

■ 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.

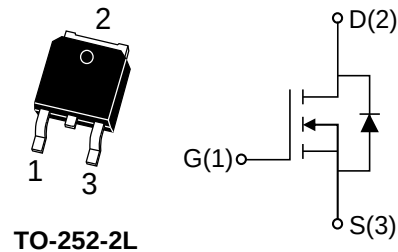
Parameter	Value	Unit
V_{DS}	650	V
$R_{DS(on)}_{typ@VGS=18V}$	220	mΩ
$I_{D@VGS=18V,TC=25^{\circ}C}$	8.7	A

■ 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	$V_{DS,max}$	$V_{GS}=0V, I_D=500\mu A$	650	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/+15...+18	V
Continuous Drain Current	I_D	$V_{GS}=15V, TC=25^{\circ}C$	8.3	A
		$V_{GS}=15V, TC=100^{\circ}C$	5.8	A
Continuous Drain Current		$V_{GS}=18V, TC=25^{\circ}C$	8.7	A
		$V_{GS}=18V, TC=100^{\circ}C$	6.2	A
Pulsed Drain Current	$I_{D(pulsed)}$	Pulse with T_p limited by T_{jmax}	17	A
Avalanche energy, Single pulse	E_{AS}	$V_{DD}=100V, L=10mH, T_j(start)=25^{\circ}C$	11	mJ
Power Dissipation	P_{tot}	$TC=25^{\circ}C, T_j=175^{\circ}C$	30	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	$R_{\theta JC}$	—	5	—	$^{\circ}\text{C/W}$

Electrical Characteristics

Static Characteristics

Parameter	Symbol	Test Condition	Value			Unit
			Min	Typ	Max	
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS}=V_{DS}, I_D=3.5\text{mA}, T_j=25^{\circ}\text{C}$	2.7	3.5	4.8	V
		$V_{GS}=V_{DS}, I_D=3.5\text{mA}, T_j=175^{\circ}\text{C}$	—	2.5	—	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}	$V_{GS}=0\text{V}, V_{DS}=650\text{V}, T_j=25^{\circ}\text{C}$	—	—	50	μA
Gate to Source Leakage Current	I_{GSS+}	$V_{GS}=22\text{V}, V_{DS}=0\text{V}, T_j=25^{\circ}\text{C}$	—	—	250	nA
	I_{GSS-}	$V_{GS}=-10\text{V}, V_{DS}=0\text{V}, T_j=25^{\circ}\text{C}$	—	—	-250	nA
Drain to Source on Resistance	$R_{DS(on)}$	$V_{GS}=15\text{V}, I_D=5\text{A}, T_j=25^{\circ}\text{C}$	—	300	440	m Ω
		$V_{GS}=15\text{V}, I_D=5\text{A}, T_j=175^{\circ}\text{C}$	—	317	—	m Ω
		$V_{GS}=18\text{V}, I_D=5\text{A}, T_j=25^{\circ}\text{C}$	—	220	330	m Ω
		$V_{GS}=18\text{V}, I_D=5\text{A}, T_j=175^{\circ}\text{C}$	—	284	—	m Ω
Transconductance	g_{fs}	$V_{DS}=20\text{V}, I_{DS}=5\text{A}, T_j=25^{\circ}\text{C}$	—	4	—	S



Electrical Characteristics

Dynamic Characteristics

Parameter	Symbol	Test Condition	Value			Unit
			Min	Typ	Max	
Input Capacitance	C_{iss}	VGS=0V, VDS=400V, f=1MHz, Tj=25°C	—	207	—	pF
Output Capacitance	C_{oss}		—	16.8	—	pF
Reverse Transfer Capacitance	C_{rss}		—	1.4	—	pF
Gate-Source Charge	Q_{gs}	VGS=0/15V, VDS=400V, ID=5A, Tj=25°C	—	3.3	—	nC
Gate-Drain Charge	Q_{gd}		—	1.4	—	nC
Total Gate Charge	Q_g		—	9.8	—	nC
Gate Resistance	R_g	VAC=25mV, f=1MHz	—	29	—	Ω

Switching Characteristics

Parameter	Symbol	Test Condition	Value			Unit
			Min	Typ	Max	
Turn-On Delay Time	$t_{d(on)}$	VGS=0/15V, VDD=400V, ID=5A, Rg=4.3Ω, L=600μH, Tj=25°C	—	6	—	ns
Rise Time	t_r		—	17.9	—	ns
Turn-Off Delay Time	$t_{d(off)}$		—	14.5	—	ns
Fall Time	t_f		—	13.3	—	ns
Turn-On Switching Energy	E_{on}	VGS=0/15V, VDD=400V, ID=5A, Rg=4.3Ω, L=600μH, Tj=25°C	—	43.3	—	μJ
Turn-Off Switching Energy	E_{off}		—	4.6	—	μJ

Reverse Diode Characteristics

Parameter	Symbol	Test Condition	Value			Unit
			Min	Typ	Max	
Diode Forward Voltage	V_{SD}	VGS=0V, ISD=2.5A, Tj=25°C	—	4.2	—	V
		VGS=0V, ISD=2.5A, Tj=175°C	—	3	—	V
Continuous Diode Forward Current	I_S	VGS=0V, Tj=25°C	—	7	—	A
Reverse Recovery Time	t_{rr}	VGS=0V, ISD=5A, VR=400V, -di/dt=1000A/us, Tj=25°C	—	10.7	—	ns
Reverse Recovery Charge	Q_{rr}		—	27.5	—	nC
Peak Reverse Recovery Current	I_{rrm}		—	4.1	—	A



Typical Performance

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

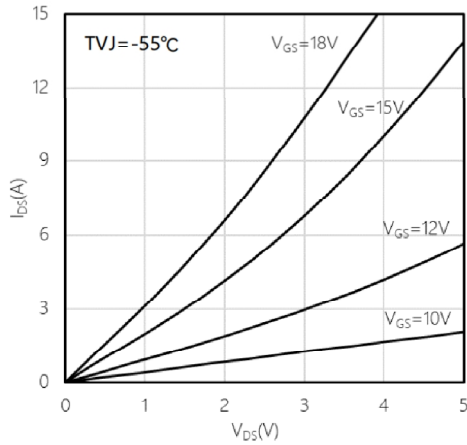


Fig2. Output Characteristics $T_J = 25^\circ\text{C}$

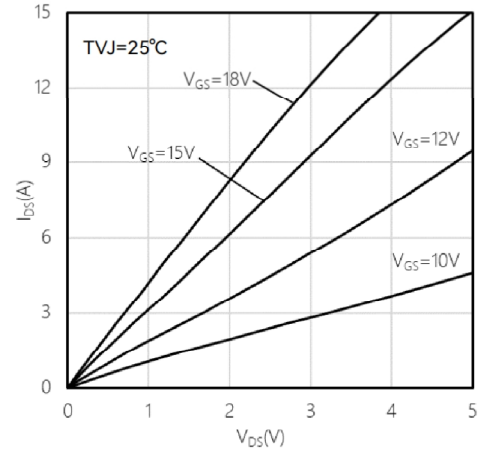


Fig3. Output Characteristics $T_J = 175^\circ\text{C}$

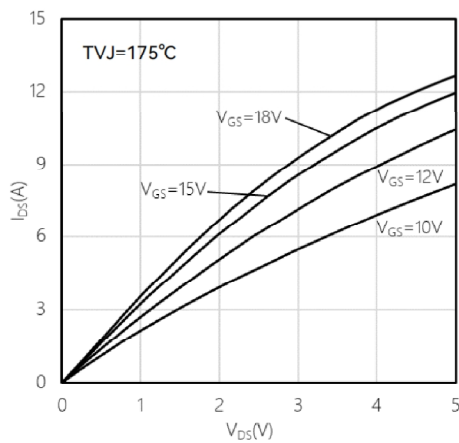


Fig4. On-Resistance vs. Temperature For Various Gate Voltages

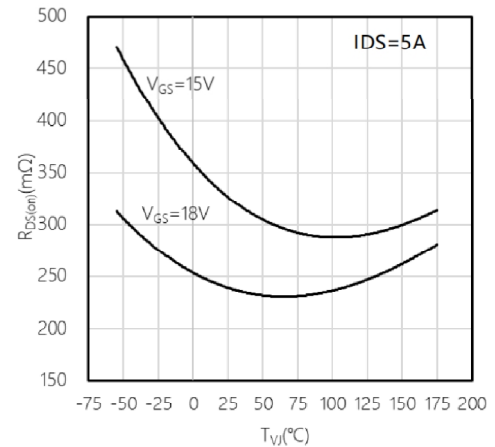


Fig5. On-Resistance vs. Drain Current For Various Temperatures

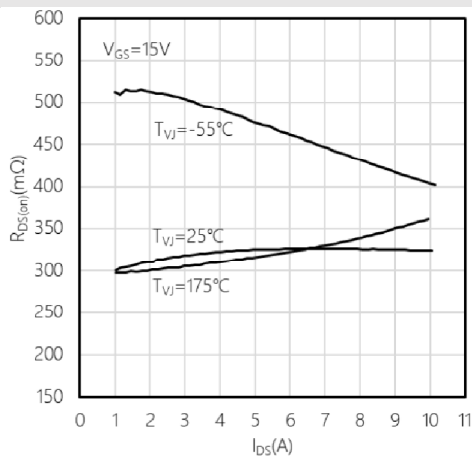
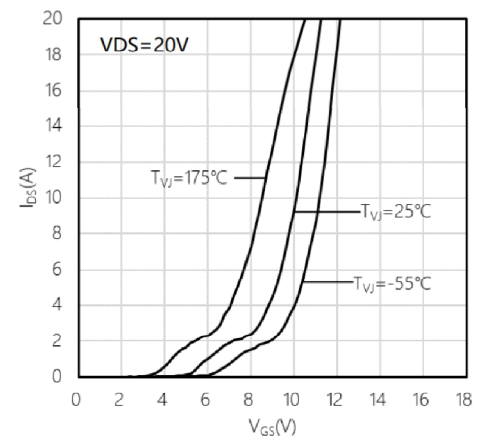


Fig6. Transfer Characteristic for Various Junction Temperature



Typical Performance

Fig7. Typical Reverse Drain Current vs. Reverse Drain Voltage at Different VGS Tj=-55°C

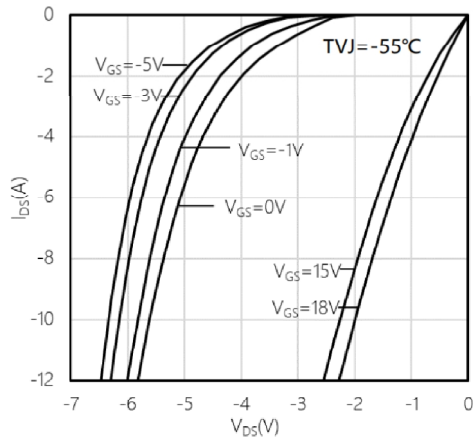


Fig8. Typical Reverse Drain Current vs. Reverse Drain Voltage at Different VGS Tj=25°C

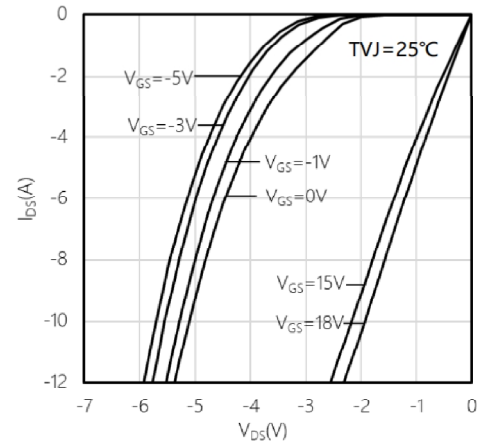


Fig9. Typical Reverse Drain Current vs. Reverse Drain Voltage at Different VGS Tj=175°C

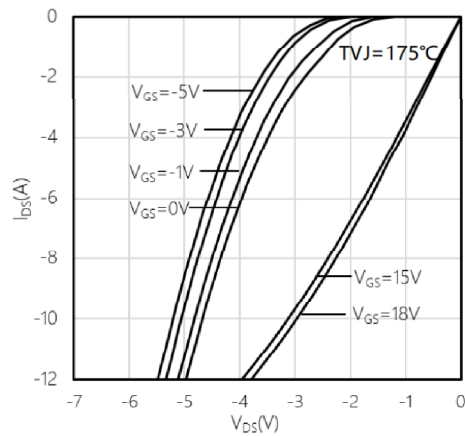


Fig10. Threshold Voltage vs. Temperature

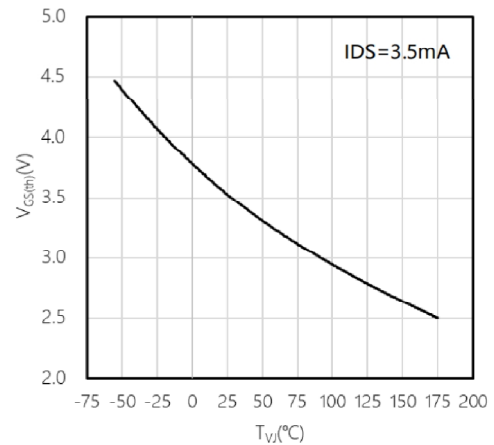


Fig11. Gate Charge Characteristics

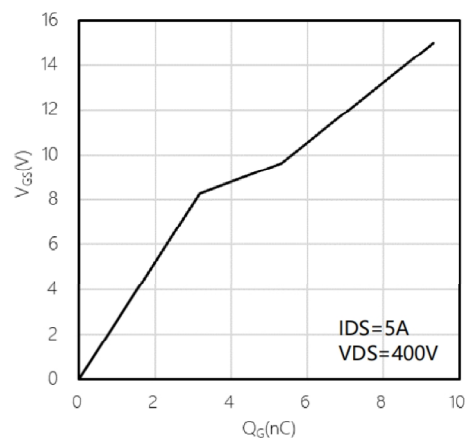
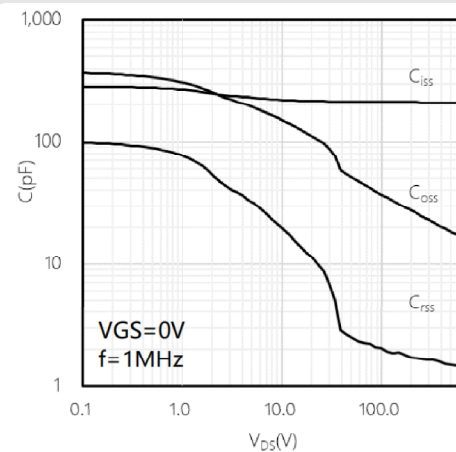


Fig12. Capacitances vs. Drain-Source Voltage(0-200V)



Typical Performance

Fig13. Clamped Inductive Switching Energy vs. Drain Current

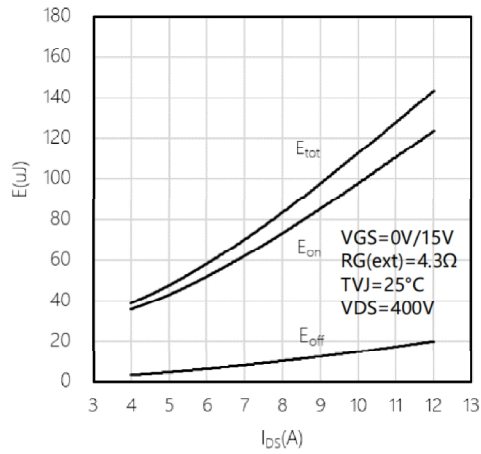


Fig14. Clamped Inductive Switching Energy vs. R_g at $T_j=25^{\circ}C$

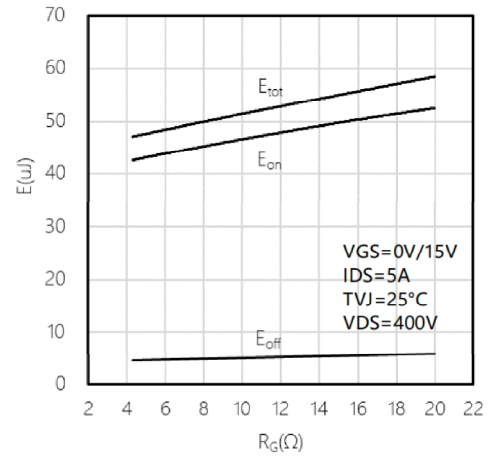


Fig15. Clamped inductive switching energy vs. temperature at $T_j=25^{\circ}C$

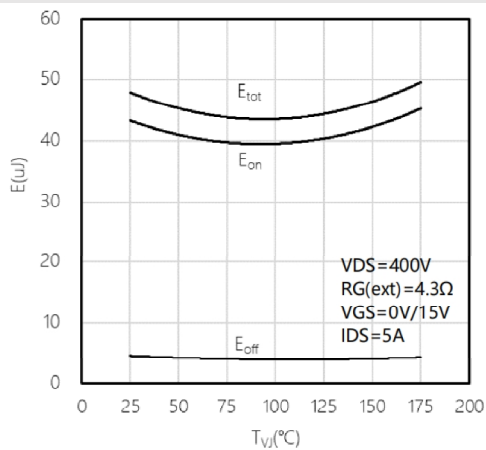


Fig16. Maximum Power Dissipation Derating vs. Case Temperature

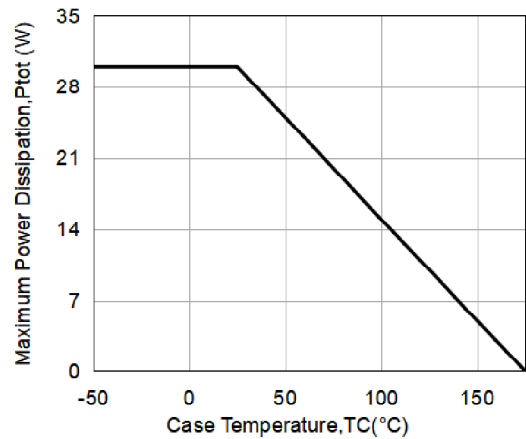
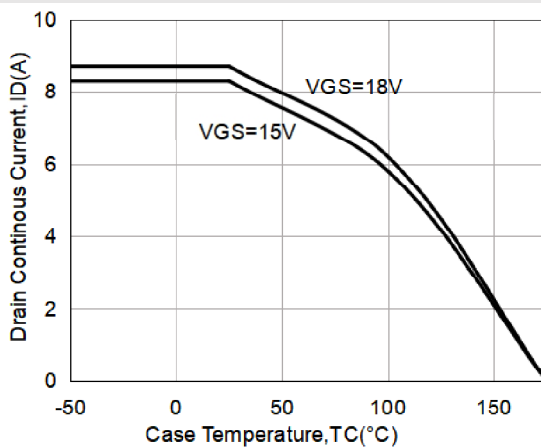
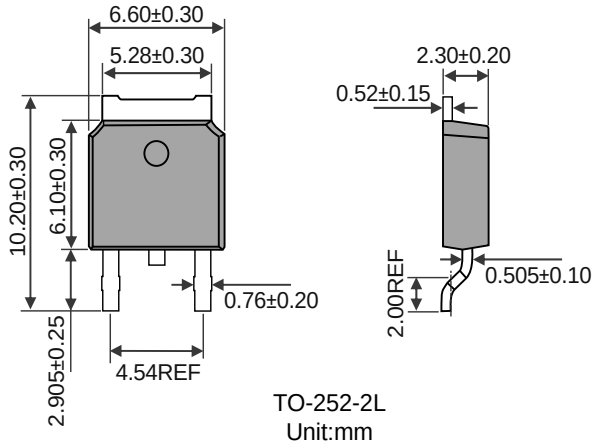


Fig17. Continuous Drain Current Derating vs. Case Temperature

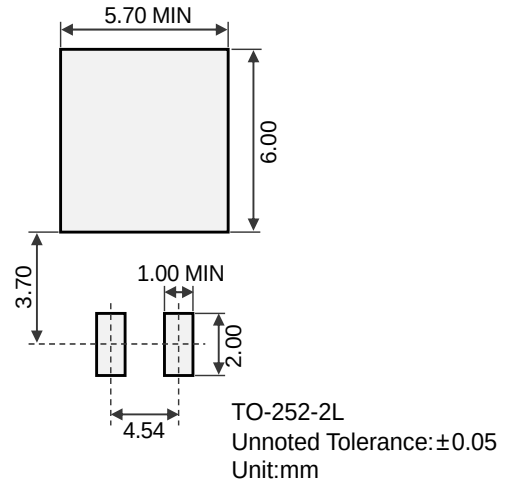


Package Outline Dimensions & Suggested Solder Pad Layout

Package Outline Dimensions



Suggested Solder Pad Layout



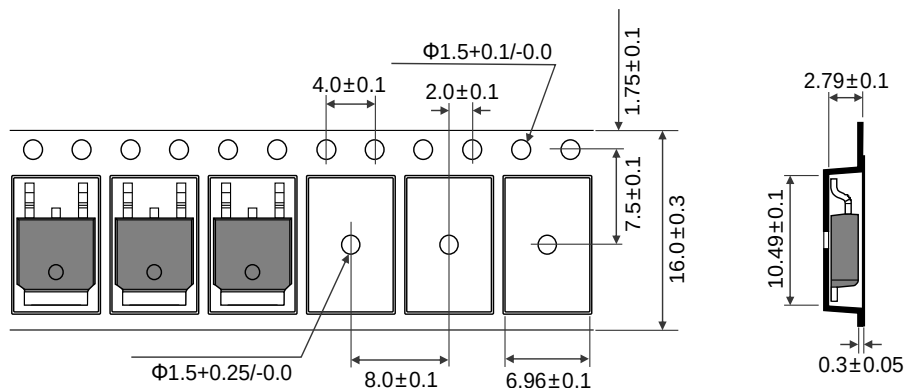
Marking Information



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

Marking Code	Part Number
C65N220S2	HXMC65N220S2

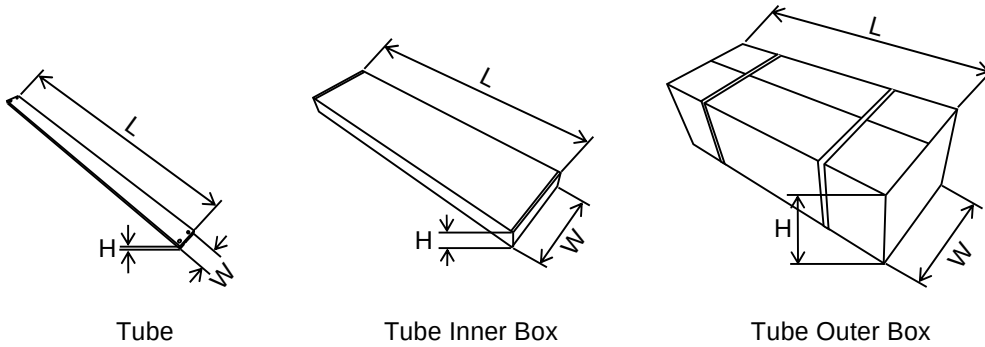
Reel Tape Dimensions (Dimensions in mm)



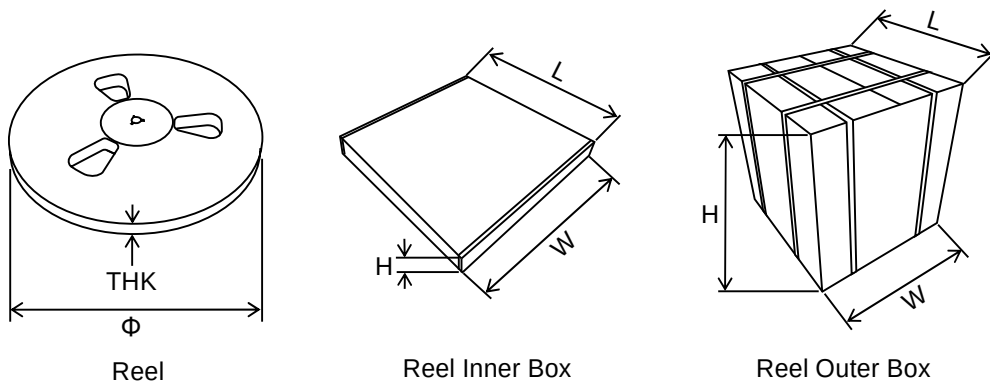
Packing Information

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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