75A 650V Half bridge module

1 Description

These Insulated Gate Bipolar Transistor used advanced trench and Fieldstop technology design, provided excellent V_{CEsat} and switching speed ,low gate charge. Which accords with the RoHS standard.

2 Features

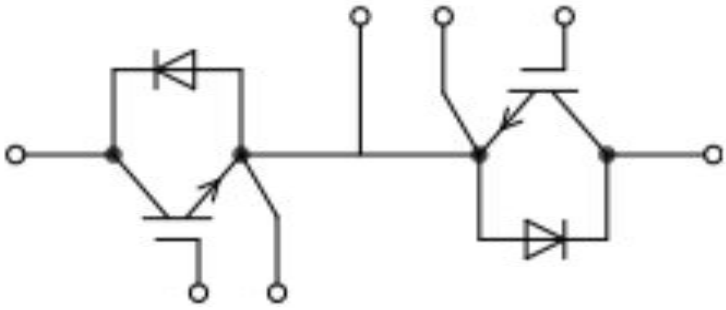
- FS Trench Technology, Positive temperature coefficient
- Low saturation voltage: $V_{CE(sat)}$, typ = 1.7V @ I_C =75A and T_j = 25°C
- Extremely enhanced avalanche capability

3 Applications

- Welding
- UPS
- Three-leve Inverter
- AC and DC servo drive amplifier

Type	V_{CE}	I_C	V_{CEsat},T_j=25℃	T_{jop}	Package
DGA75H65M2T	650V	75A (T_j=100℃)	1.7V (Typ)	175℃	34MM

4 Equivalent Circuit Schematic



5 Electrical Characteristics

5.1 Absolute Maximum Ratings (IGBT) (Tc=25℃,unless otherwise specified)

Parameter		Symbol	Value	Units
Collector-to-Emitter Voltage		V_{CE}	650	V
Gate-to-Emitter Voltage		V_{GE}	±30	V
DC Collector current	T_j=25℃	I_C	150	A
	T_j=100℃		75	A
Pulsed Collector Current #1		I_{CM}	300	A
Maximum Power Dissipation @Tc=25℃		P_D	500	W

Notes: #1 Pulse duration is limited bv $T_{j,max}$

5.2 Absolute Maximum Ratings (Diode) (Tc=25℃,unless otherwise specified)

PARAMETER		SYMBOL	VALUE	UNIT
Peak Repetitive Reverse Voltage		V_{RRM}	650	V
DC Blocking Voltage		V_R	650	V
Average Rectified Forward Current		$I_{F(AV)}$	75	A
Repetitive Peak Surge Current		I_{FRM}	150	A
Nonrepetitive Peak Surge Current(single)	tp=8.3ms	I_{FSM}	600	A

5.53IGBT Module

Parameter	Symbol	VALUE	Units
Junction Temperature Range	T_{jmax}	-45～175	℃
Operating Junction Temperature	T_{jop}	-45～150	℃
Storage Temperature Range	T_{stg}	-45～150	℃
Isolation Voltage R_{MS},f=50Hz,t=1min	V_{ISO}	4000	V

5.4Thermal Characteristics（IGBT Module）

Parameter		Symbol	Rating	Units
Thermal Resistance Junction to Case	IGBT	R_{thJC}	0.30	℃/W
	Diode		0.48	

5.5 Electrical Characteristics (IGBT) (Tc=25℃, unless otherwise specified)

Parameter	Symbol	Conditions	Value			Units
			Min	Typ	Max	
Static Characteristics						
Collector-to-Emitter Breakdown Voltage	$V_{(BR)CES}$	I_C=1mA,V_{GE}=0V,T_j=25℃	650	--	--	V
Collector-to-Emitter Leakage Current	I_{CES}	V_{CE}=650V,V_{GE}=0V,T_j=25℃	--	--	20	μA
		V_{CE}=650V,V_{GE}=0V,T_j=150℃	--	--	5.0	mA
Gate-to-Emitter Leakage Current	I_{GES}	V_{GE}=±30V,V_{CE}=0V,T_j=25℃	--	--	±100	nA
		V_{GE}=±30V,V_{CE}=0V,T_j=150℃	--	--	±200	nA
Gate Threshold Voltage	$V_{GE(th)}$	V_{CE}=V_{GE},I_C=1mA	5.0	6.0	7.5	V
Collector-emitter saturation voltage	V_{CEsat}	V_{GE}=15V,I_C=75A,T_j=25℃	--	1.7	2.0	V
		V_{GE}=15V,I_C=75A,T_j=150℃	--	1.95	-	V
Dynamic Characteristics						
Input Capacitance	C_{iss}	V_{CE}=25V,V_{GE}=0V, f=1MHz,T_a=25℃	--	5474	--	pF
Output Capacitance	C_{oss}		--	243	--	
Reverse Transfer Capacitance	C_{rss}		--	35	--	
IGBT Characteristics						
Turn-on delay time	$t_{d(on)}$	V_{CE}=400V,I_C=75A, R_g=5Ω,V_{GE}=15V, 感性负载,T_j=25℃	--	41	--	nS
Rise time	t_r		--	125	--	nS
Turn-off delay time	$t_{d(off)}$		--	143	--	nS
Fall time	t_f		--	95	--	nS
Turn-on energy	E_{on}		--	2.65	--	mJ
Turn-off energy	E_{off}		--	1.91	--	mJ
Total switching energy	E_{ts}		--	4.56	--	mJ
Turn-on delay time	$t_{d(on)}$	V_{CE}=400V,I_C=75A, R_g=10Ω,V_{GE}=15V, 感性负载,T_j=175℃	--	37	--	nS
Rise time	t_r		--	119	--	nS
Turn-off delay time	$t_{d(off)}$		--	169	--	nS
Fall time	t_f		--	147	--	nS
Turn-on energy	E_{on}		--	2.69	--	mJ
Turn-off energy	E_{off}		--	2.33	--	mJ
Total switching energy	E_{ts}		--	5.02	--	mJ
Gate charge	Q_g	V_{CE}=520V,I_C=75A, V_{GE}=15V	--	187	--	nC

5.6Electrical Characteristics (Diode)(Tc=25℃, unless otherwise specified)

Parameter	Symbol	Conditions	Value			Units
			Min	Typ	Max	
Diode forward voltage	V_F	I_F=75A, T_j=25℃	--	1.72	2.5	V
		I_F=75A, T_j=150℃	--	1.10	--	V
Diode reverse recovery time	t_{rr}	I_F=0.5A, I_R=1.0A,I_{rr}=0.25A	--	40	--	ns
Diode reverse recovery time	t_{rr}	I_F=75A , di/dt=200A/uS ,	--	105	--	ns
Diode peak reverse recovery curren	I_{rrm}		--	2.2	--	A
Diode reverse recovery charge	Q_{rr}		--	126	--	nC
Maximum Instantaneous Reverse	I_R	V_R = 650V	--	--	10	uA
		V_R = 650V, T_C = 150℃	--	--	5	mA

5 Typical Characteristic Curves

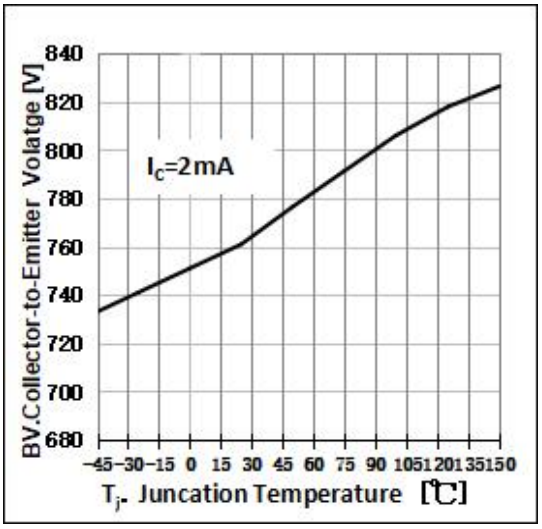


Fig1.**Collector-to-Emitter Breakdown Voltage Temperature characteristic**

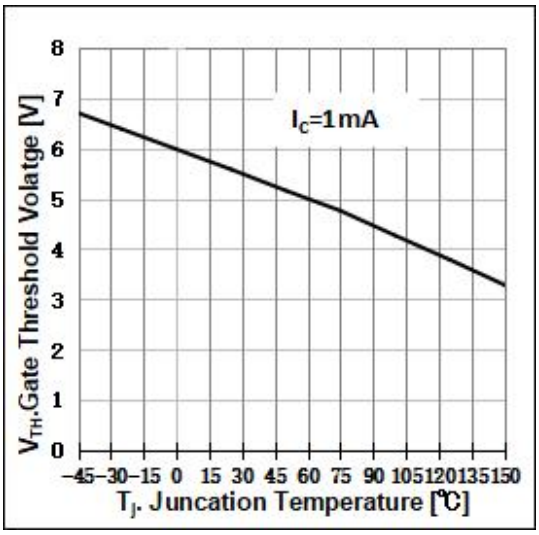


Fig2.**Gate Threshold Voltage Temperature characteristic**

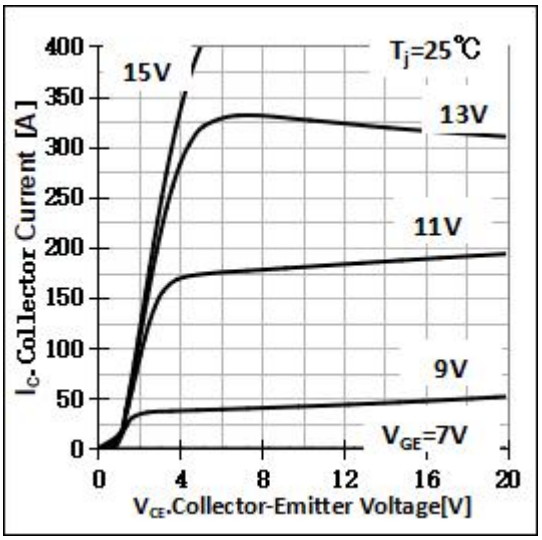


Fig3.**Typical output characteristic**

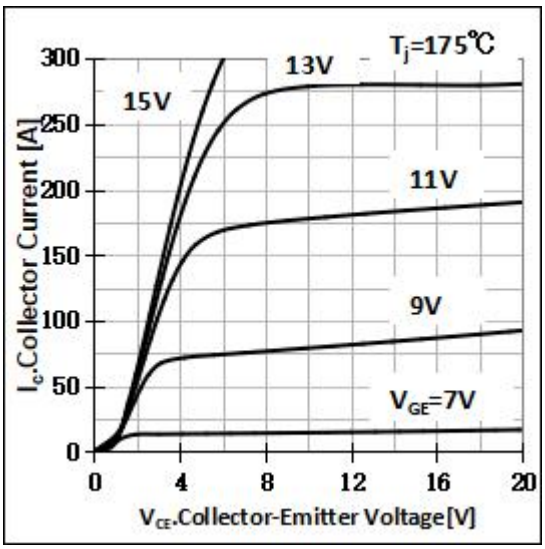


Fig4.**Typical output characteristic**

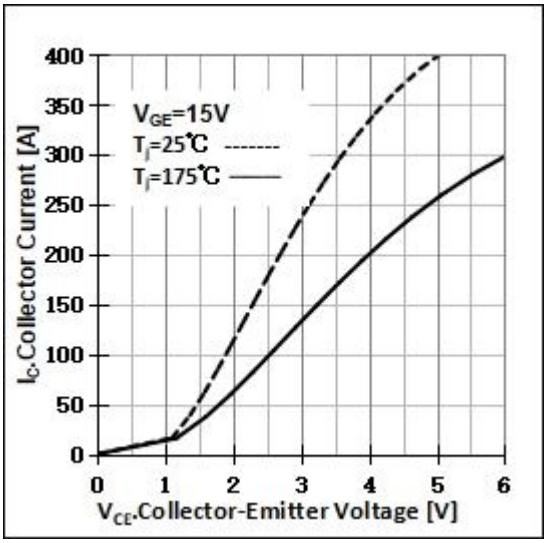


Fig5.**Collector-emitter saturation voltage Characteristic**

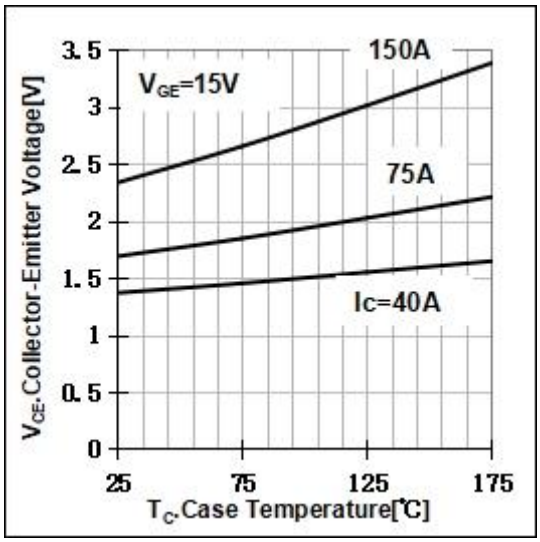


Fig6.**Collector-emitter saturation voltage Temperature Characteristic**

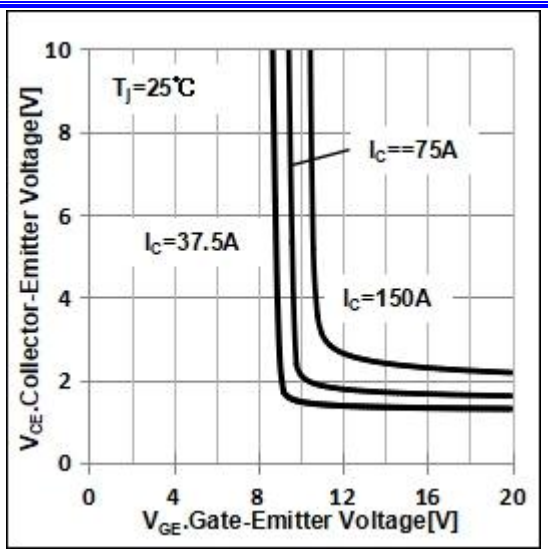


Fig7.**Typical Transfer characteristic curve of Saturation Voltage vs Vge**

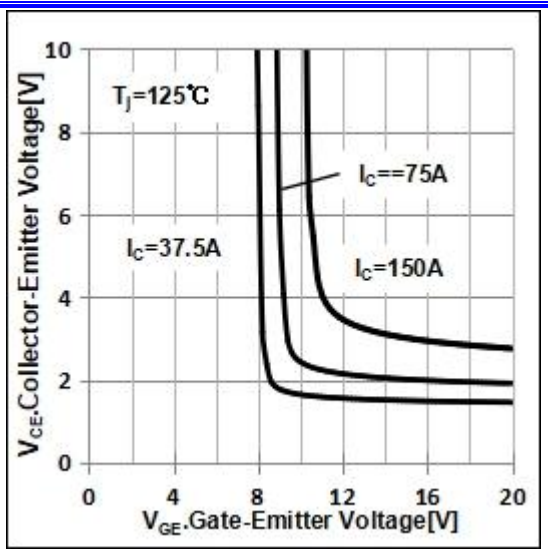


Fig8. **Typical Transfer characteristic curve of Saturation Voltage vs Vge**

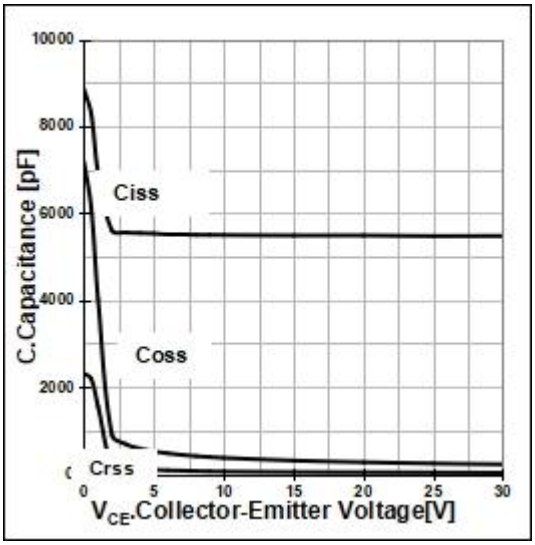


Fig9.**Typical capacitance as a function of collector-emitter voltage**

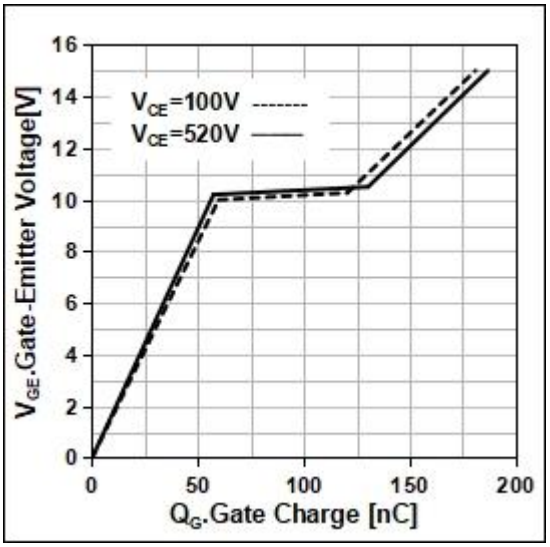


Fig10.**Typical gate charge**

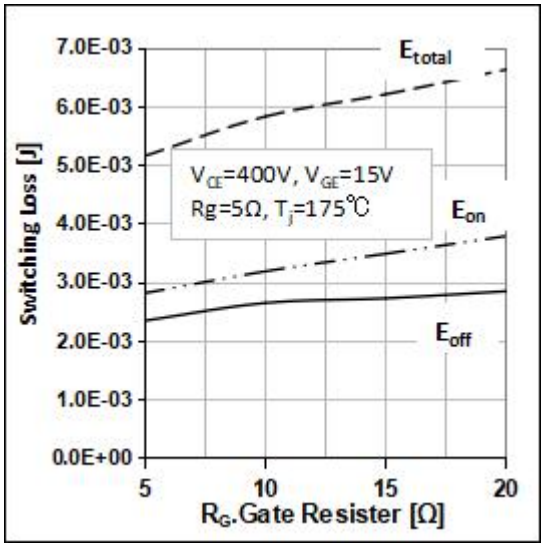


Fig11.**Typical switching energy losses as a function of gate resistor**

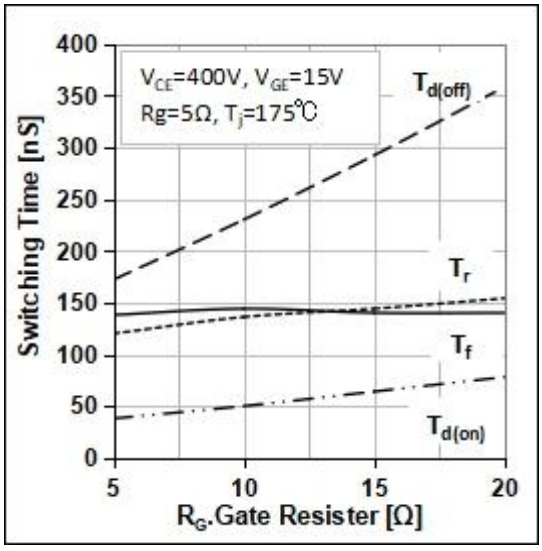


Fig12.**Typical switching times as a function of gate resistor**

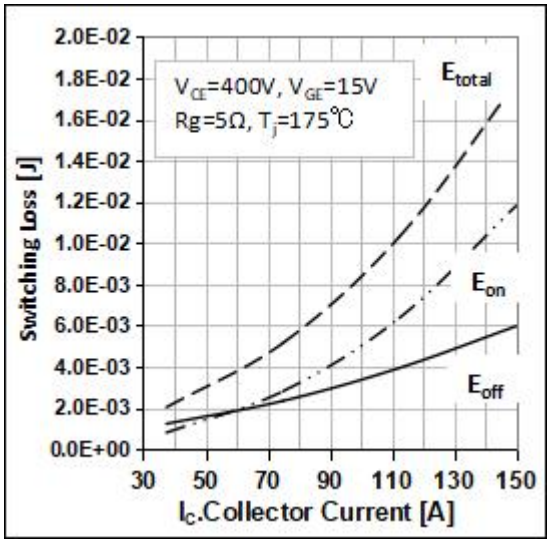


Fig13.**Typical switching energy losses as a function of Collector Current**

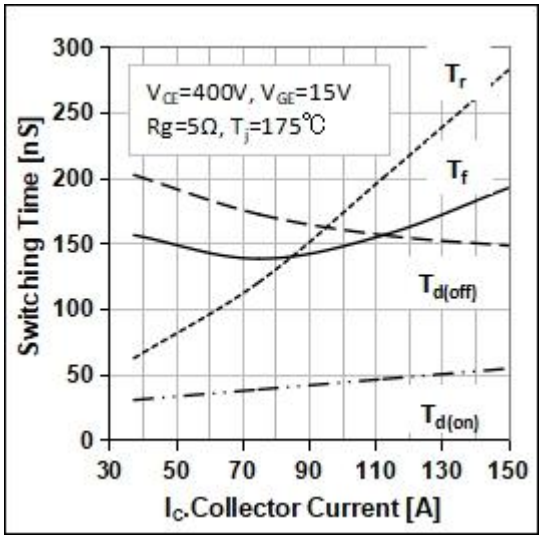


Fig14.**Typical switching times as a function of Collector Current**

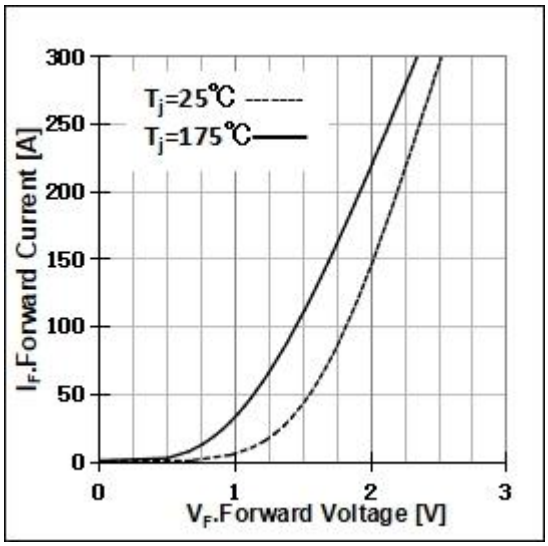


Fig15.**Typical diode forward current as a function of forward voltage**

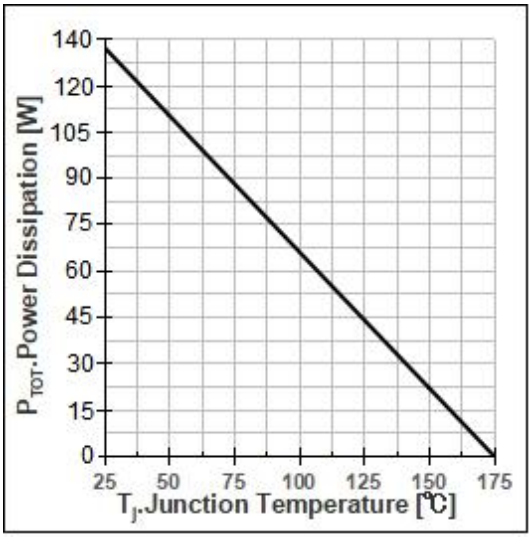
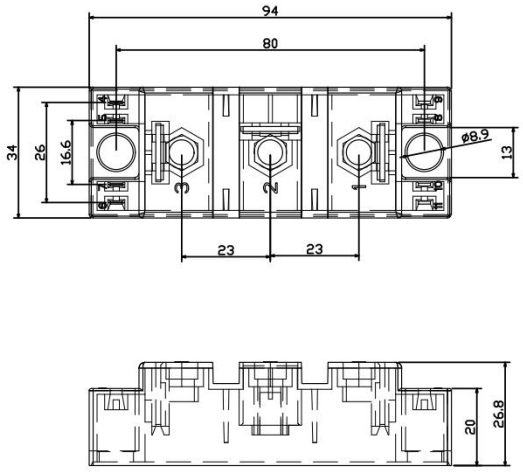
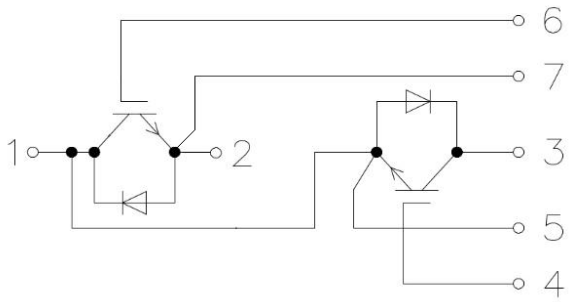


Fig16.**Power dissipation temperature characteristic**

7 Dimensions



7.1 Circuit Schematic



8 Attentions

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- Product promotion is endless, our company will be dedicated to provide customers with better products.

9 Appendix

Revision history:

Date	REV.	Description	Page
2020.10.12	1.0	Original	