

■ 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.

G3 MOSFET Technology

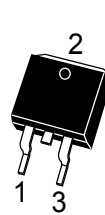
Parameter	Value	Unit
V_{DS}	650	V
$R_{DS(on)}_{typ@VGS=18V}$	160	mΩ
$I_{D@VGS=15V,TC=25^{\circ}C}$	17	A

■ Benefits

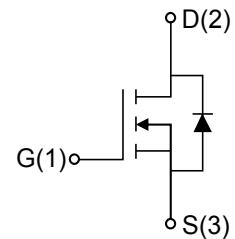
- Reduced Switching Losses.
- Increased System Switching Frequency.
- Increased Power Density.
- Reduction of Heat Sink Requirements.
- Reduced EMI.

■ Application

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



TO-263-2L



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

Parameter	Symbol	Test Condition	Value	Unit
Drain to Source Voltage	$V_{DS,max}$	$V_{GS}=0V, I_D=500\mu A$	650	V
Gate to Source Voltage	$V_{GS,max}$	Absolute Maximum Values	-8/+20	V
Recommended Operation Voltage of Gate to Source	$V_{GS,op}$	Recommended Operational Values	-5...0/+15	V
Continuous Drain Current	I_D	$V_{GS}=15V, TC=25^{\circ}C$	17	A
		$V_{GS}=15V, TC=100^{\circ}C$	12	A
Pulsed Drain Current	$I_{D(pulsed)}$	$V_{GS}=15V, TC=25^{\circ}C$	43	A
Power Dissipation	P_{tot}	$TC=25^{\circ}C, T_j=175^{\circ}C$	75	W
Operating and Storage Temperature	T_j, T_{stg}	—	-55 to +175	$^{\circ}C$
Solder Temperature, 1.6mm from case for 10s	T_L	—	260	$^{\circ}C$



Thermal Characteristics

Parameter	Symbol	Value			Unit
		Min	Typ	Max	
Thermal Resistance from Junction to Case	$R_{\theta JC}$	—	2	—	$^{\circ}\text{C/W}$

Electrical Characteristics

Static Characteristics

Parameter	Symbol	Test Condition	Value			Unit
			Min	Typ	Max	
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS}=V_{DS}, I_D=2\text{mA}, T_j=25^{\circ}\text{C}$	2.4	3.2	4	V
		$V_{GS}=V_{DS}, I_D=2\text{mA}, T_j=175^{\circ}\text{C}$	—	2.4	—	V
Drain to Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0\text{V}, I_D=500\mu\text{A}$	650	—	—	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{GS}=0\text{V}, V_{DS}=650\text{V}, T_j=25^{\circ}\text{C}$	—	—	10	μA
Gate to Source Leakage Current	I_{GSS+}	$V_{GS}=20\text{V}, V_{DS}=0\text{V}, T_j=25^{\circ}\text{C}$	—	—	50	nA
	I_{GSS-}	$V_{GS}=-8\text{V}, V_{DS}=0\text{V}, T_j=25^{\circ}\text{C}$	—	—	-50	nA
Drain to Source on Resistance	$R_{DS(on)}$	$V_{GS}=15\text{V}, I_D=7\text{A}, T_j=25^{\circ}\text{C}$	—	190	268	$\text{m}\Omega$
		$V_{GS}=15\text{V}, I_D=7\text{A}, T_j=175^{\circ}\text{C}$	—	230	—	$\text{m}\Omega$
		$V_{GS}=18\text{V}, I_D=7\text{A}, T_j=25^{\circ}\text{C}$	—	160	220	$\text{m}\Omega$
		$V_{GS}=18\text{V}, I_D=7\text{A}, T_j=175^{\circ}\text{C}$	—	200	—	$\text{m}\Omega$
Transconductance	g_{fs}	$V_{DS}=20\text{V}, I_{DS}=7\text{A}, T_j=25^{\circ}\text{C}$	—	6.2	—	S
		$V_{DS}=20\text{V}, I_{DS}=7\text{A}, T_j=175^{\circ}\text{C}$	—	5.6	—	S



Electrical Characteristics

Dynamic Characteristics

Parameter	Symbol	Test Condition	Value			Unit
			Min	Typ	Max	
Input Capacitance	C_{iss}	$V_{GS}=0V, V_{DS}=400V,$ $f=1MHz, V_{AC}=25mV$	—	448	—	pF
Output Capacitance	C_{oss}		—	44	—	pF
Reverse Transfer Capacitance	C_{rss}		—	2.2	—	pF
Reverse Transfer Capacitance	E_{oss}		—	2.8	—	μJ
Gate-Source Charge	Q_{gs}	$V_{GS}=0/15V, V_{DS}=400V,$ $I_D=7A, T_j=25^{\circ}C$	—	4.6	—	nC
Gate-Drain Charge	Q_{gd}		—	3.8	—	nC
Total Gate Charge	Q_g		—	12.6	—	nC
Gate Resistance	R_g	$V_{AC}=25mV, f=1MHz$	—	7	—	Ω

Switching Characteristics

Parameter	Symbol	Test Condition	Value			Unit
			Min	Typ	Max	
Turn-On Delay Time	$t_{d(on)}$	$V_{GS}=0/15V, V_{DD}=400V,$ $I_D=7A, R_{G(ext)}=2.5\Omega,$ $R_L=80\Omega$	—	11	—	ns
Rise Time	t_r		—	8.6	—	ns
Turn-Off Delay Time	$t_{d(off)}$		—	18.2	—	ns
Fall Time	t_f		—	14.6	—	ns
Turn-On Switching Energy	E_{on}	$V_{DS}=400V, V_{GS}=0V/15V$	—	24	—	μJ
Turn-Off Switching Energy	E_{off}	$I_D=7A, R_{G(ext)}=2.5\Omega, L=100\mu H$	—	16	—	μJ

Reverse Diode Characteristics

Parameter	Symbol	Test Condition	Value			Unit
			Min	Typ	Max	
Diode Forward Voltage	V_{SD}	$V_{GS}=-5V, I_{SD}=3.5A,$ $T_j=25^{\circ}C$	—	4.7	—	V
		$V_{GS}=-5V, I_{SD}=3.5A,$ $T_j=175^{\circ}C$	—	3.6	—	V
Continuous Diode Forward Current	I_S	$V_{GS}=0V, T_j=25^{\circ}C$	—	—	16	A
Reverse Recovery Time	t_{rr}	$V_{GS}=0V, I_{SD}=3.5A,$ $V_R=400V, T_j=25^{\circ}C$	—	12	—	ns
Reverse Recovery Charge	Q_{rr}		—	28	—	nC
Peak Reverse Recovery Current	I_{rrm}		—	1.8	—	A



Typical Performance

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

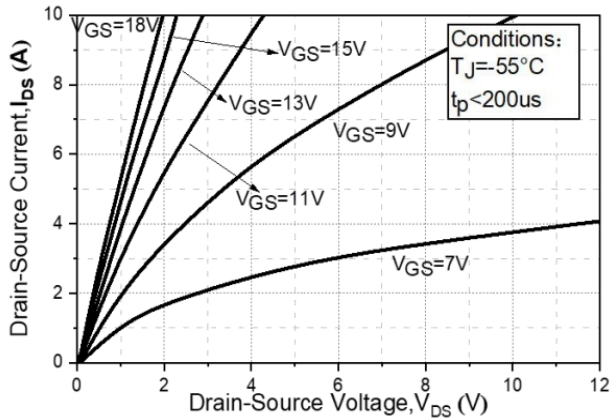


Fig2. Output Characteristics $T_J = 25^\circ\text{C}$

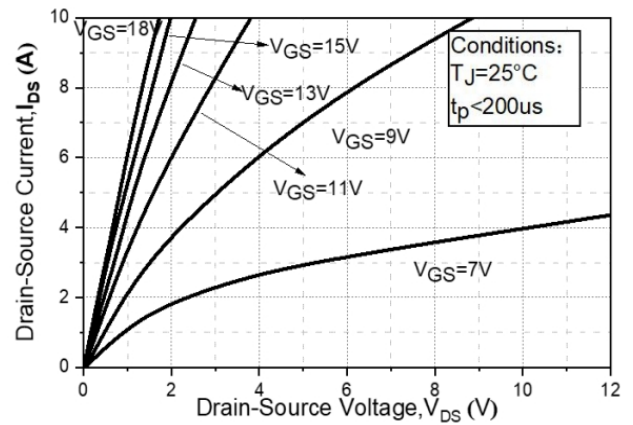


Fig3. Output Characteristics $T_J = 175^\circ\text{C}$

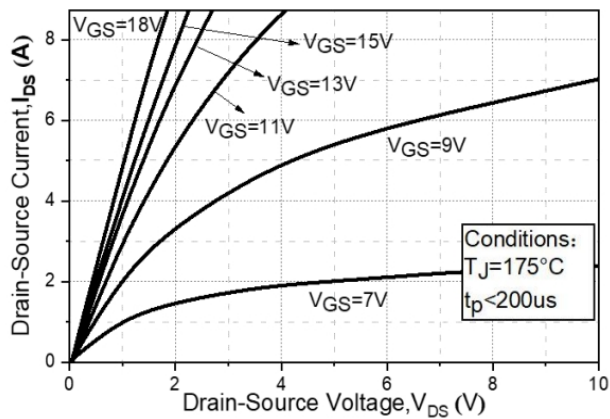


Fig4. Normalized On-Resistance vs. Temperature

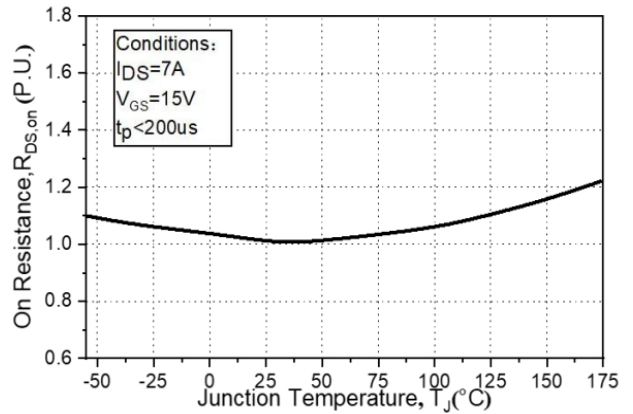


Fig5. On-Resistance vs. Drain Current For Various Temperatures

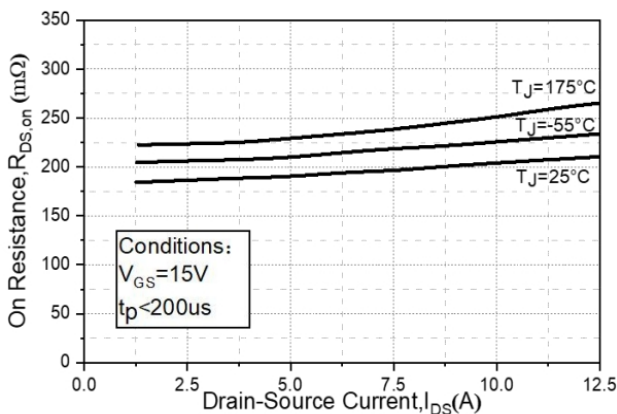
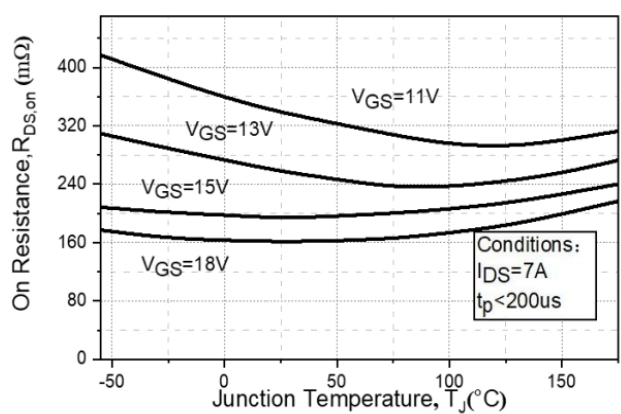


Fig6. On-Resistance vs. Temperature For Various Gate Voltage



Typical Performance

Fig7. Transfer Characteristic for Various Junction Temperatures

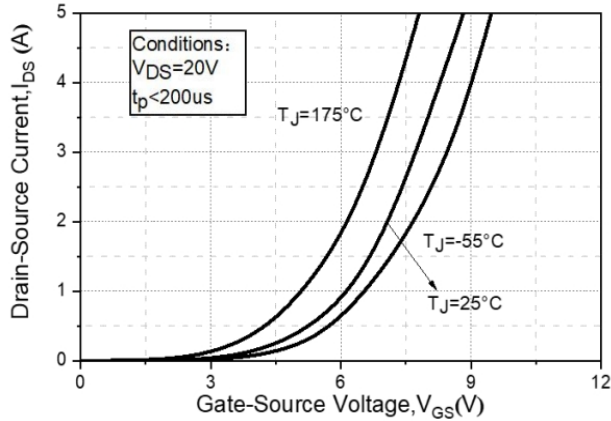


Fig8. Body Diode Characteristic at -55°C

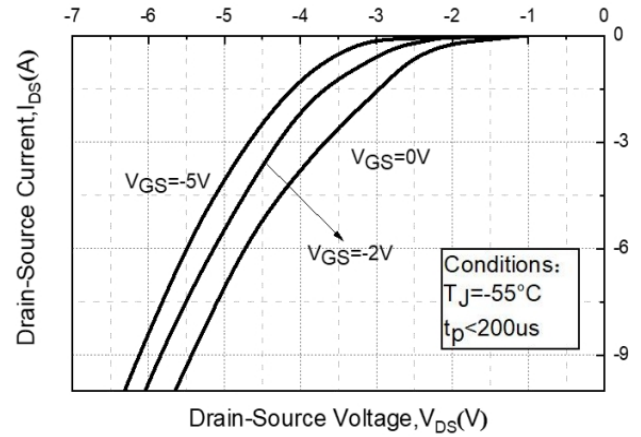


Fig9. Body Diode Characteristic at 25°C

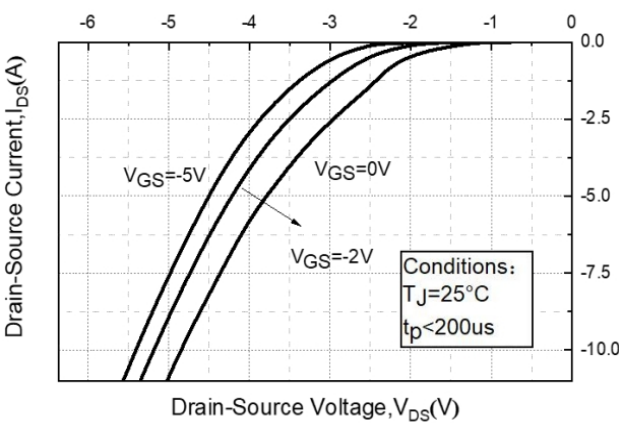


Fig10. Body Diode Characteristic at 175°C

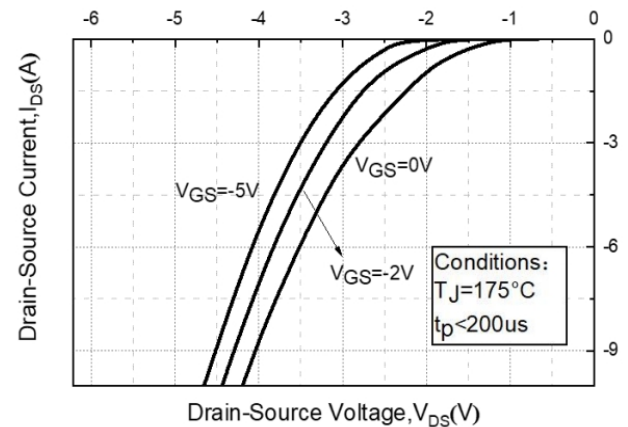


Fig11. Threshold Voltage vs. Temperature

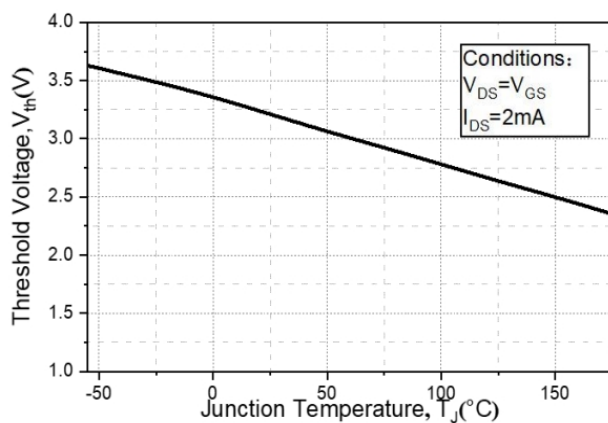
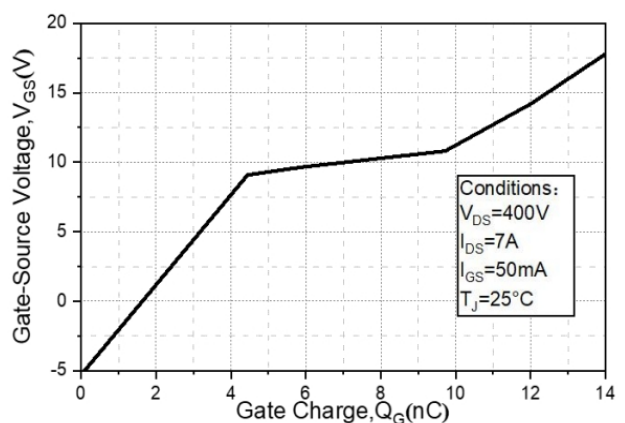


Fig12. Gate Charge Characteristics



Typical Performance

Fig13. 3rd Quadrant Characteristic at -55°C

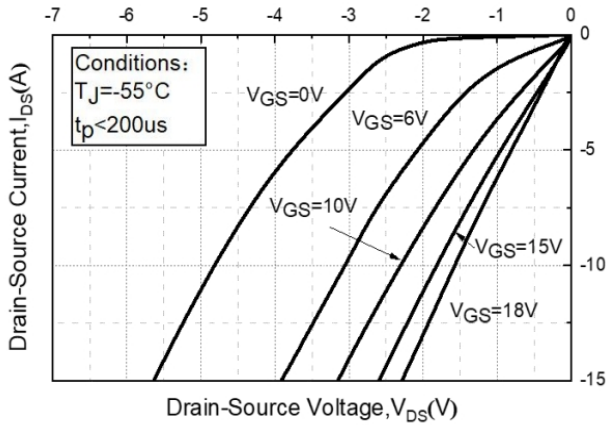


Fig14. 3rd Quadrant Characteristic at 25°C

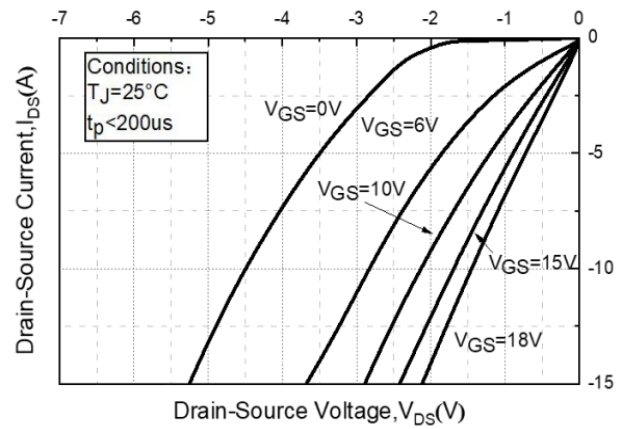


Fig15. 3rd Quadrant Characteristic at 175°C

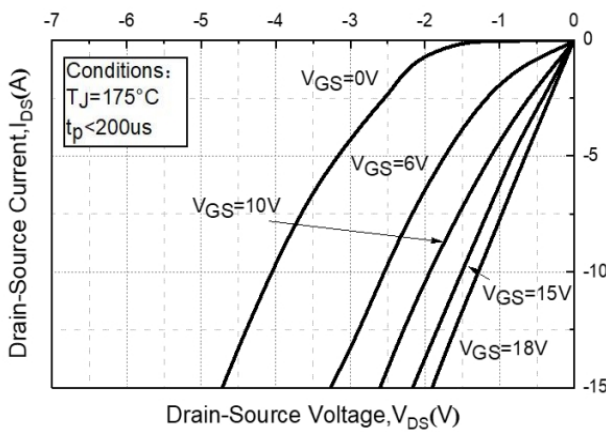


Fig16. Output Capacitor Stored Energy

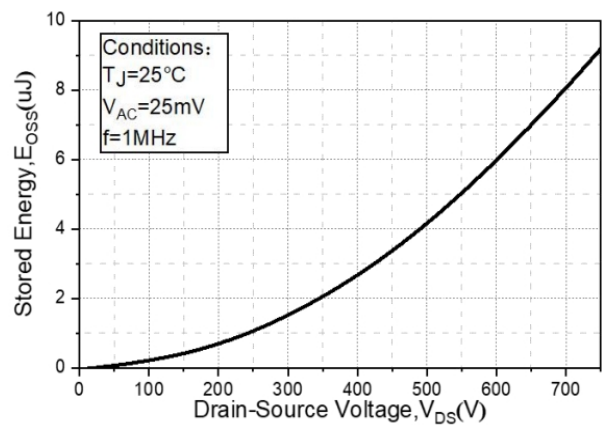


Fig17. Capacitances vs. Drain-Source Voltage (0-200V)

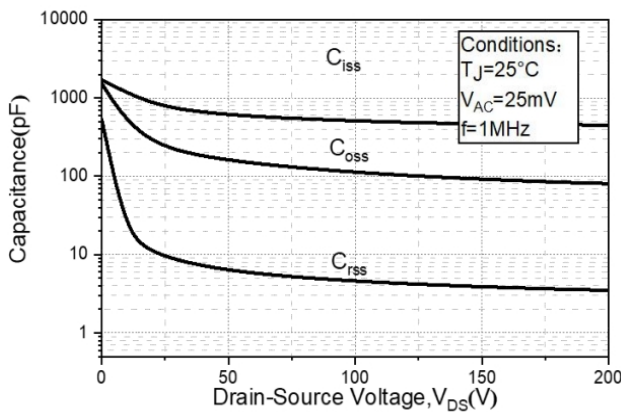
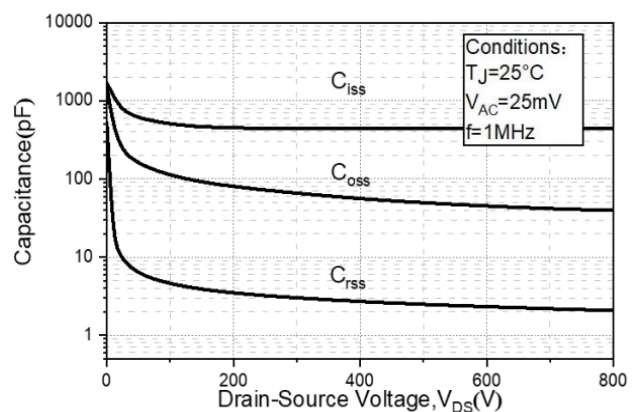


Fig18. Capacitances vs. Drain-Source Voltage (0-800V)



Typical Performance

Fig19. Continuous Drain Current vs. Case Temperature

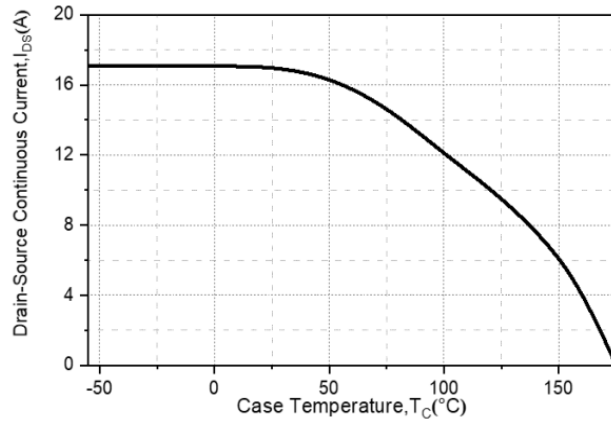
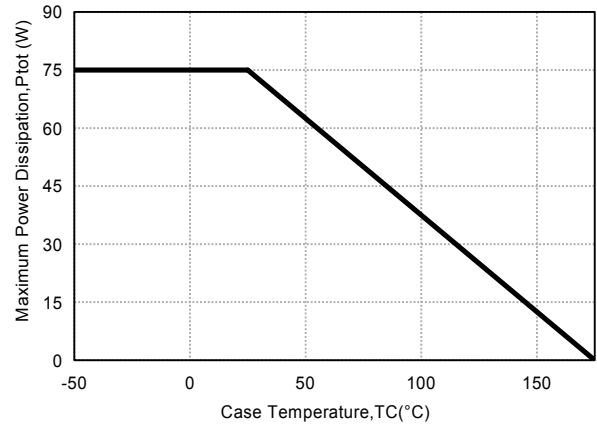
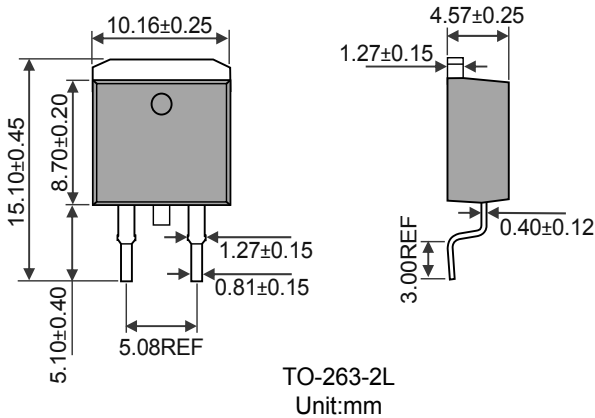


Fig20. Maximum Power Dissipation vs. Case Temperature

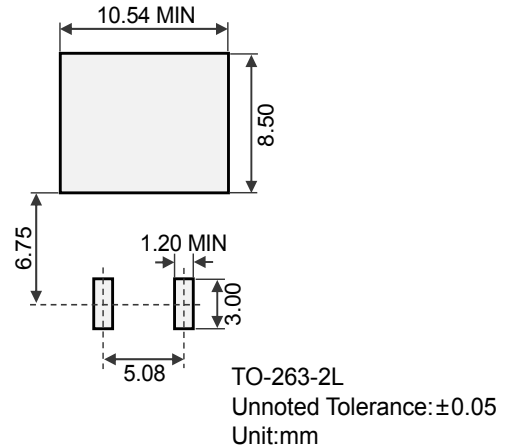


Package Outline Dimensions & Suggested Solder Pad Layout

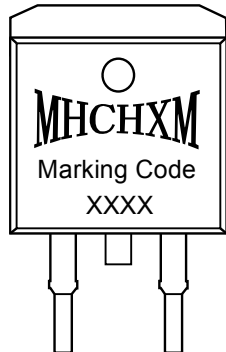
Package Outline Dimensions



Suggested Solder Pad Layout



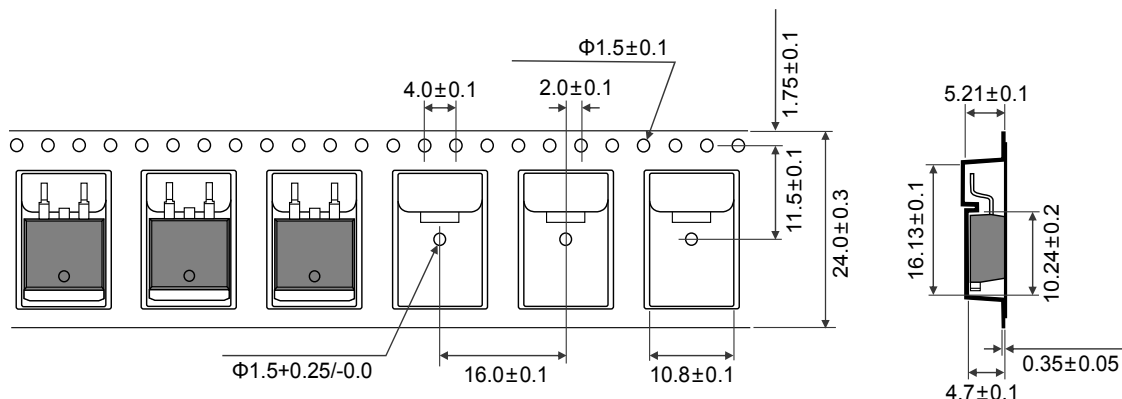
Marking Information



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

Marking Code	Part Number
C65N160D3	HXMC65N160D3

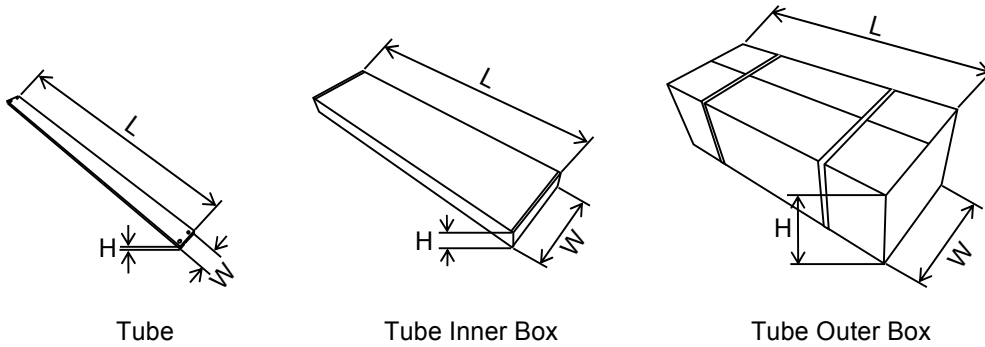
Reel Tape Dimensions (Dimensions in mm)



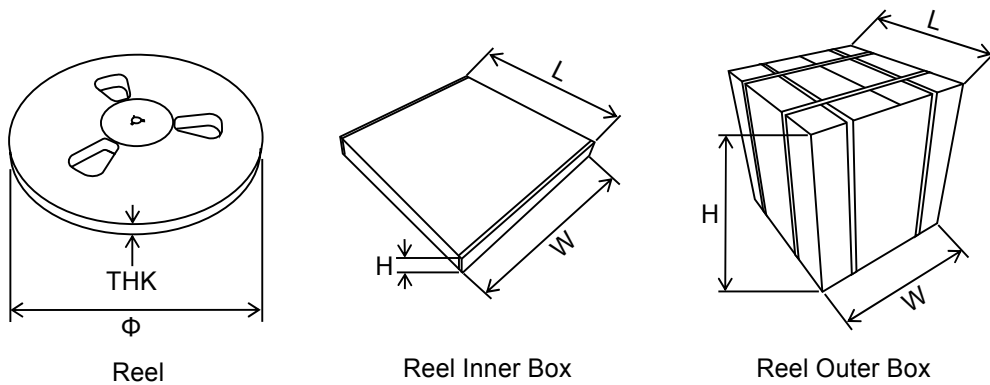
Packing Information

Packaging	Part Number	Quantity(pcs)	Size(mm)
Tube	Tube	50	L534×W33×H7
	Inner Box	1000	L560×W150×H40
	Outer Box	5000	L565×W235×H175
Reel	Reel	800	Φ330×THK25
	Inner Box	800	L355×W335×H35
	Outer Box	8000	L385×W365×H365

Packaging:Tube



Packaging:Reel



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