

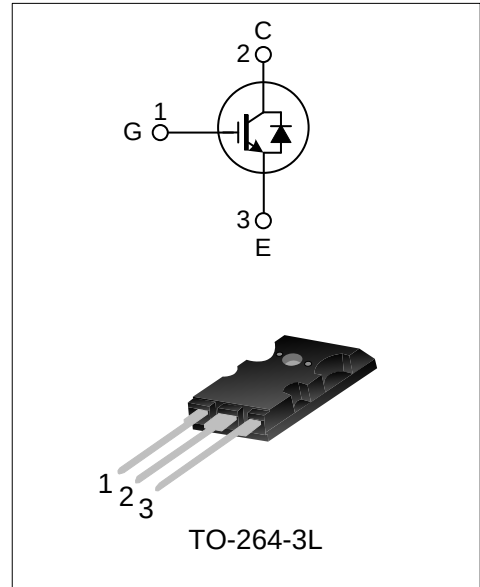
50A, 1200V FIELD STOP IGBT

DESCRIPTION

The SGT50T120FD3PL IGBT is fabricated using Silan 4th generation of trench field stop technology, features low conduction loss and switching loss, positive temperature coefficient for easy parallel operation. This device is applicable to electric welding machine, UPS, SMPS, and PFC fields.

FEATURES

- 50A, 1200V, $V_{CE(sat)}(typ.)=2.3V@I_C=50A$
- Low conduction loss
- Ultra fast switching
- High breakdown voltage



NOMENCLATURE

SGT 50 T 120 F D 3 P7	
IGBT series	Package
Current, 70: 70A	P7 : TO-247-3L
N : N Channel	1,2,3... : Version No.
NE : N-channel planar gate with ESD	Blank: Standard diode
T : Field Stop 3/4	M : Standard Diode, full range
U : Field Stop 4+	R : Rapid Diode
V : Field Stop 5	B : Rapid Diode, full range
W : Field Stop 6	S : Soft Diode, full range
X : Field Stop 7	
Voltage, 65: 650V	D : Packaged with fast recovery diode
120: 1200V	R : RC IGBT
	L : Ultra low switching, recommended frequency ~2KHz
	Q : Low switching, recommended frequency 2~20KHz
	S : Standard frequency, recommended frequency 5~40KHz
	F : Fast switching, recommended frequency 10~60KHz
	UF : Ultra fast switching, recommended frequency 40KHz~

ORDERING INFORMATION

Part No.	Package	Marking	Hazardous Substance Control	Packing Type
SGT50T120FD3PL	TO-264-3L	50T120FD	Pb free	Tube

ABSOLUTE MAXIMUM RATINGS (UNLESS OTHERWISE NOTED, $T_C=25^{\circ}\text{C}$)

Characteristics		Symbol	Ratings	Unit
Collector to Emitter Voltage		V _{CE}	1200	V
Gate to Emitter Voltage		V _{GE}	±20	V
Collector Current	T _C =25°C	I _C	100	A
	T _C =100°C		50	
Pulsed Collector Current		I _{CM}	150	A
Maximum Power Dissipation (T _C =25°C) -Derate above 25°C		P _D	360	W
			2.88	W/°C
Operating Junction Temperature		T _J	-55~+150	°C
Storage Temperature Range		T _{stg}	-55~+150	°C

THERMAL CHARACTERISTICS

Characteristics	Symbol	Ratings	Unit
Thermal Resistance, Junction to Case (IGBT)	$R_{\theta JC}$	0.26	$^{\circ}\text{C/W}$
Thermal Resistance, Junction to Case (FRD)	$R_{\theta JC}$	1.3	$^{\circ}\text{C/W}$
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	40	$^{\circ}\text{C/W}$

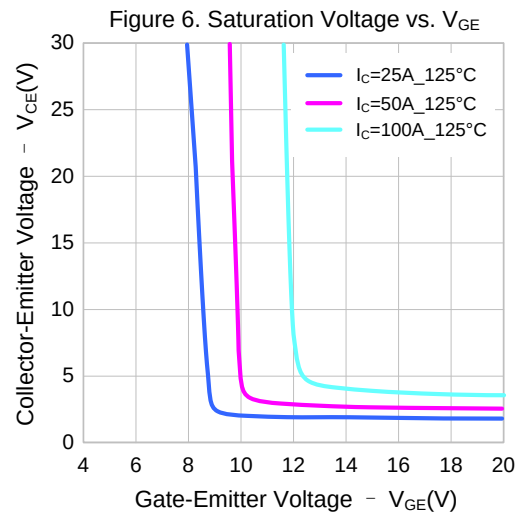
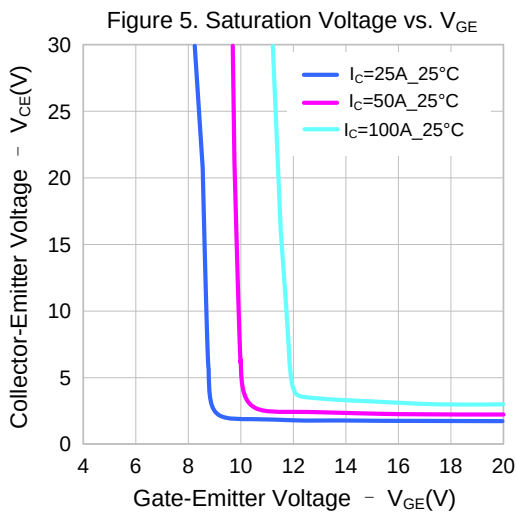
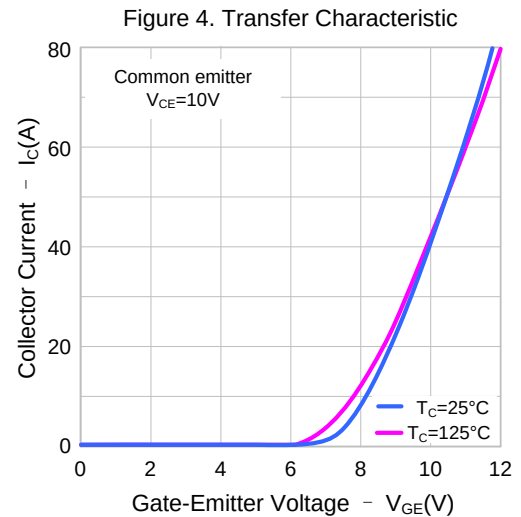
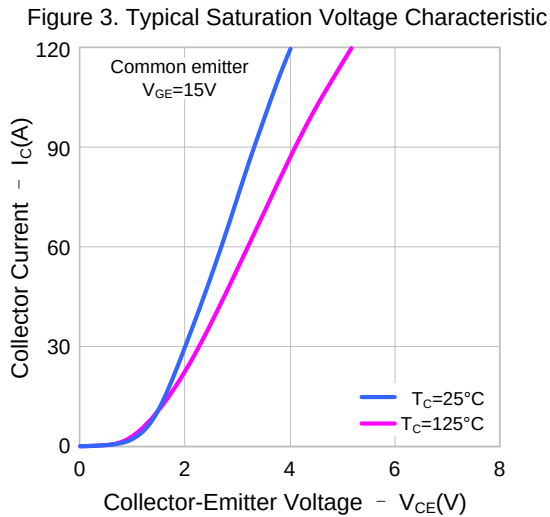
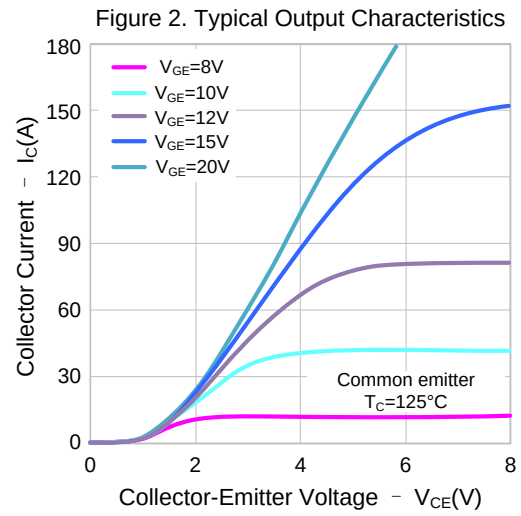
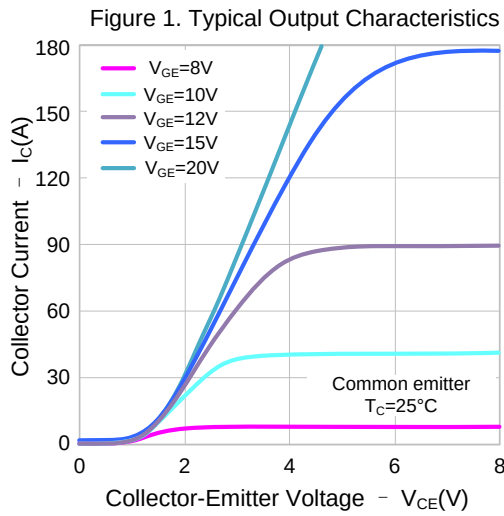
ELECTRICAL CHARACTERISTICS OF IGBT (UNLESS OTHERWISE NOTED, $T_c=25^\circ\text{C}$)

Characteristics	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Collector to Emitter Breakdown Voltage	BV_{CE}	$V_{GE}=0V, I_C=1mA$	1200	--	--	V
C-E Leakage Current	I_{CES}	$V_{CE}=1200V, V_{GE}=0V$	--	--	500	μA
G-E Leakage Current	I_{GES}	$V_{GE}=20V, V_{CE}=0V$	--	--	± 400	nA
G-E Threshold Voltage	$V_{GE(th)}$	$I_C=1.0mA, V_{CE}=V_{GE}$	3.5	6.0	7.5	V
Collector to Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C=50A, V_{GE}=15V$	--	2.3	2.8	V
		$I_C=50A, V_{GE}=15V, T_C=125^\circ\text{C}$	--	2.6	--	V
Input Capacitance	C_{ies}	$V_{CE}=30V$	--	5700	--	pF
Output Capacitance	C_{oes}	$V_{GE}=0V$	--	170	--	
Reverse Transfer Capacitance	C_{res}	$f=1MHz$	--	93	--	
Turn-On Delay Time	$T_{d(on)}$	$V_{CE}=600V$ $I_C=50A$ $R_g=10\Omega$ $V_{GE}=15V$ Inductive load	--	55	--	ns
Rise Time	T_r		--	125	--	
Turn-Off Delay Time	$T_{d(off)}$		--	240	--	
Fall Time	T_f		--	140	--	
Turn-On Switching Loss	E_{on}	Inductive load	--	4.8	--	mJ
Turn-Off Switching Loss	E_{off}		--	1.5	--	
Total Switching Loss	E_{st}		--	6.3	--	
Total Gate Charge	Q_g	$V_{CE}=600V, I_C=50A,$ $V_{GE}=15V$	--	260	--	nC
Gate to Emitter Charge	Q_{ge}		--	60	--	
Gate to Collector Charge	Q_{gc}		--	132	--	

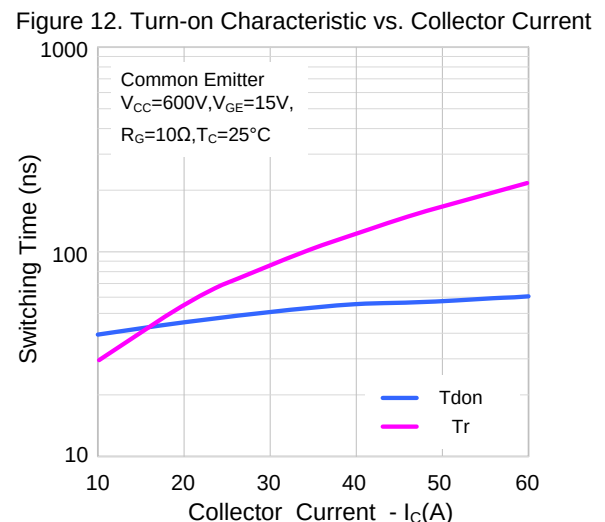
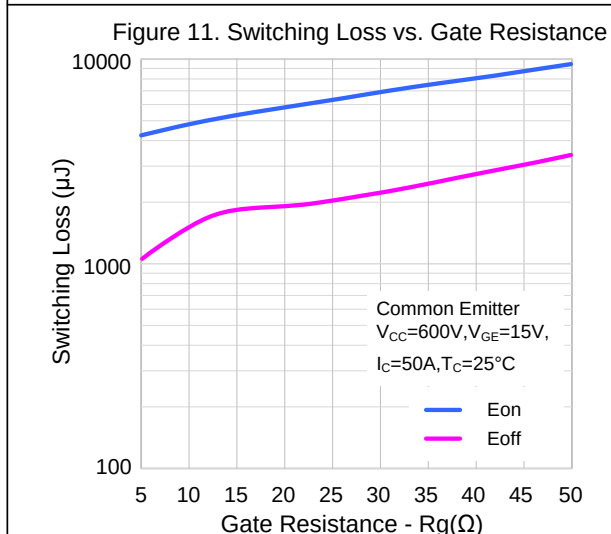
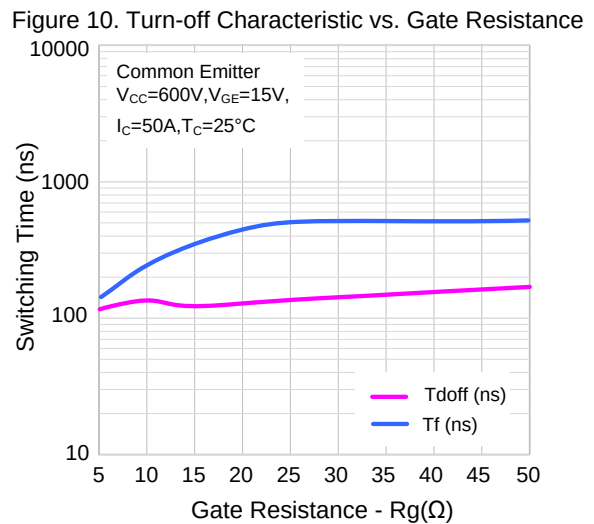
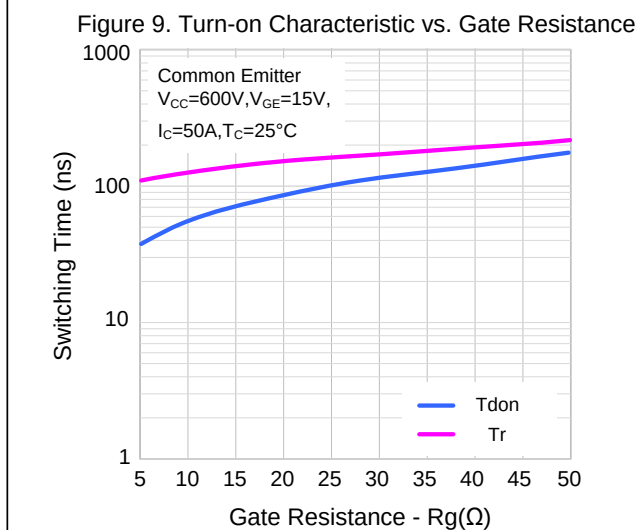
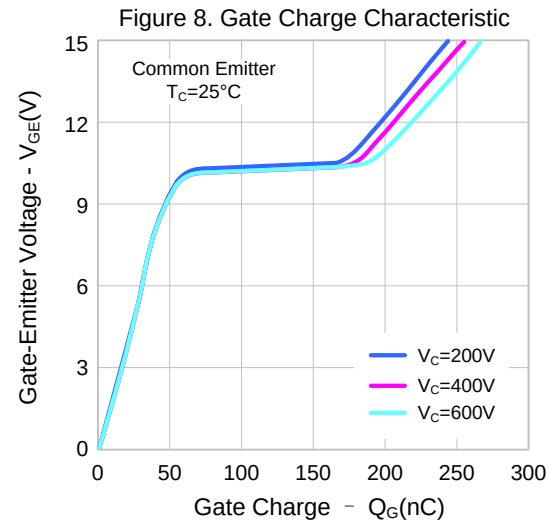
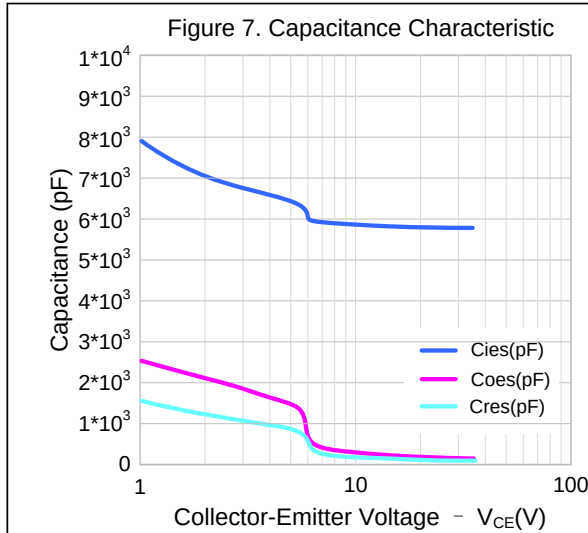
ELECTRICAL CHARACTERISTICS OF FRD (UNLESS OTHERWISE NOTED, $T_c=25^\circ\text{C}$)

Characteristics	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Diode Forward Voltage	V_{FM}	$I_F=10A, T_C=25^\circ\text{C}$	--	2.5	3.1	V
		$I_F=10A, T_C=125^\circ\text{C}$	--	2.0	--	
Diode Reverse Recovery Time	T_{rr}	$I_{ES}=10A, di_{ES}/dt=200A/\mu s$	--	88	--	ns
Diode Reverse Recovery Charge	Q_{rr}	$I_{ES}=10A, di_{ES}/dt=200A/\mu s$	--	0.35	--	nC

TYPICAL CHARACTERISTICS



TYPICAL CHARACTERISTICS (CONTINUED)



TYPICAL CHARACTERISTICS (CONTINUED)

Figure 13. Turn-off Characteristic vs. Collector Current

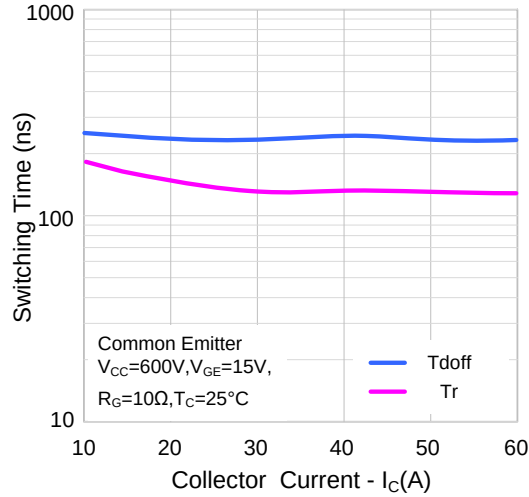


Figure 14. Switching Loss vs. Collector Current

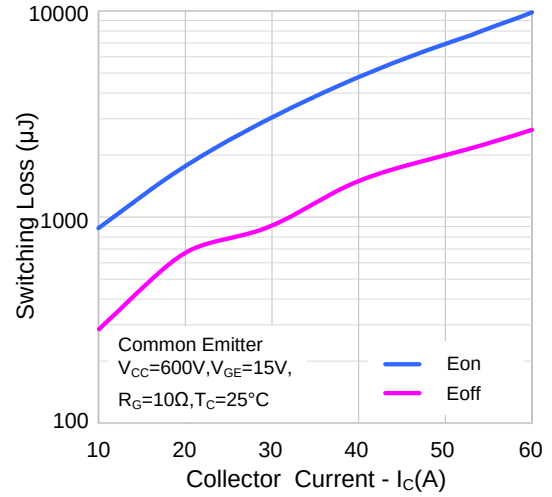


Figure 15. Forward Characteristic

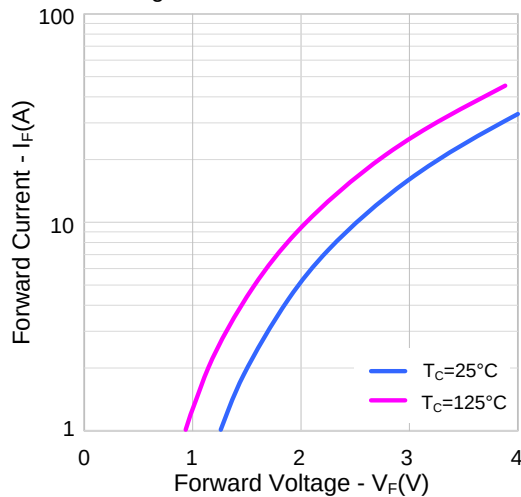


Figure 16. Reverse Recovery Time vs. Forward Current

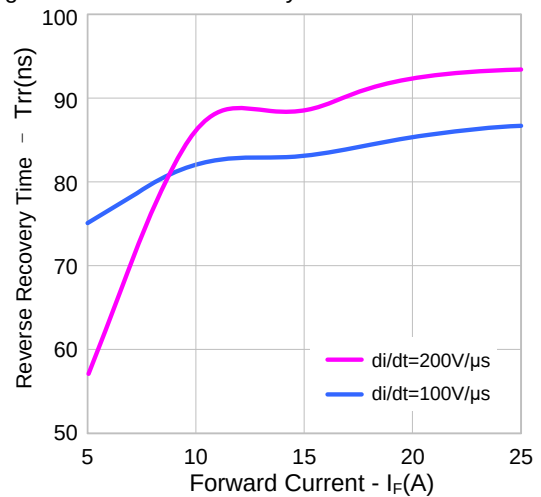
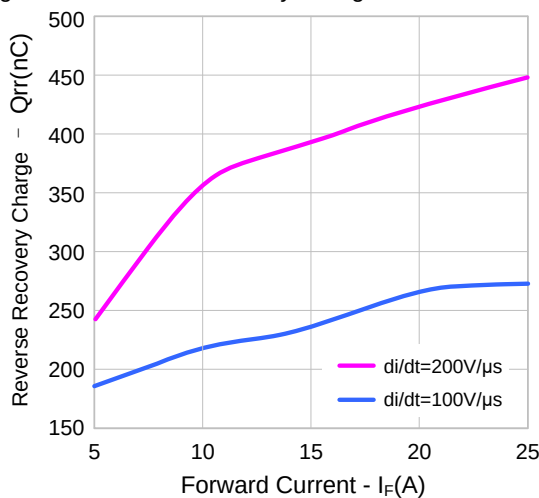


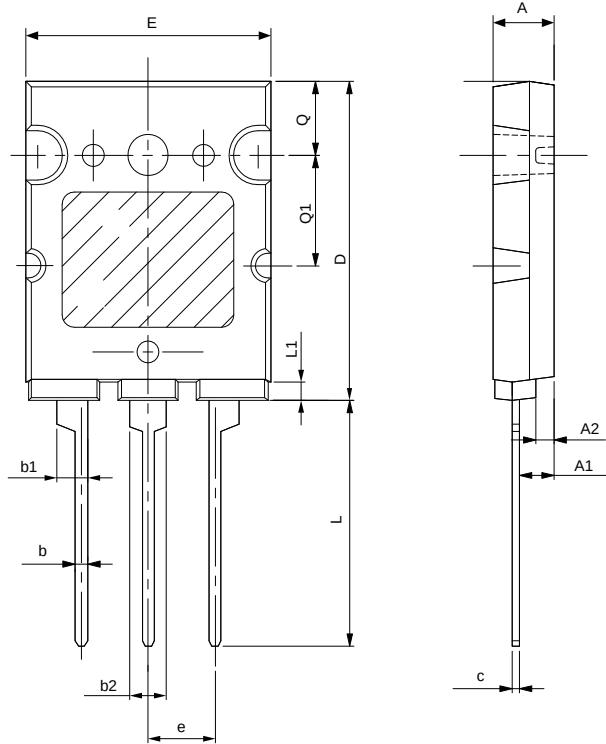
Figure 17. Reverse Recovery Charge vs. Forward Current



PACKAGE OUTLINE

TO-264-3L

UNIT: mm



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	4.70	5.00	5.30
A1	2.50	2.80	3.10
A2	1.40	1.50	1.85
b	0.90	---	1.25
b1	2.20	2.50	2.80
b2	2.70	3.00	3.30
c	0.45	0.60	0.85
D	25.20	26.00	26.80
E	19.20	20.00	20.80
e	5.45 TYP		
L	19.20	20.00	20.80
L1	1.35REF		
Q	5.70	6.00	6.30
Q1	8.60	9.00	9.40

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- The instructions are subject to change without 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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- Product promotion is endless, our company will wholeheartedly provide customers with better products!
- Website: <http://www.silan.com.cn>

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Rev.: 1.0

Revision History:

1. First release
