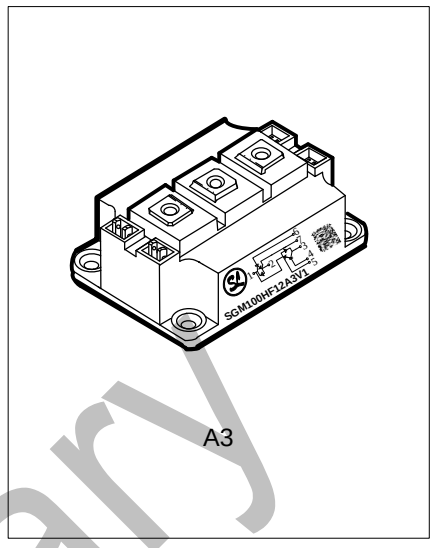
100A、1200V IGBT MODULE

DESCRIPTION

SGM100HF12A3V1 Module offers the optimum performance for UPS, AC inverter drive and electronic welders at fsw up to 20 kHz.



A3

FEATURES

- 100A, 1200V, $V_{CE(sat)(typ.)}$ =1.9V@I_C=100A
- VCEsat with positive temperature coefficient
- High short circuit capability
- Low switching loss
- Isolated copper baseplate using DBC technology

NOMENCLATURE

S G M 1 0 0 H F 1 2 A 3 V 1

- IGBT Module Series
- Nominal Current: e.g. 100=100A
- Circuit Configuration: Half Bridge
- Voltage: e.g. 12=1200V
- Package Type: Cu Base, DBC, 106mm×62mm×30mm
- Version: includes die characteristics

ORDERING INFORMATION

Part No.	Package	Marking	Material	Packing
SGM100HF12A3V1	A3	SGM100HF12A3V1	Lead free	Carton

ABSOLUTE MAXIMUM RATINGS (TC = 25°, UNLESS OTHERWISE NOTED)

Characteristics	Symbol	Ratings	Units
Collector to Emitter Voltage	V_{CE}	1200	V
Gate to Emitter Voltage	V_{GE}	±20	V
Collector Current	I_C	100	A
Repetitive Pulsed Collector Current	I_{CRM}	300	A
Operating Junction Temperature Range	T_J	-40～+175	°C
Storage Temperature Range	T_{stg}	-40～+125	°C
Isolation Voltage	V_{iso}	2500	V

Thermal Characteristics

Characteristics	Symbol	Ratings	Units
Thermal Resistance, Junction to Case (IGBT)	$R_{\theta JC}$	0.16	°C/W
Thermal Resistance, Junction to Case (FRD)	$R_{\theta JC}$	0.3	°C/W
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	0.05	°C/W

ELECTRICAL CHARACTERISTICS OF IGBT (T_C = 25°C unless otherwise noted)

Characteristics	Symbol	Test conditions	Min.	Typ.	Max.	Units
Collector to Emitter Breakdown Voltage	BV_{CE}	V_{GE}=0V, I_C=0.25mA	1200	--	--	V
C-E Leakage Current	I_{CES}	V_{CE}=1200V, V_{GE}=0V, T_C=25°C	--	--	1000	μA
		V_{CE}=1200V, V_{GE}=0V, T_C=150°C	--	--	6000	μA
G-E Leakage Current	I_{GES}	V_{GE}=±20V, V_{CE}=0V	--	--	±600	nA
Gate Threshold Voltage	$V_{GE(th)}$	I_C=250μA, V_{CE}=V_{GE}	5.0	5.9	6.5	V
Collector to Emitter Saturation Voltage	$V_{CE(sat)}$	I_C=100A, V_{GE}=15V	1.4	1.9	2.1	V
Input Capacitance	C_{ies}	V_{CE}=25V V_{GE}=0V f=1MHz	--	11	--	nF
Output Capacitance	C_{oes}		--	0.9	--	
Reverse Transfer Capacitance	C_{res}		--	0.4	--	
Turn-On Delay Time	$T_{d(on)}$	V_{CE}=600V I_C=100A R_g=10Ω V_{GE}=15V Inductive Load,	--	160	--	ns
Rise Time	T_r		--	167	--	
Turn-Off Delay Time	$T_{d(off)}$		--	1091	--	
Fall Time	T_f		--	90	--	
Turn-On Switching Loss	E_{on}		--	11.2	--	mJ
Turn-Off Switching Loss	E_{off}		--	10.2	--	
Total Switching Loss	E_{st}		--	21.5	--	
Total Gate Charge	Q_g	V_{CE} = 400V, I_C=100A, V_{GE} = -8 to 15V	--	870	--	nC
Gate to Emitter Charge	Q_{ge}		--	274	--	
Gate to Collector Charge	Q_{gc}		--	397	--	

ELECTRICAL CHARACTERISTICS OF FRD (T_C = 25°C unless otherwise noted)

Characteristics	Symbol	Test conditions	Min.	Typ.	Max.	Units
Diode Forward Voltage	V_F	I_F = 100A T_C=25°C	--	1.81		V
		I_F = 100A T_C=150°C	--	1.94	--	
Diode Reverse Recovery Time	T_{rr}	I_f =100A, di/dt=200A/μs	--	281	--	ns
Diode Reverse Recovery Current	Irr		--	17.2	--	A
Diode Reverse Recovery Charge	Q_{rr}		--	2.5	--	μC

TYPICAL CHARACTERISTICS CURVE

Figure 1. Typical output characteristics(25°C)

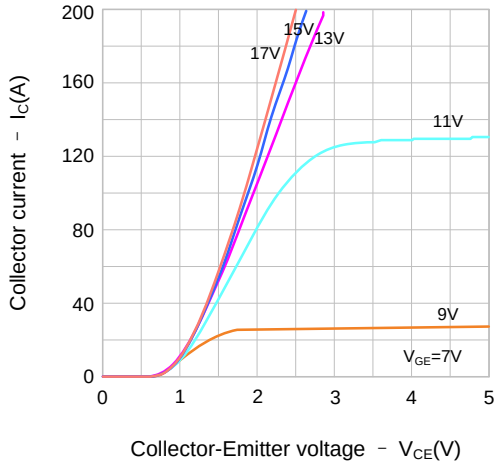


Figure 2. Typical output characteristics(150°C)

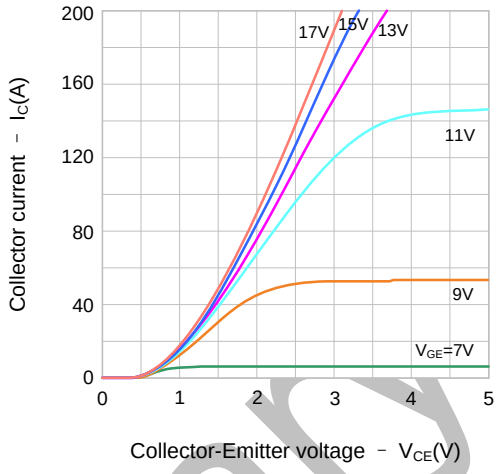


Figure 3. Transfer characteristics

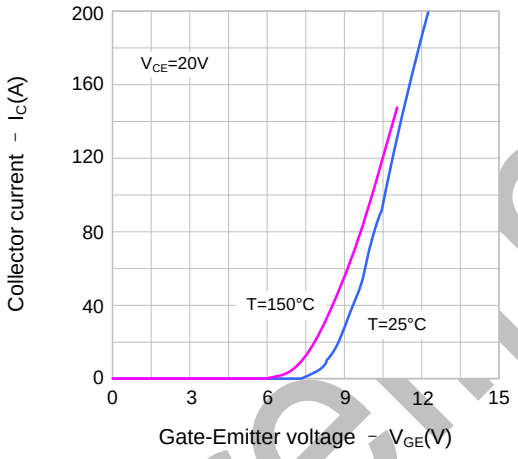


Figure 4. Capacitance characteristics

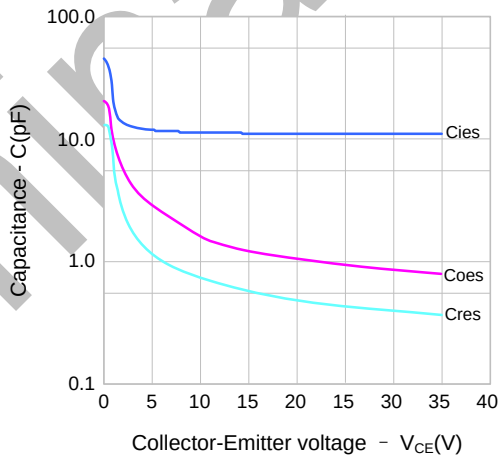


Figure 5. Gate charge characteristic

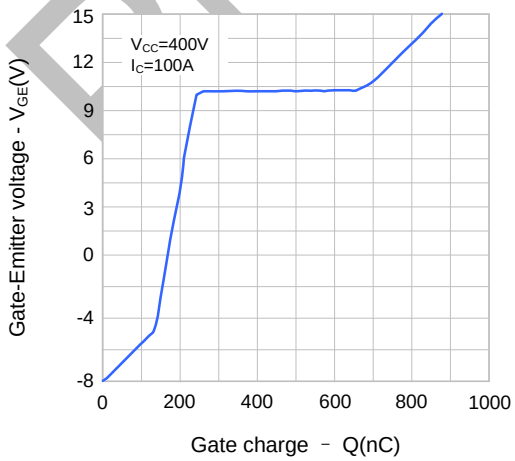
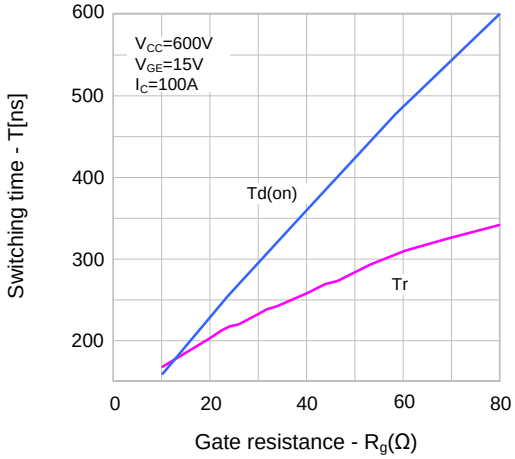


Figure 6. Turn-on characteristics vs. Gate resistance



TYPICAL CHARACTERISTICS CURVE (continued)

Figure 7. Turn-off characteristics vs. Gate resistance

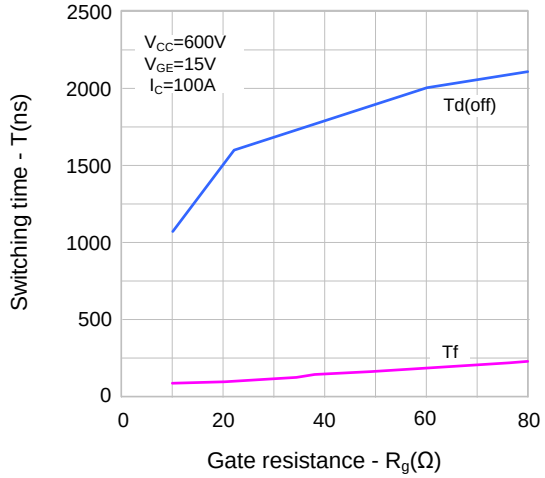


Figure 8. Switching loss vs. Gate resistance

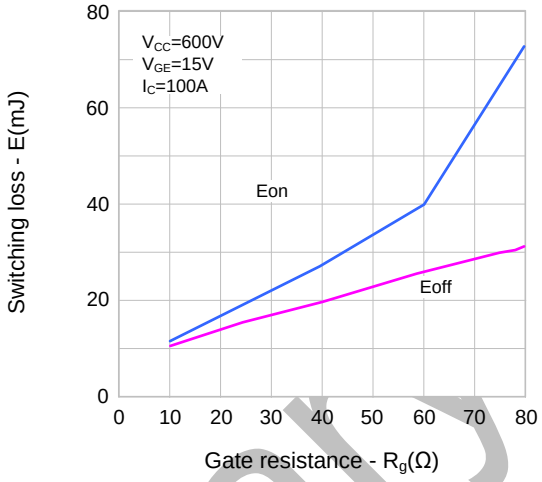


Figure 9. Turn-on characteristics vs. Collector current

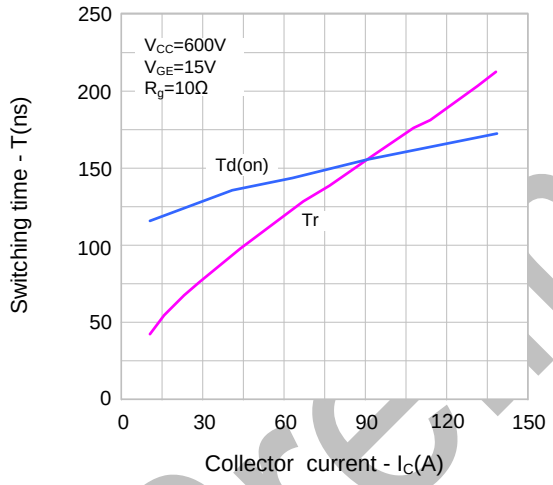


Figure 10. Turn-off characteristics vs. Collector current

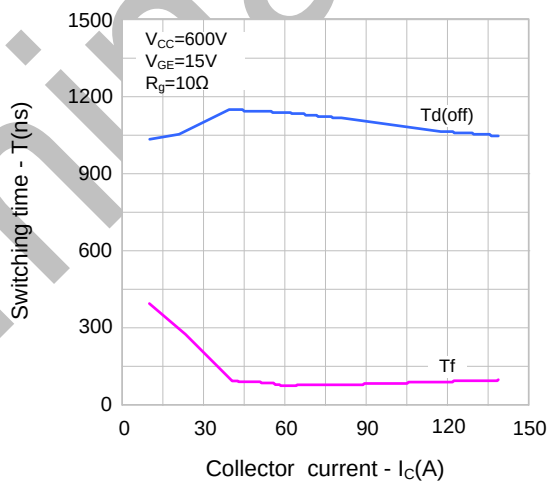


Figure 11. Switching losses vs. Collector current

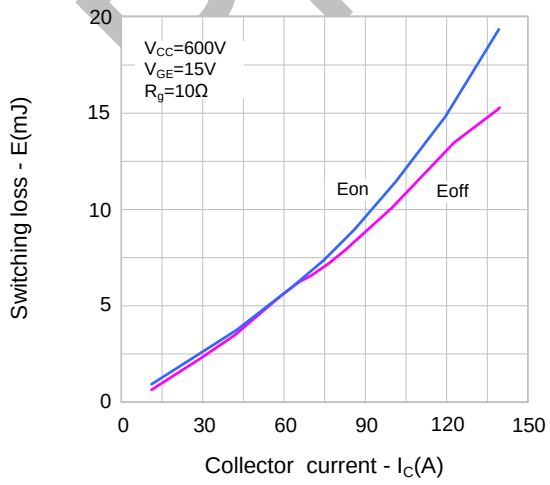
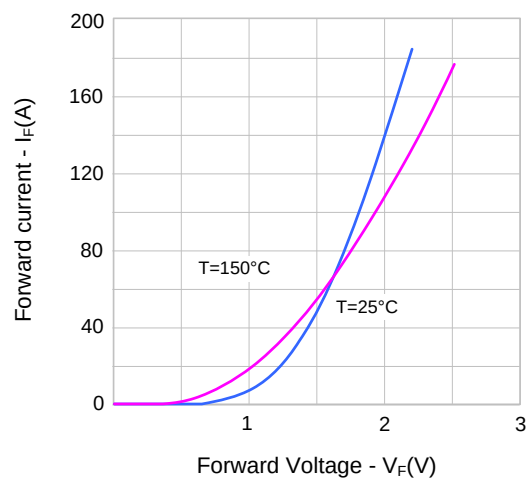
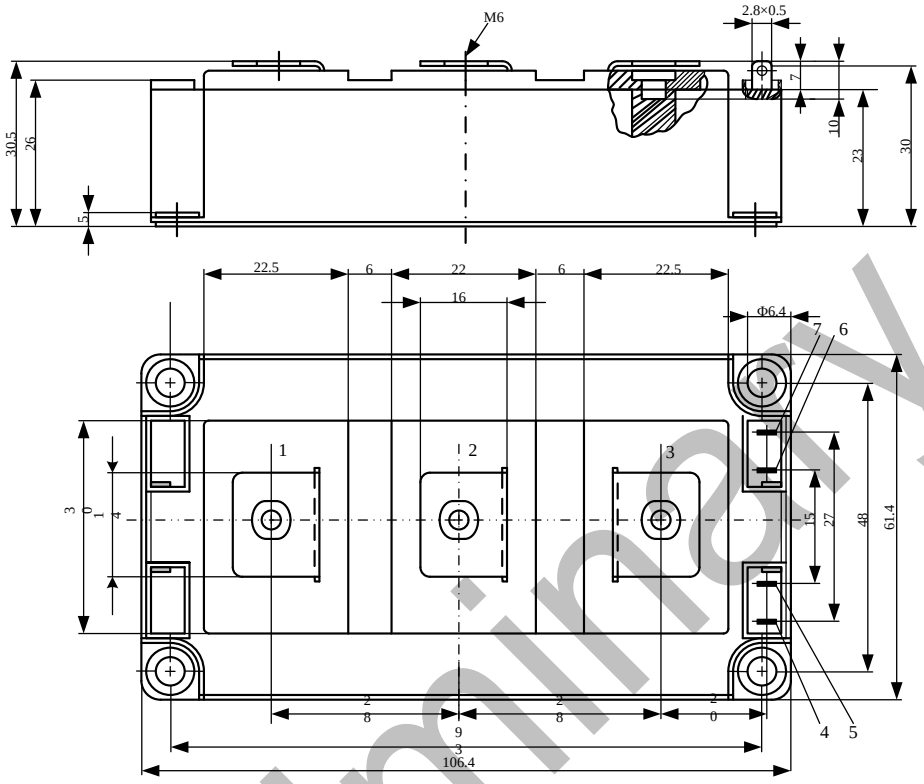


Figure 12. Diode forward characteristics



PACKAGE OUTLINE

A3 UNIT: mm



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1. Preliminary