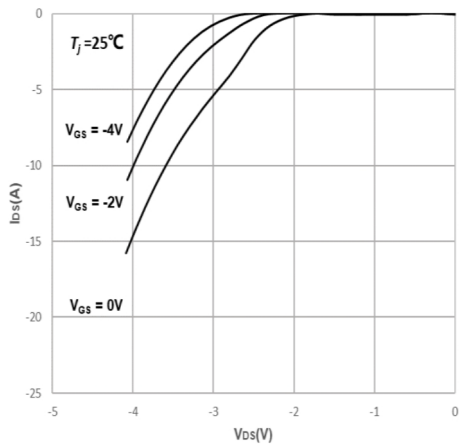
**Fig7. Capacitances vs. Drain-Source Voltage (0-200V)**



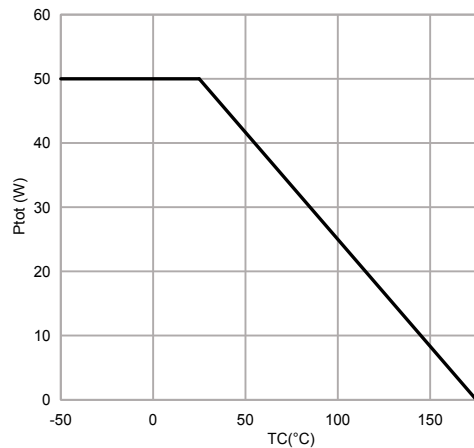
**Fig8. Capacitances vs. Drain-Source Voltage (0-600V)**



**Fig9. Body Diode Characteristics**

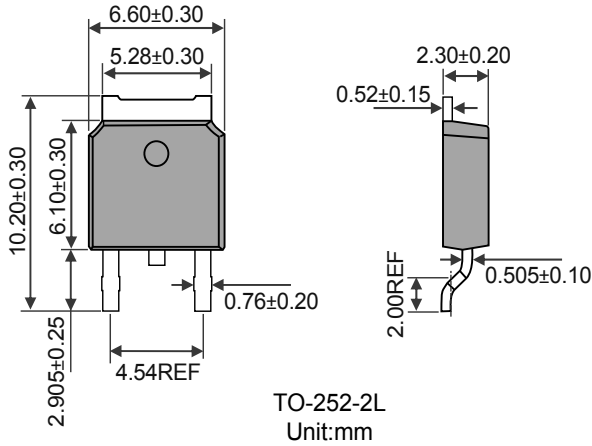


**Fig10. Maximum Power Dissipation vs. Case Temperature**

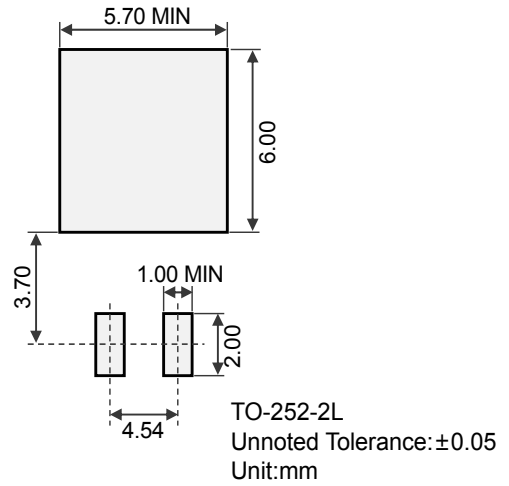


## Package Outline Dimensions & Suggested Solder Pad Layout

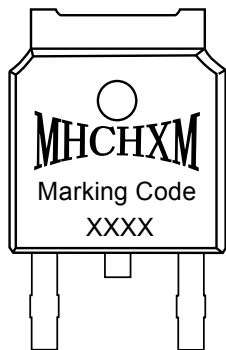
Package Outline Dimensions



Suggested Solder Pad Layout



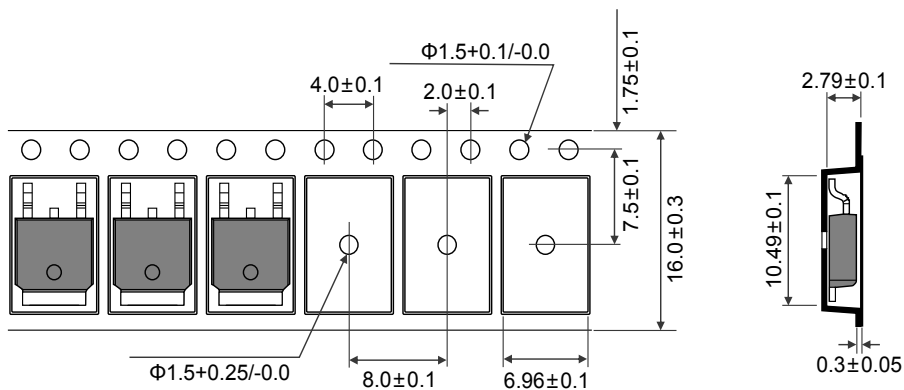
## Marking Information



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

Marking Code	Part Number
C80N90S1	HXMC80N90S1

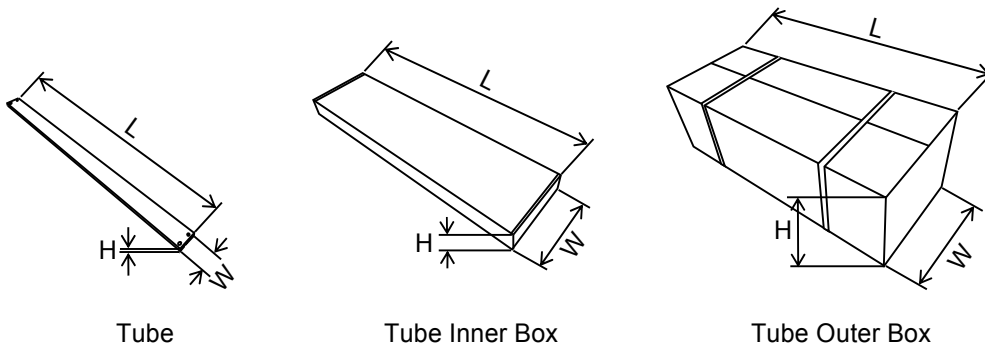
## Reel Tape Dimensions (Dimensions in mm)



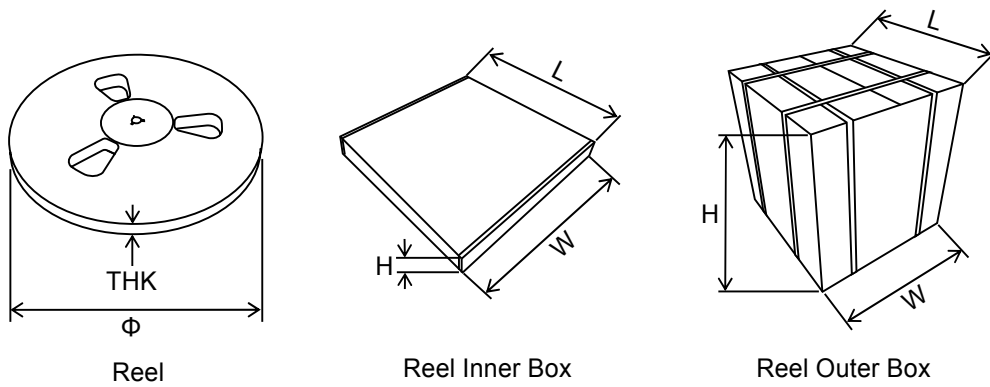
**Packing Information**

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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