

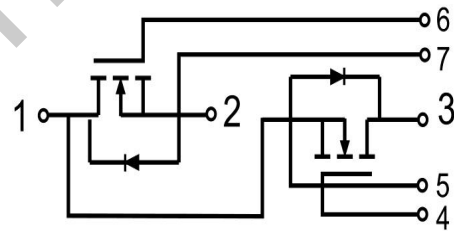
GSM300M17BM2

SiC MOSFET Half-Bridge Module

V_{DS}	1700V
$R_{DS(ON)} (Typ.)$	5m Ω
I_{DS}	300A

Features:

- High Frequency Switching
- Low Capacitances and Low Gate Charge
- Fast and Reliable Body Diode
- Compatible with Commercial Gate Drivers
- Low Conduction Losses at High Temperatures
- Reduced Ringing
- Fast and More Efficient Switching
- Lesser Switching Spikes and Lower Losses
- Better Power Density and System Efficiency
- Ease of Paralleling without Thermal Runaway
- Higher System Reliability
- Simple to Drive
- Copper Baseplate and Aluminum Nitride Insulator



Applications:

- EV Fast Charging
- Solar Inverters
- Industrial Motor Drives
- Transportation
- Industrial Power Supply
- Smart Grid and HVDC
- Induction Heating and Welding
- Pulsed Power

Absolute Maximum Ratings ($T_C=25^{\circ}\text{C}$ unless otherwise specified)

Symbol	Description	Values	Units
V_{DSS}	Drain-Source Blocking Voltage	1700	V
V_{GSmax}	Gate-Source Voltage	Absolute Maximum Values	-10/+20
V_{GSop}		Recommended Operational Values	-5/+15
I_D	Continuous Drain Current	$V_{GS}=-5/+15\text{V}, T_C=25^{\circ}\text{C}$	424
		$V_{GS}=-5/+15\text{V}, T_C=100^{\circ}\text{C}$	320
		$V_{GS}=-5/+15\text{V}, T_C=135^{\circ}\text{C}$	260
$I_{D(pluse)}$	Pulsed Drain Current	$t_p \leq 3\mu\text{s}, D \leq 1\%, V_{GS}=15\text{V}$	1000
E_{AS}	Non-Repetitive Avalanche Energy	$L=0.5\text{mH}, I_{AS}=150\text{A}$	5625
P_D	Power Dissipation	$T_C=25^{\circ}\text{C}, T_J=175^{\circ}\text{C}$	2460

Electrical Characteristics of MOSFET ($T_C=25^{\circ}\text{C}$ unless otherwise specified)

Symbol	Description	Conditions	Min.	Typ.	Max.	Units
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0\text{V}, I_D=400\mu\text{A}$	1700			V
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=15\text{mA}, T_J=25^{\circ}\text{C}$		1.45		V
		$V_{DS}=V_{GS}, I_D=15\text{mA}, T_J=125^{\circ}\text{C}$		0.90		V
		$V_{DS}=V_{GS}, I_D=15\text{mA}, T_J=150^{\circ}\text{C}$		0.84		V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=1700\text{V}, V_{GS}=0\text{V}$			1	mA
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=20\text{V}, V_{DS}=0\text{V}$			400	nA
		$V_{GS}=-10\text{V}, V_{DS}=0\text{V}$			-400	nA
$R_{DS(on)}$	On State Resistance	$V_{GS}=20\text{V}, I_{DS}=300\text{A}, T_J=25^{\circ}\text{C}$		3.3		mΩ
		$V_{GS}=20\text{V}, I_{DS}=300\text{A}, T_J=125^{\circ}\text{C}$		5.9		
		$V_{GS}=20\text{V}, I_{DS}=300\text{A}, T_J=150^{\circ}\text{C}$		6.6		
g_{fs}	Transconductance	$V_{DS}=10\text{V}, I_D=300\text{A}, T_J=25^{\circ}\text{C}$		152		S
		$V_{DS}=10\text{V}, I_D=300\text{A}, T_J=200^{\circ}\text{C}$		147		
C_{iss}	Input Capacitance	$V_{DS}=1000\text{V}, f=1\text{MHz}, V_{GS}=0\text{V}, V_{AC}=25\text{mV}$		30.48		nF
C_{oss}	Output Capacitance			0.82		nF



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C _{rSS}	Reverse Transfer Capacitance	V _{DS} =1000V, f=1MHz, V _{GS} =0V, V _{AC} =25mV			0.15		nF
E _{oss}	C _{oss} Stored Energy	V _{DS} =1000V, f=1MHz, V _{GS} =0V, V _{AC} =25mV			544		μJ
Q _{oss}	C _{oss} Stored Charge				1640		nC
Q _G	Total Gate Charge	V _{DS} =1000V, V _{GS} =-5V to +15V, I _D =300A			1024		nC
Q _{GS}	Gate-Source Charge				308		
Q _{GD}	Gate-Drain Charge				360		
t _{d(on)}	Turn-on Delay Time	V _{DD} =900V, V _{GS} =-5V to +20V, I _D =300A, R _{G(ext)} =2.5Ω	T _J =25°C		252		ns
			T _J =125°C		227		
			T _J =150°C		219		
t _r	Rise Time		T _J =25°C		126		ns
			T _J =125°C		112		
			T _J =150°C		112		
t _{d(off)}	Turn-off Delay Time		T _J =25°C		706		ns
			T _J =125°C		804		
			T _J =150°C		812		
t _f	Fall Time		T _J =25°C		177		ns
			T _J =125°C		173		
			T _J =150°C		169		
E _{on}	Turn-on Switching Energy		T _J =25°C		18.3		mJ
			T _J =125°C		17.0		
			T _J =150°C		15.8		
E _{off}	Turn-off Switching Energy		T _J =25°C		38.7		mJ
			T _J =125°C		38.0		
			T _J =150°C		37.5		
R _{G(int)-C}	Internal Gate Resistance(chip)				0.45		Ω
R _{G(int)-M}	Internal Gate Resistance(module)				5.0		Ω
R _{θJC}	Thermal Resistance Junction-to-Case for SiC MOSFET(per leg)					0.061	°C/W

**GLOSIC****Built-in SiC Body Diode****Electrical Characteristics of Diode ($T_C=25^{\circ}\text{C}$ unless otherwise specified)**

Symbol	Description	Conditions		Min.	Typ.	Max.	Units
I _S	Inverse Diode Continuous, Forward Current	V _{GS} =-5V, T _C =100°C		340			A
I _{S(pluse)}	Inverse Diode Direct Current, Pulsed	V _{GS} =-5V			1360		A
V _{SD}	Diode Forward Voltage	I _{SD} =300A, V _{GS} =0V, T _J =25°C			4.80		V
		I _{SD} =300A, V _{GS} =0V, T _J =125°C			2.03		V
		I _{SD} =300A, V _{GS} =0V, T _J =150°C			2.25		V
t _{rr}	Reverse Recovery Time	I _{SD} =300A, V _{GS} =-5V to +20V, V _R =900V, -di/dt=3277A/μs (T _J =150°C)	T _J =25°C		80		ns
			T _J =125°C		89		
			T _J =150°C		91		
Q _{rr}	Reverse Recovery Charge		T _J =25°C		2.75		uC
			T _J =125°C		6.76		
			T _J =150°C		7.87		
I _{rr}	Peak Reverse Recovery Current		T _J =25°C		56.0		A
			T _J =125°C		119		
			T _J =150°C		138		

Symbol	Description		Min.	Typ.	Max.	Units
V _{ISO}	Isolation Voltage (All Terminals Shorted)	f=50Hz, 1minute	5000			V
Internal Isolation			AlN Ceramic			
d _{creep}	Creepage Distance: Terminal to Baseplate				40	mm
	Creepage Distance: Terminal to Terminal				30	
d _{clear}	Terminal to Terminal				9	mm
L _{SCE}	Stray Inductance Module	Measured between terminals 2 and 3			15	nH
T _J	Maximum Junction Temperature				175	°C
T _{JOP}	Maximum Operating Junction Temperature Range		-40		+150	°C
T _{stg}	Storage Temperature		-40		+125	°C
CTI	Comparative Tracking Index		200			
R _{θCS}	Case-to-Sink Thermally (Conductive Grease Applied)				0.03	°C/W
M	Power Terminals Screw:M6		3.0		5.0	N·m
M	Mounting Screw:M6		4.0		6.0	N·m
G	Weight			290		g

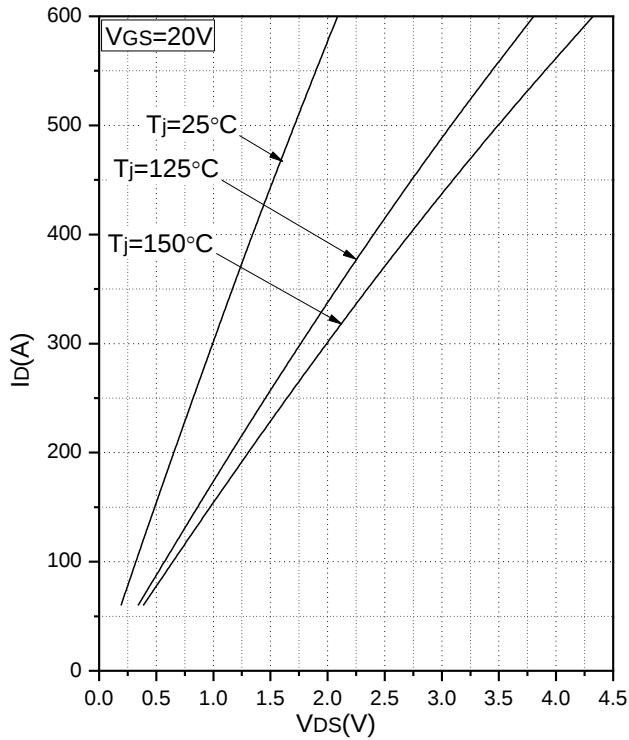


Fig.1 Transfer Characteristics

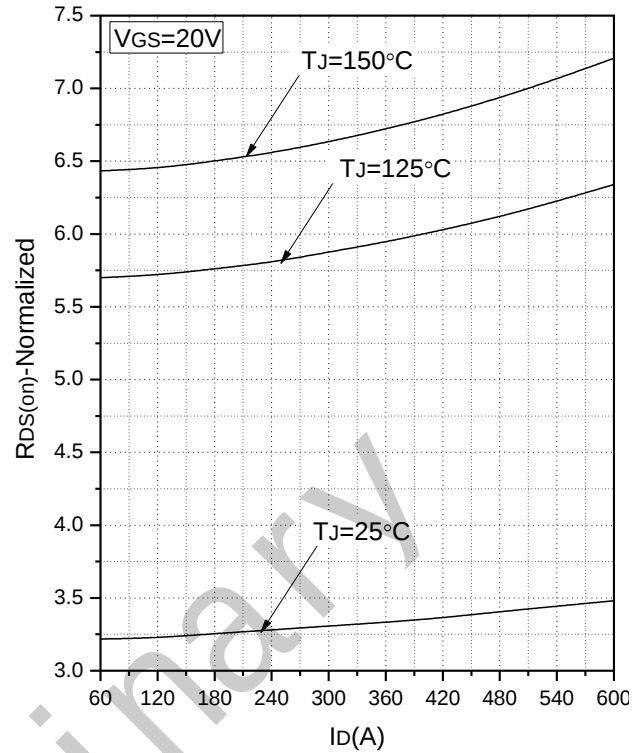


Fig.2 Normalized On-Resistance vs. Drain Current

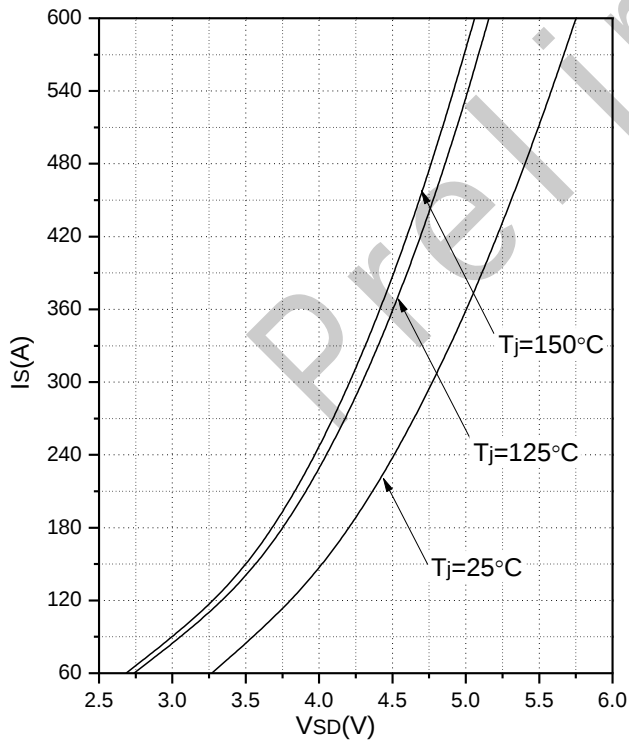


Fig.3 Forward Characteristics

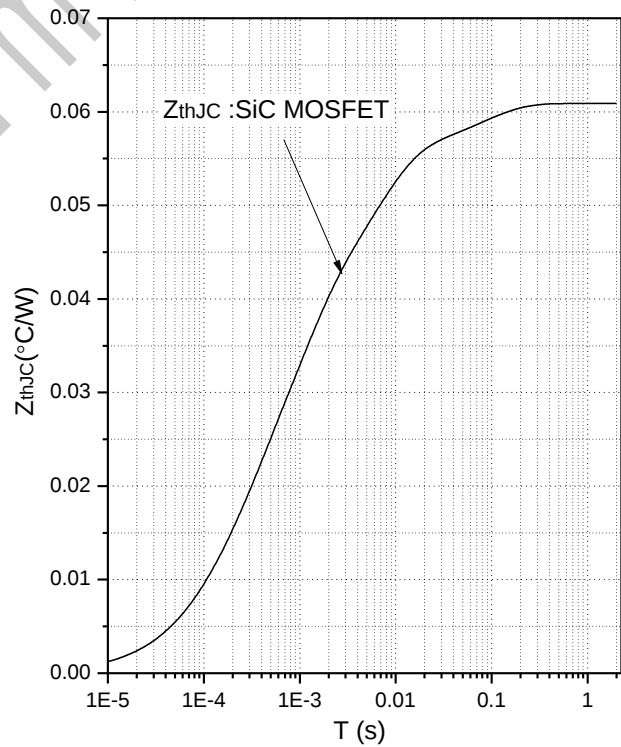


Fig.4 Transient Thermal Impedance

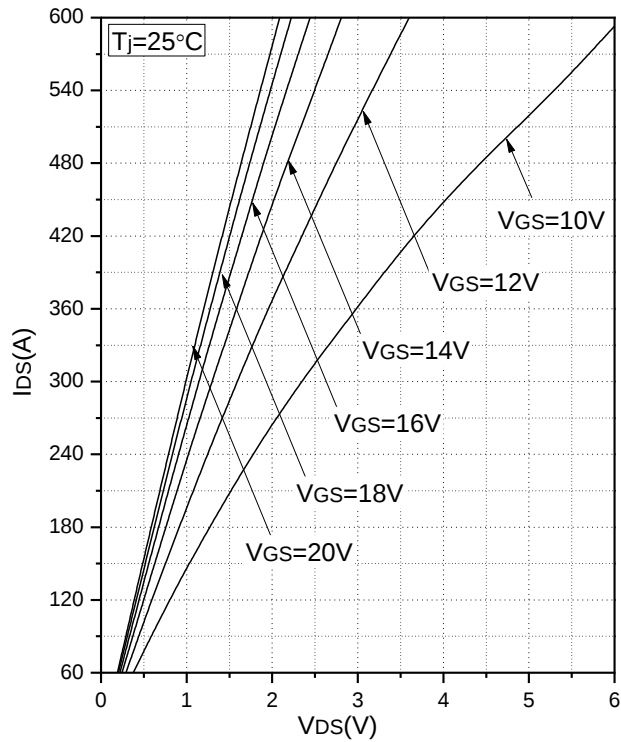


Fig.5 Typical Output Characteristics

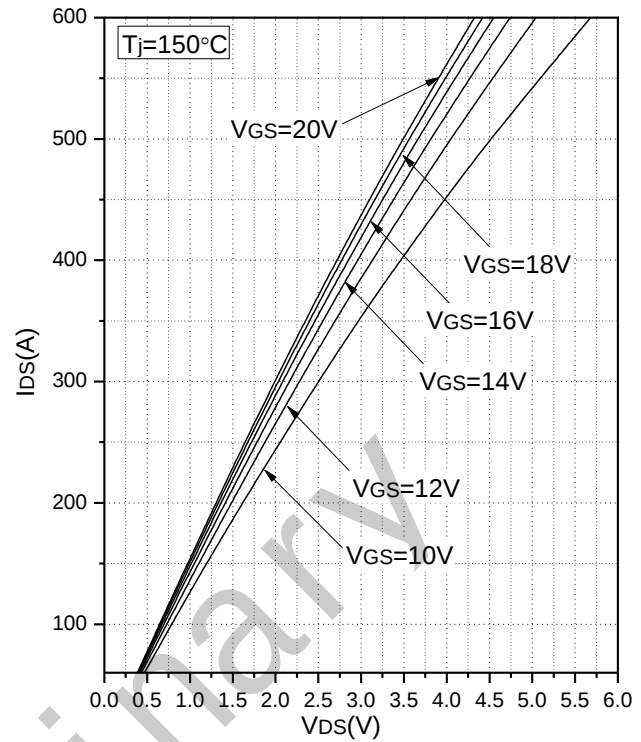


Fig.6 Typical Output Characteristics

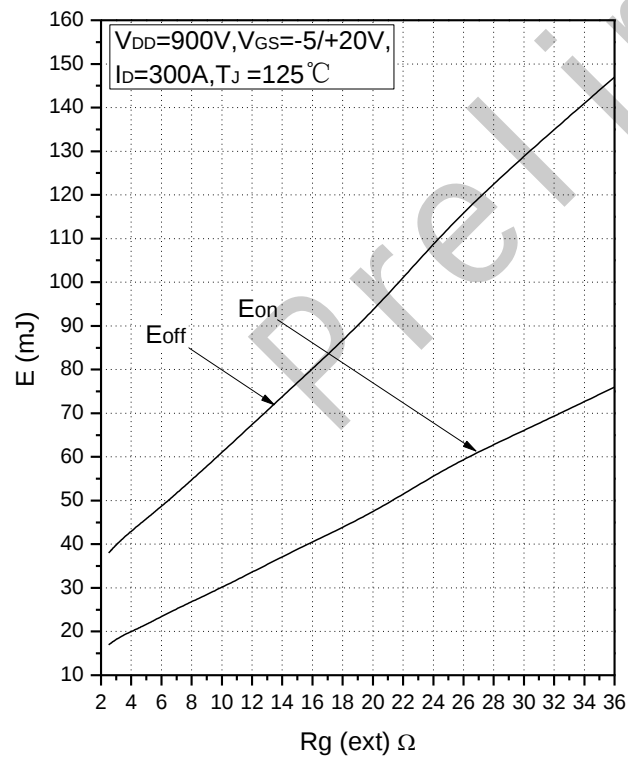


Fig.7 Inductive Switching Energy vs. $R_G(\text{ext})$

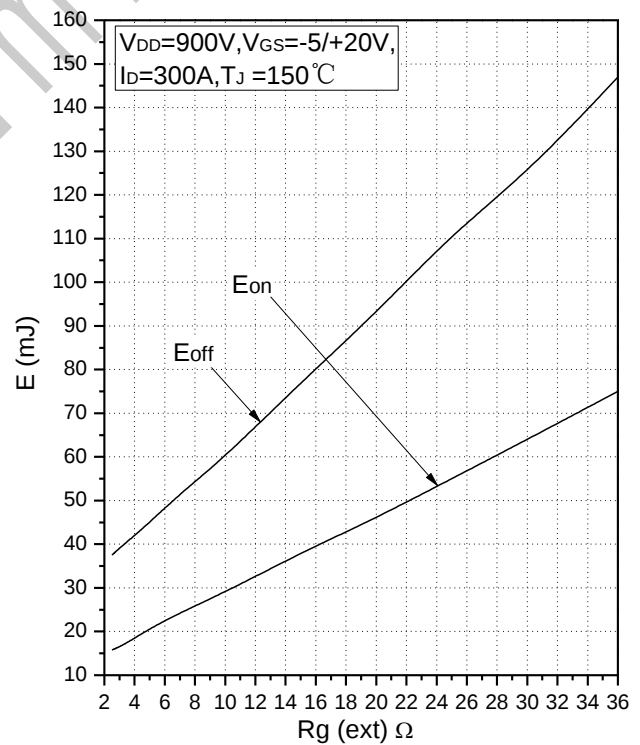
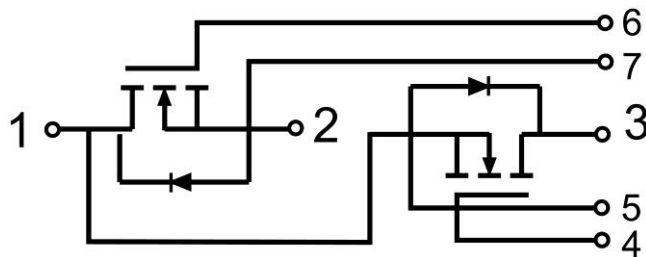
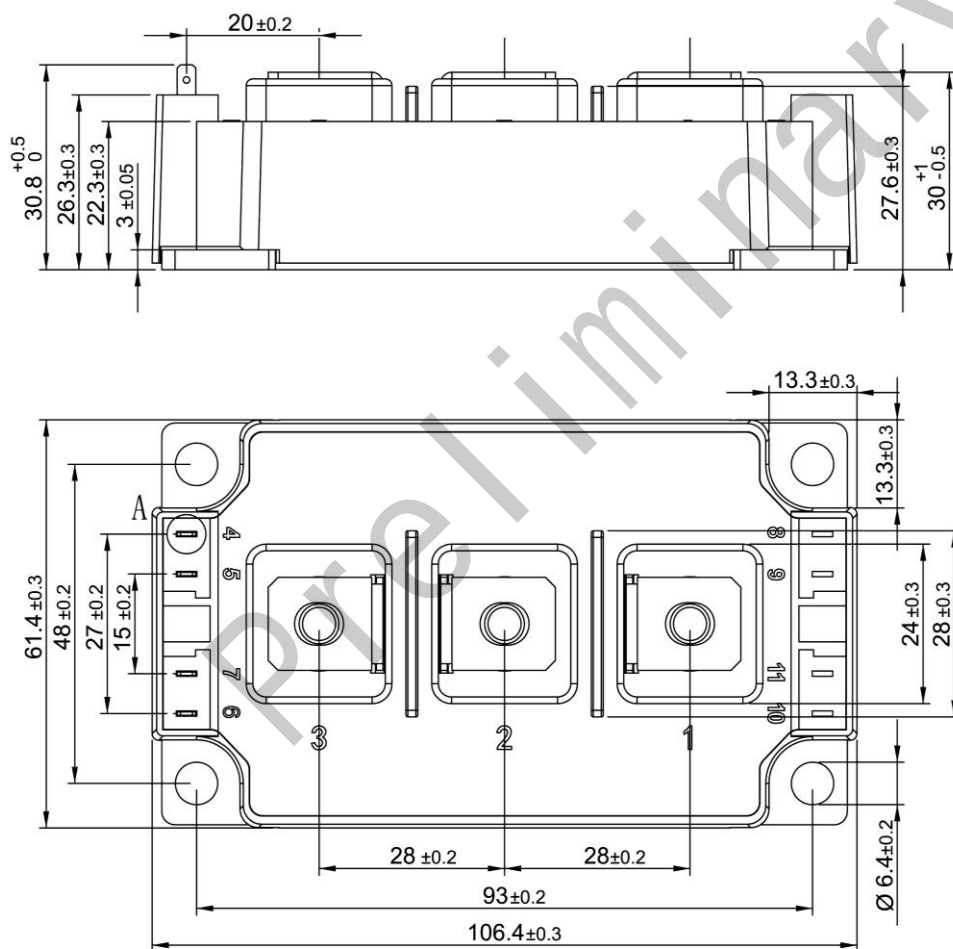


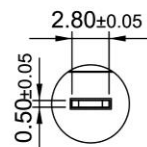
Fig.8 Inductive Switching Energy vs. $R_G(\text{ext})$



Package Outline (Unit: mm):



View A
scale 3:1





Date	Revision	Notes
01/21/2022	01	Initial Release

Announcement

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The released datasheet would be issued with “REV.” + “alphabet characters”.