

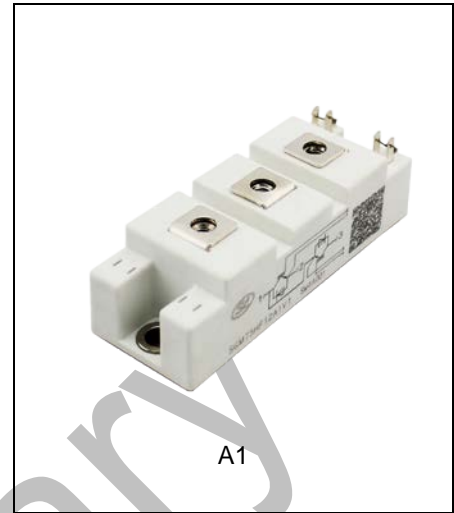
100A, 1200V IGBT MODULE

DESCRIPTION

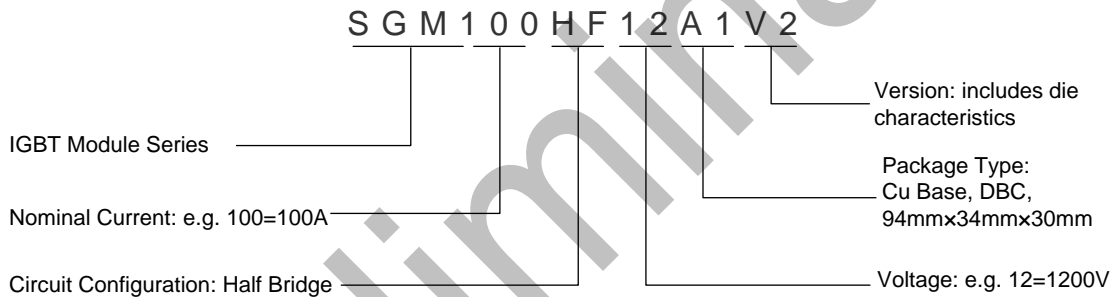
SGM100HF12A1V2 Module offers the optimum performance for UPS, AC inverter drive and electronic welders at fsw up to 20 kHz.

FEATURES

- ◆ 100A, 1200V, $V_{CE(sat)(typ.)}=2.1V@I_C=100A$
- ◆ VCEsat with positive temperature coefficient
- ◆ High short circuit capability
- ◆ Low switching loss
- ◆ Isolated copper baseplate using DBC technology



NOMENCLATURE



ORDERING INFORMATION

Part No.	Package	Marking	Material	Packing
SGM100HF12A1V2	A1	SGM100HF12A1V2	Pb Free	Carton

ABSOLUTE MAXIMUM RATINGS (T_c = 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}	200	A
Operating Junction Temperature Range	T_J	-40~+150	°C
Storage Temperature Range	T_{stg}	-40~+125	°C
Isolation Voltage	V_{iso}	2500	V
To heat sink M6	M_s	3~5	Nm
To terminals M5	M_t	2.5~5	Nm
Weight	W	160	g

THERMAL CHARACTERISTICS

Characteristics	Symbol	Ratings	Units
Thermal Resistance, Junction to Case (IGBT)	$R_{\theta JC}$	0.38	$^{\circ}\text{C/W}$
Thermal Resistance, Junction to Case (FRD)	$R_{\theta JC}$	0.41	$^{\circ}\text{C/W}$
Thermal Resistance, Case to sink	$R_{\theta CS}$	0.03	$^{\circ}\text{C/W}$

ELECTRICAL CHARACTERISTICS OF IGBT ($T_C=25^{\circ}\text{C}$ 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}	$V_{CE}=1200V, V_{GE}=0V, T_C=25^{\circ}\text{C}$	--	--	20	μA
		$V_{CE}=1200V, V_{GE}=0V, T_C=125^{\circ}\text{C}$	--	--	50	μA
G-E Leakage Current	I_{GES}	$V_{GE}=\pm 20V, V_{CE}=0V$	-200	--	200	nA
Gate Threshold Voltage	$V_{GE(th)}$	$I_C=250\mu\text{A}, V_{CE}=V_{GE}$	5.0	5.5	6.5	V
Collector to Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C=100A, V_{GE}=15V, T_C=25^{\circ}\text{C}$	--	2.1	2.5	V
		$I_C=100A, V_{GE}=15V, T_C=125^{\circ}\text{C}$	--	2.3	2.7	V
Input Capacitance	C_{ies}	$V_{CE}=25V$	--	6400	--	pF
Output Capacitance	C_{oes}	$V_{GE}=0V$	--	828	--	
Reverse Transfer Capacitance	C_{res}	$f=1\text{MHz}$	--	328	--	
Integrated Gate Resistor	R_g	$f=1\text{MHz}, C \text{ open}, \text{Osc level}=20\text{mV}$	--	6.9	--	Ω
Turn-On Delay Time	$T_{d(on)}$	$V_{CE}=600V, I_C=100A, R_g=10\Omega$	--	118	--	ns
Rise Time	T_r		--	164	--	
Turn-Off Delay Time	$T_{d(off)}$		--	740	--	
Fall Time	T_f		--	88	--	
Turn-On Switching Loss	E_{on}	$V_{GE}=15V$	--	11.9	--	mJ
Turn-Off Switching Loss	E_{off}	Inductive Load,	--	7.2	--	
Total Switching Loss	E_{st}		--	19.1	--	
Total Gate Charge	Q_g	$V_{CE}=600V, I_C=50A, V_{GE}=-8 \text{ to } 15V$	--	450	--	nC
Gate to Emitter Charge	Q_{ge}		--	42	--	
Gate to Collector Charge	Q_{gc}		--	239	--	
SC data	I_{SC}	$V_{CC}=600V, V_{GE}=15V$	--	315	--	A
SC data	T_{SC}		--	--	10	μs

ELECTRICAL CHARACTERISTICS OF FRD ($T_C = 25^{\circ}\text{C}$ unless otherwise noted)

Characteristics	Symbol	Test conditions	Min.	Typ.	Max.	Units
Diode Forward Voltage	V_F	$I_F=100A, T_C=25^{\circ}\text{C}$	--	2.1	--	V
		$I_F=100A, T_C=125^{\circ}\text{C}$	--	1.8	--	
Diode Reverse Recovery Time	T_{rr}	$I_F=100A, di/dt=200A/\mu\text{s}$	--	120	--	ns
Diode Reverse Recovery Current	I_{rr}		--	13	--	A
Diode Reverse Recovery Charge	Q_{rr}		--	0.8	--	μC

TYPICAL CHARACTERISTICS CURVE

Figure 1. Typical output characteristics(25°C)

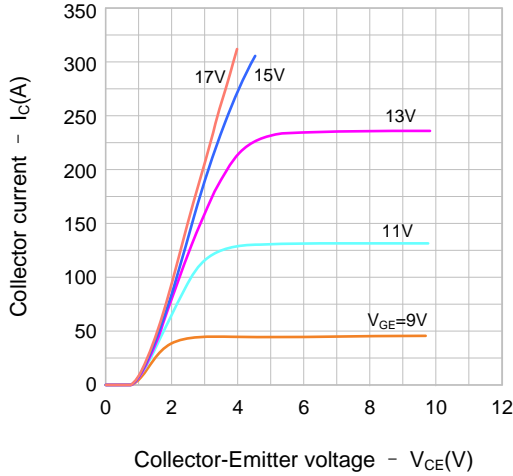


Figure 2. Typical output characteristics(125°C)

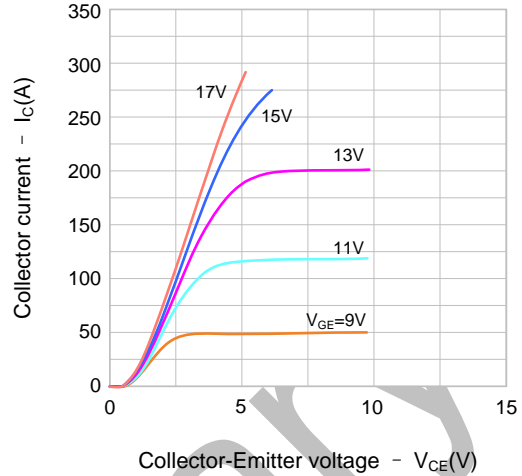


Figure 3. Transfer characteristics

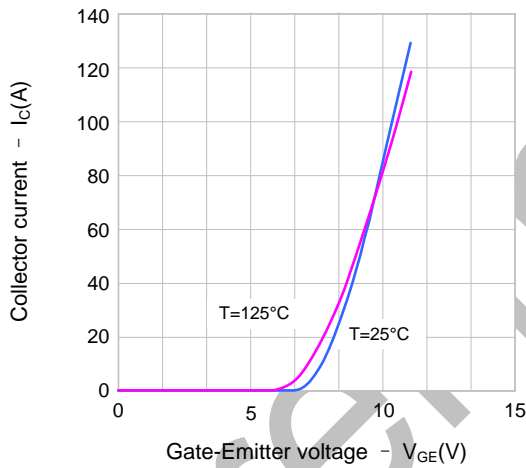


Figure 4. Capacitance characteristics

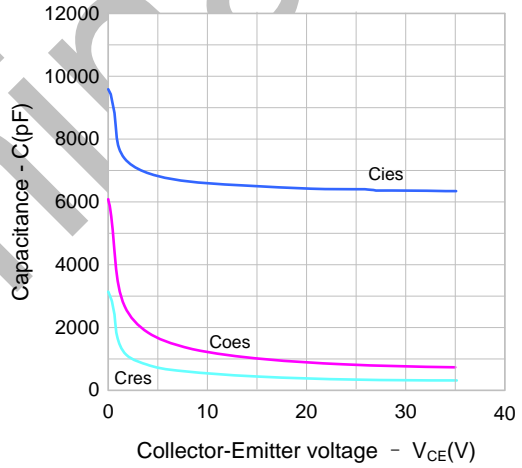


Figure 5. Gate charge characteristic

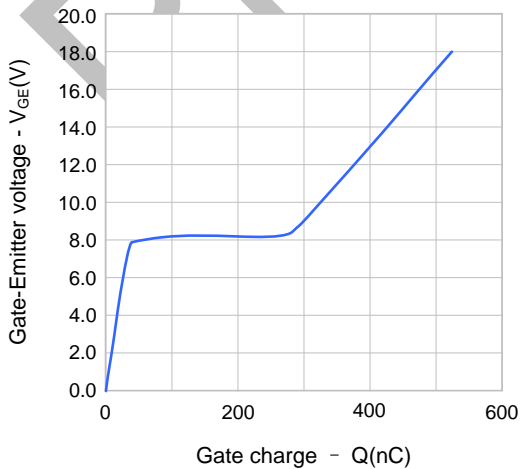
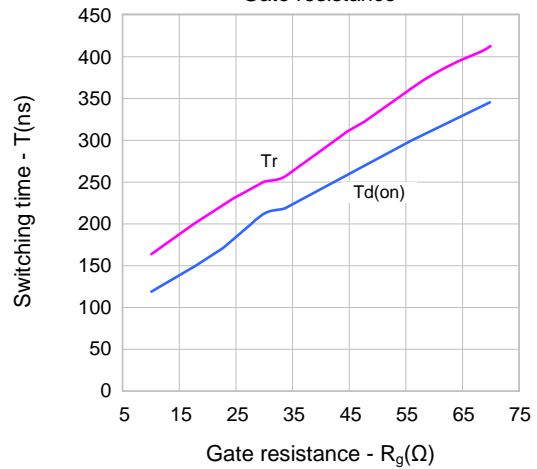


Figure 6. Turn-on characteristics vs. Gate resistance



TYPICAL CHARACTERISTICS CURVE (CONTINUED)

Figure 7. Turn-off characteristics vs. Gate resistance

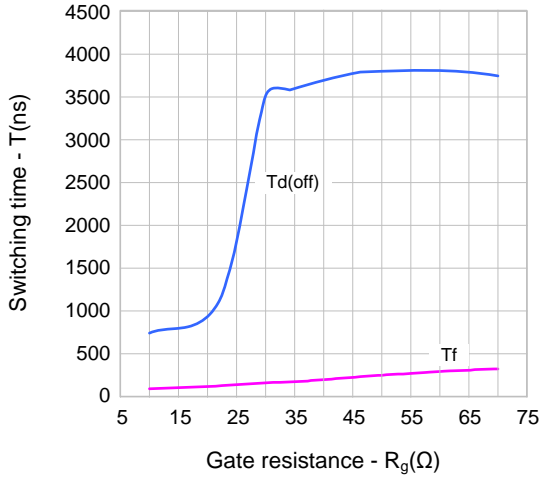


Figure 8. Switching loss vs. Gate resistance

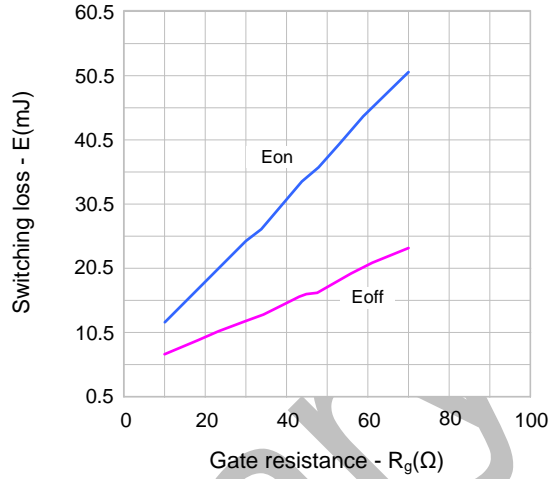


Figure 9. Turn-on characteristics vs. Collector current

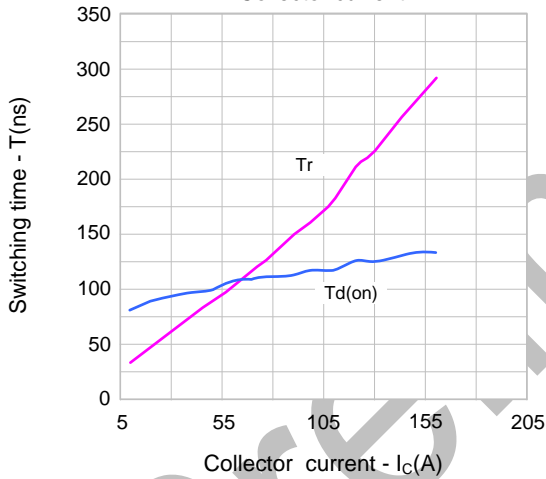


Figure 10. Turn-off characteristics vs. Collector current

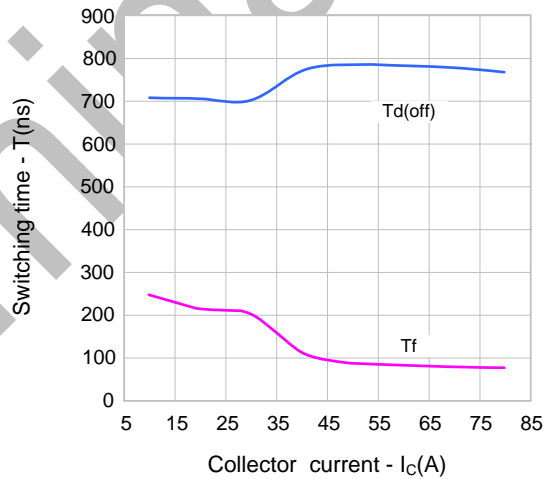


Figure 11. Switching losses vs. Collector current

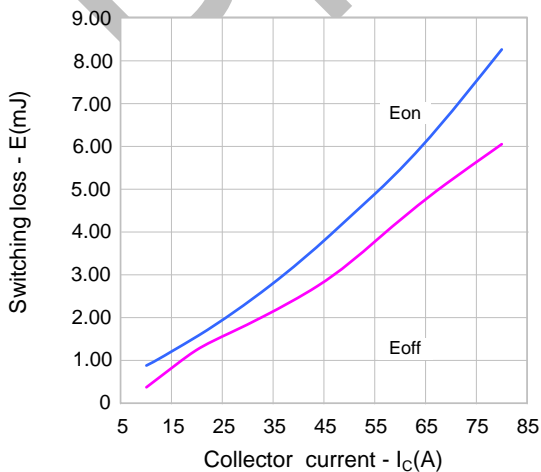
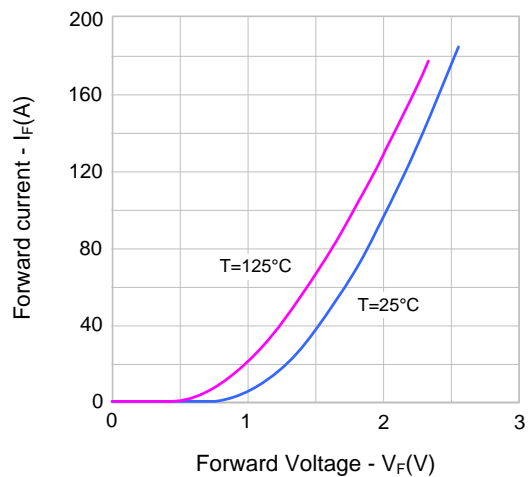
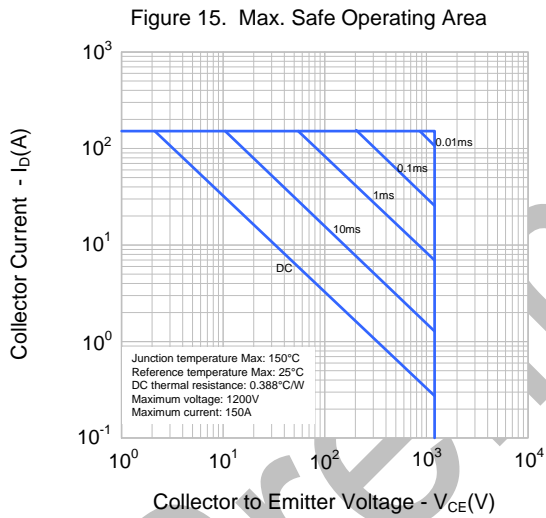
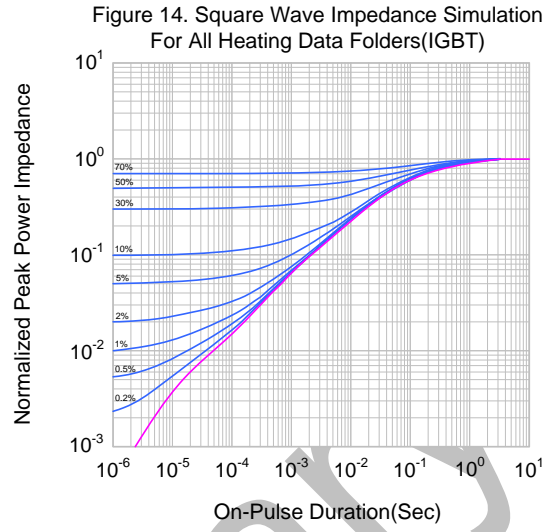
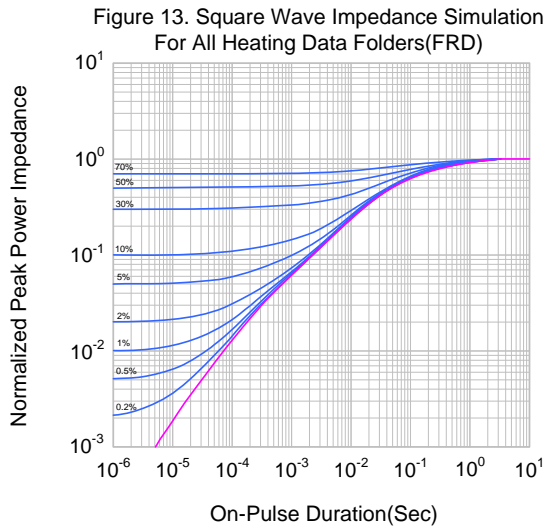


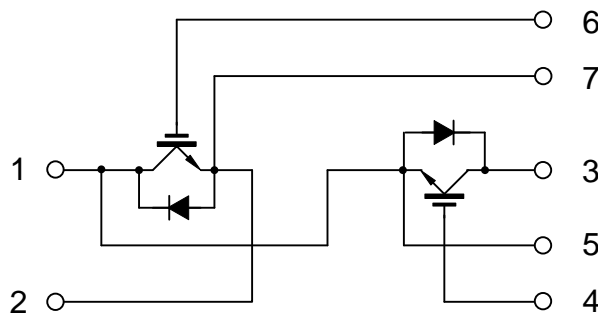
Figure 12. Diode forward characteristics



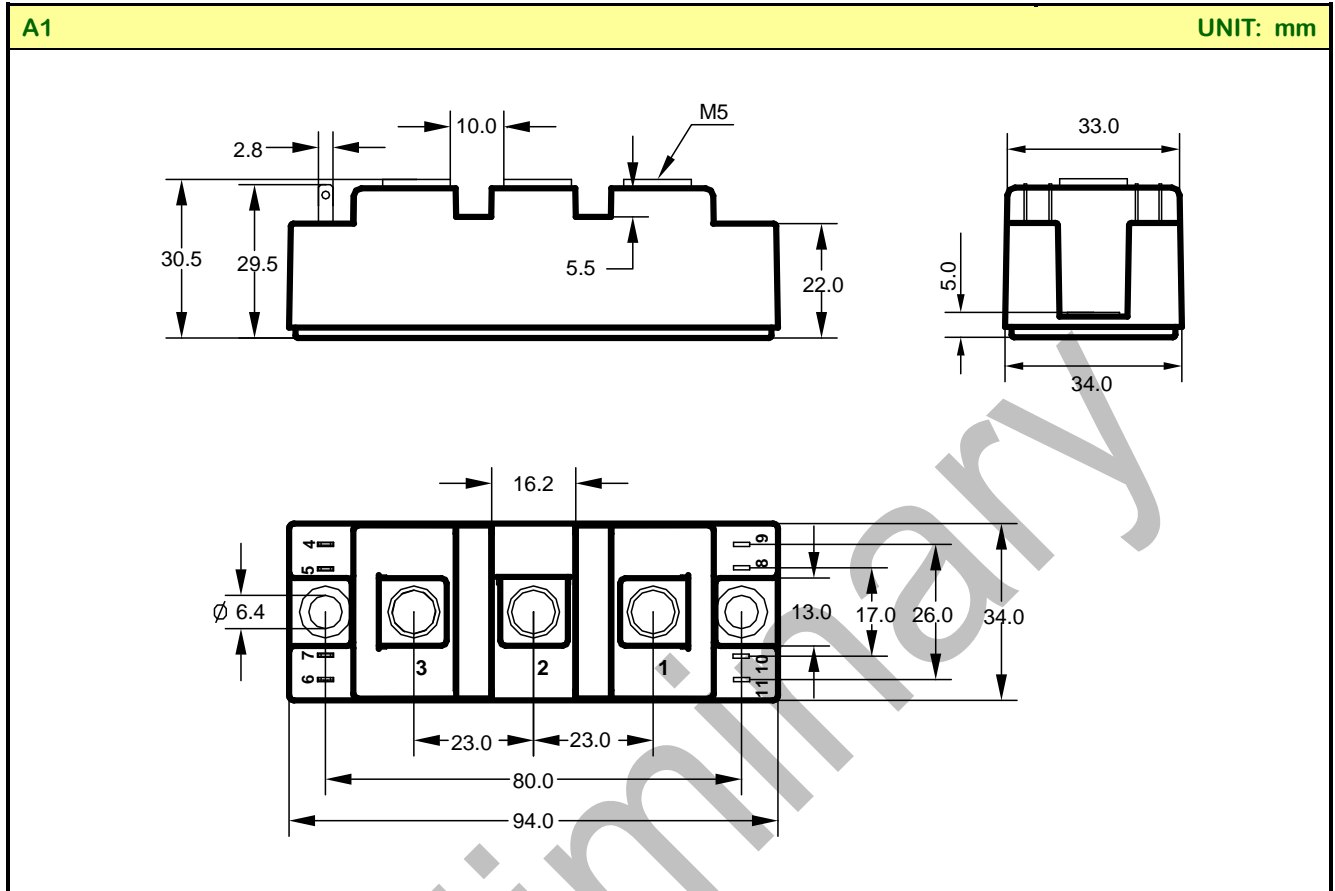
TYPICAL CHARACTERISTICS CURVE (CONTINUED)



CIRCUIT DIAGRAM



PACKAGE OUTLINE



Disclaimer :

- Silan reserves the right to make changes to the information herein for the improvement of the design and performance without further notice! Customers should obtain the latest relevant information before placing orders and should verify that such information is complete and current.
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Rev.:	0.2	Author:	Gu Yongli
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Revision History:

1. Modify the electrical characteristics
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Rev.:	0.1	Author:	Gu Yongli
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Revision History:

1. Preliminary
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Preliminary