

PIM/Built-in converter with thyristor and brake (S series) 1200V / 35A / PIM



■ Features

- Low $V_{CE(sat)}$
- Compact Package
- P.C. Board Mount Module
- Converter Diode Bridge Dynamic Brake Circuit

■ Applications

- Inverter for Motor Drive
- AC and DC Servo Drive Amplifier
- Uninterruptible Power Supply

■ Maximum ratings and characteristics

● Absolute maximum ratings ($T_c=25^\circ\text{C}$ unless without specified)

Item	Symbol	Condition		Rating	Unit	
Inverter	Collector-Emitter voltage	V _{CES}		1200	V	
	Gate-Emitter voltage	V _{GES}		±20	V	
	Collector current	I _c	Continuous	T _c =25°C	50	A
				T _c =80°C	35	
		I _{CP}	1ms	T _c =25°C	100	A
				T _c =80°C	70	
		-I _c			35	A
Collector power dissipation	P _C	1 device		240	W	
Brake	Collector-Emitter voltage	V _{CES}		1200	V	
	Gate-Emitter voltage	V _{GES}		±20	V	
	Collector current	I _c	Continuous	T _c =25°C	35	A
				T _c =80°C	25	
		I _{CP}	1ms	T _c =25°C	70	A
				T _c =80°C	50	
	Collector power dissipation	P _C	1 device		180	W
Thyristor	Repetitive peak reverse voltage(Diode)	V _{RRM}		1200	V	
	Repetitive peak off-state voltage	V _{DRM}		1600	V	
	Repetitive peak reverse voltage	V _{RRM}		1600	V	
	Average on-state current	I _{T(AV)}	50Hz/60Hz sine wave	35	A	
	Surge On-state current (Non-Repetitive)	I _{TSM}	T _j =125°C, 10ms half sine wave	390	A	
	Junction temperature	T _{jw}		125	°C	
	Converter	Repetitive peak reverse voltage	V _{RRM}		1600	V
Average output current		I _o	50Hz/60Hz sine wave	35	A	
Surge current (Non-Repetitive)		I _{FSM}	T _j =150°C, 10ms	360	A	
I ² t (Non-Repetitive)		I ² t	half sine wave	648	A ² s	
Junction temperature (except Thyristor)		T _j		+150	°C	
Storage temperature		T _{stg}		-40 to +125	°C	
Isolation between terminal and copper base *2		V _{iso}	AC : 1 minute	AC 2500	V	
voltage between thermistor and others *3				AC 2500	V	
Mounting screw torque				1.7 *1	N·m	

*1 Recommendable value : 1.3 to 1.7 N·m (M4)

*2 All terminals should be connected together when isolation test will be done.

*3 Terminal 8 and 9 should be connected together. Terminal 1 to 7 and 10 to 26 should be connected together and shorted to copper base.

● Electrical characteristics (T_j=25°C unless otherwise specified)

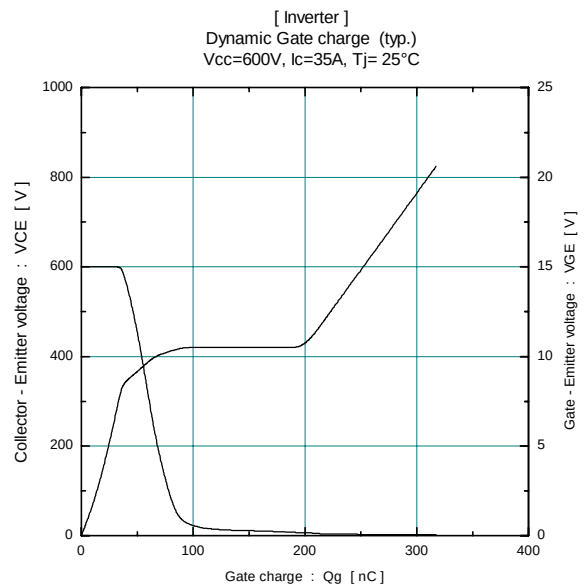
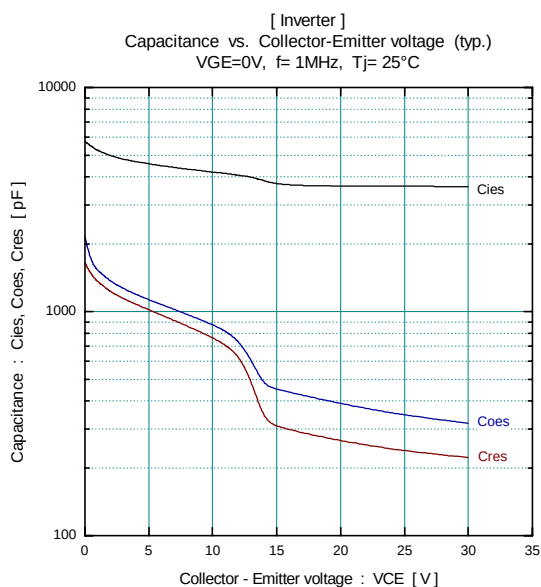
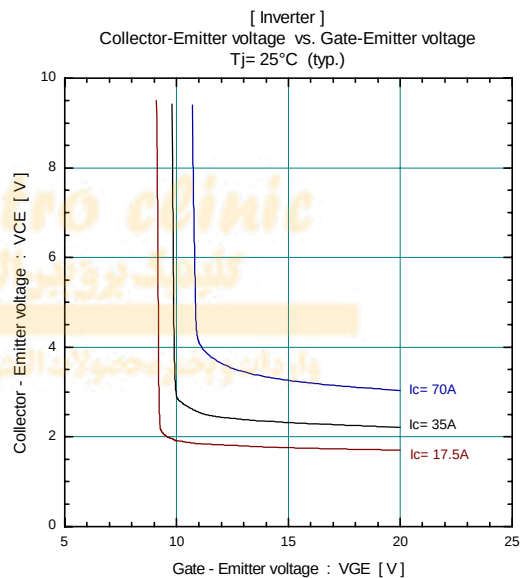
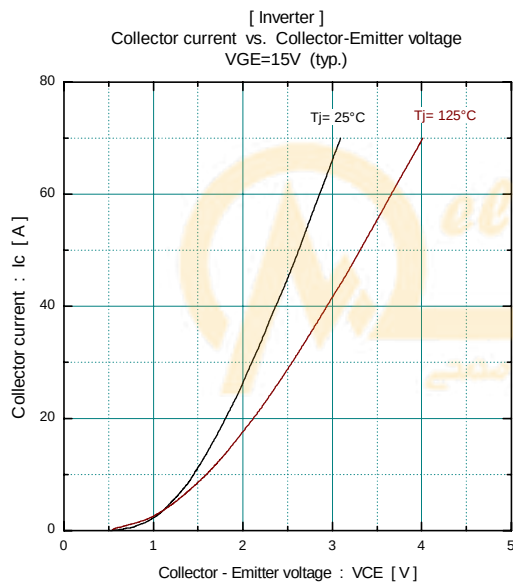
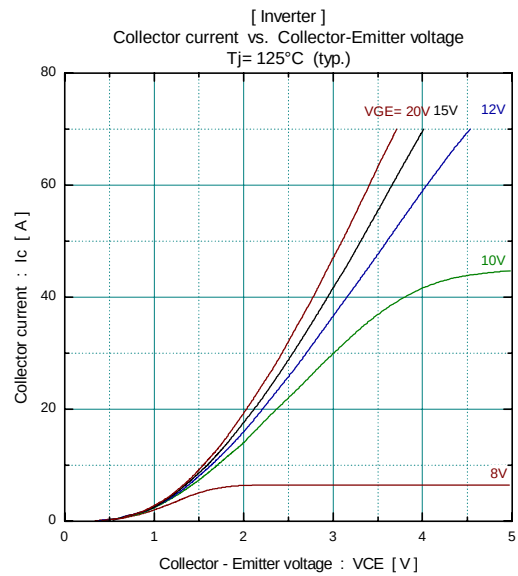
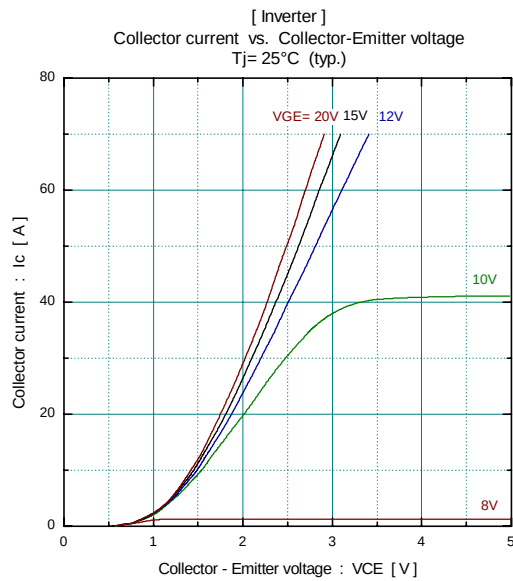
Item		Symbol	Condition	Characteristics			Unit
				Min.	Typ.	Max.	
Inverter	Zero gate voltage collector current	I _{CES}	V _{CE} =1200V, V _{GE} =0V			200	μA
	Gate-Emitter leakage current	I _{GES}	V _{CE} =0V, V _{GE} =±20V			200	nA
	Gate-Emitter threshold voltage	V _{GE(th)}	V _{CE} =20V, I _C =35mA	5.5	7.2	8.5	V
	Collector-Emitter saturation voltage	V _{CE(sat)}	V _{GE} =15V, I _C =35A		2.1		V
					2.25	2.7	
	Input capacitance	C _{ies}	V _{GE} =0V, V _{CE} =10V, f=1MHz		4200		pF
	Turn-on time	t _{on}	V _{CC} =600V I _C =35A V _{GE} =±15V R _G =33Ω		0.35	1.2	μs
		t _r			0.25	0.6	
	Turn-off	t _{off}			0.45	1.0	
		t _f			0.08	0.3	
Brake	Forward on voltage	V _F	I _F =35A		2.3		V
			chip		2.45	3.3	
			terminal				
	Reverse recovery time of FRD	t _{rr}	I _F =35A			350	ns
	Zero gate voltage collector current	I _{CES}	V _{CE} =1200V, V _{GE} =0V			200	μA
	Gate-Emitter leakage current	I _{GES}	V _{CE} =0V, V _{GE} =±20V			200	nA
	Collector-Emitter saturation voltage	V _{CE(sat)}	I _C =25A, V _{GE} =15V		2.1		V
					2.25	2.7	
	Turn-on time	t _{on}	V _{CC} =600V I _C =25A V _{GE} =±15V R _G =51Ω		0.35	1.2	μs
		t _r			0.25	0.6	
	Turn-off time	t _{off}			0.45	1.0	
		t _f			0.08	0.3	
Thyristor	Reverse current	I _{RRM}	V _R =1200V			200	μA
	off-state current	I _{DM}	V _{DM} =1600V			1.0	mA
	Reverse current	I _{RRM}	V _{RM} =1600V			1.0	mA
	Gate trigger current	I _{GT}	V _D =6V, I _T =1A			100	mA
	Gate trigger voltage	V _{GT}	V _D =6V, I _T =1A			2.5	V
	On-state voltage	V _{TM}	I _{TM} =35A	chip	1.1	1.2	V
				terminal	1.2		
	Forward on voltage	V _{FM}	I _F =35A	chip	1.1		V
				terminal	1.2	1.5	
	Reverse current	I _{RRM}	V _R =1600V			200	μA
Thermistor	Resistance	R	T=25°C		5000		Ω
			T=100°C	465	495	520	
	B value	B	T=25/50°C	3305	3375	3450	

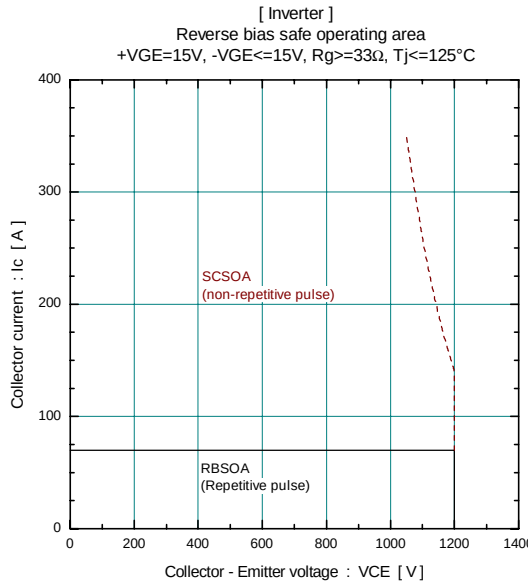
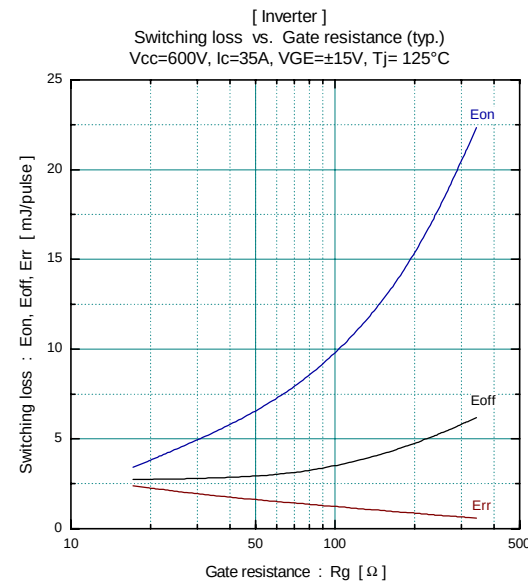
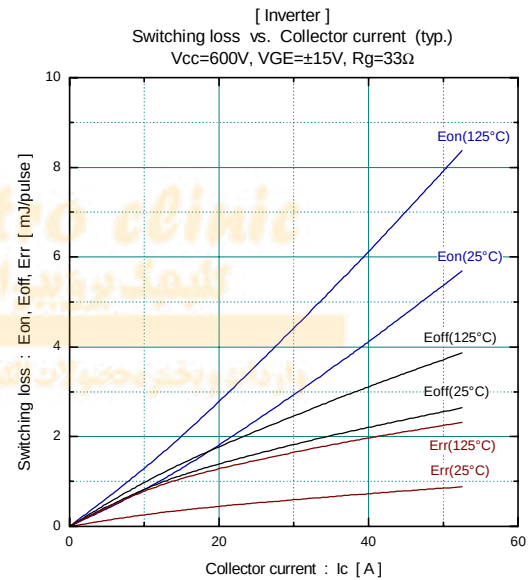
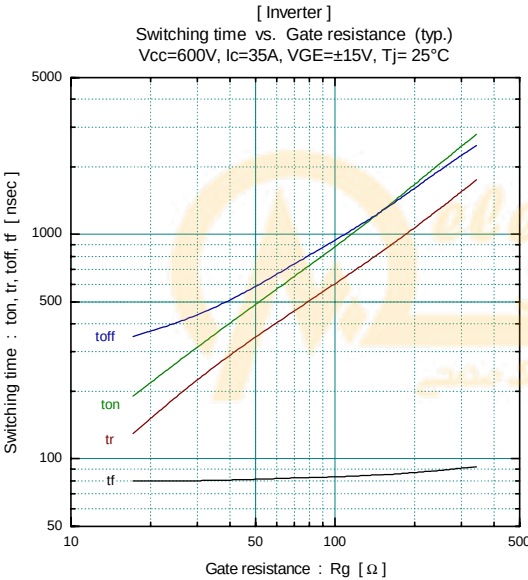
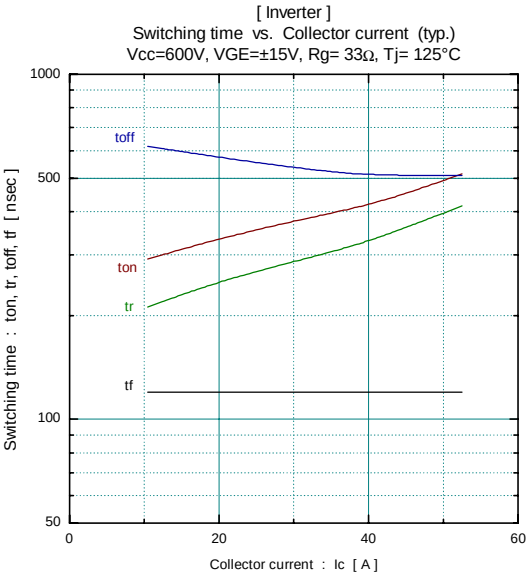
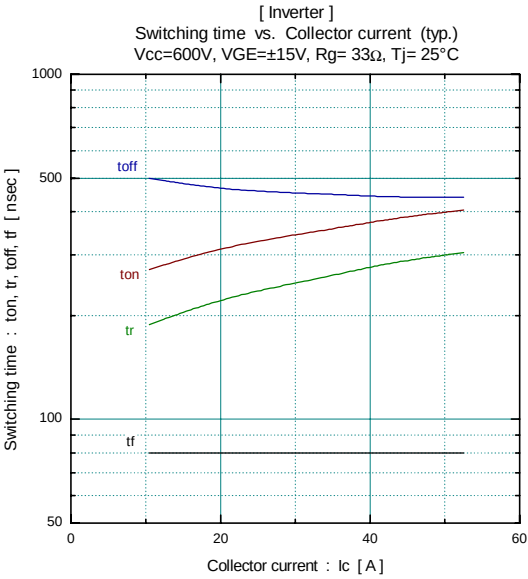
● Thermal resistance Characteristics

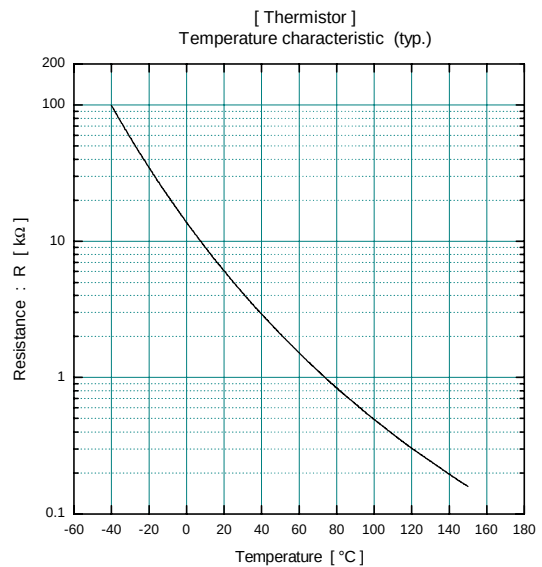
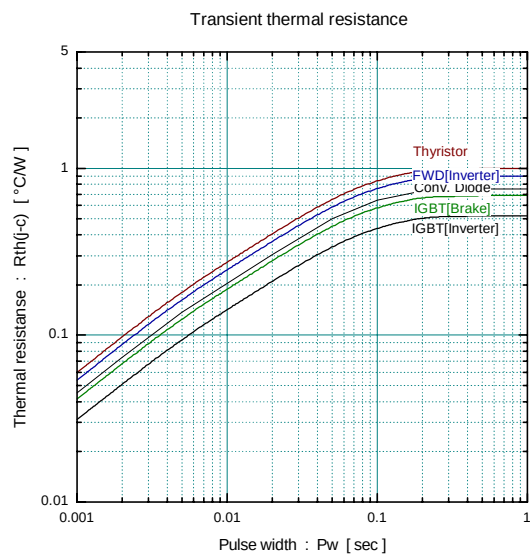
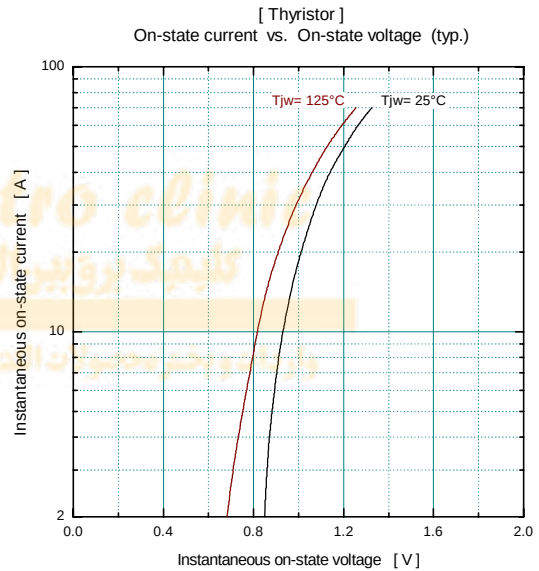
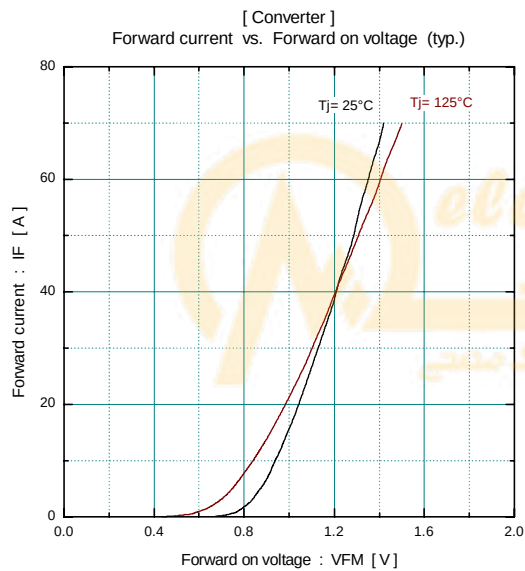
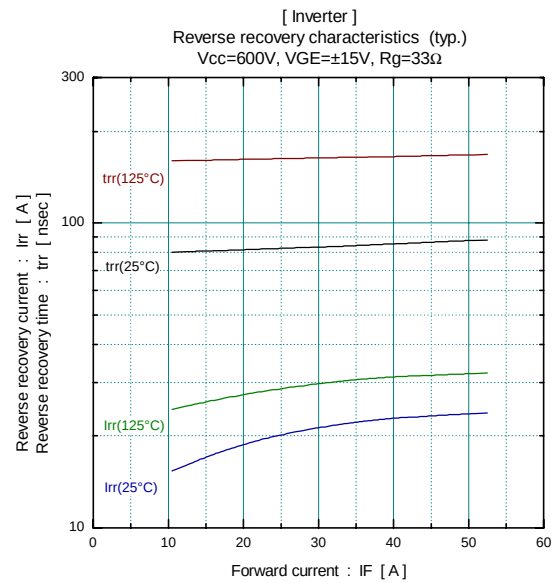
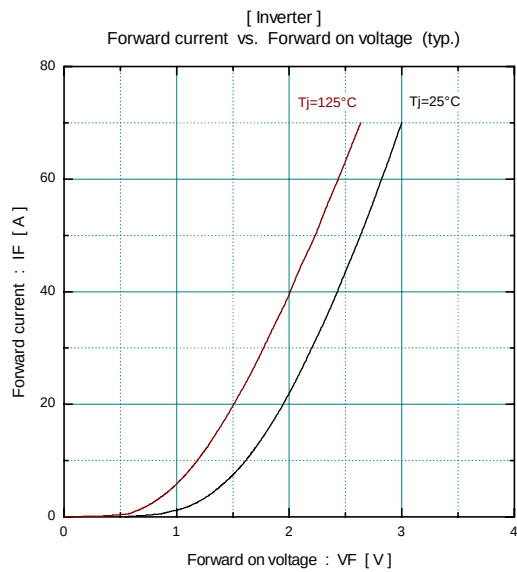
Item		Symbol	Condition	Characteristics			Unit
				Min.	Typ.	Max.	
Thermal resistance (1 device)		R _{th(j-c)}	Inverter IGBT			0.52	°C/W
			Inverter FWD			0.90	
			Brake IGBT			0.69	
			Thyristor			1.00	
			Converter Diode			0.75	
Contact thermal resistance *		R _{th(c-f)}	With thermal compound		0.05		

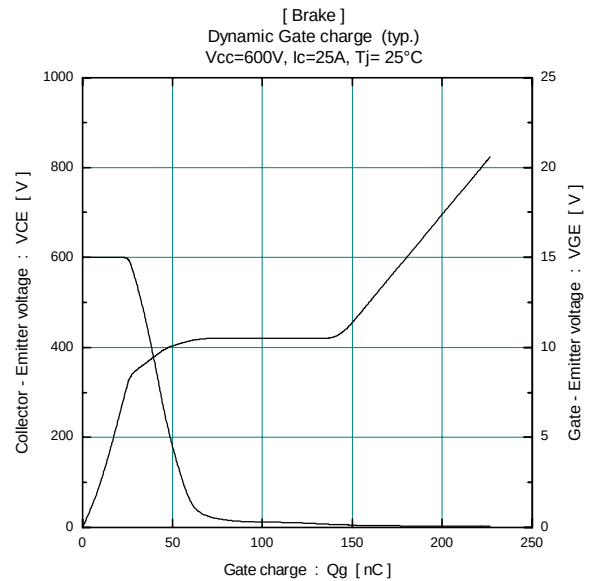
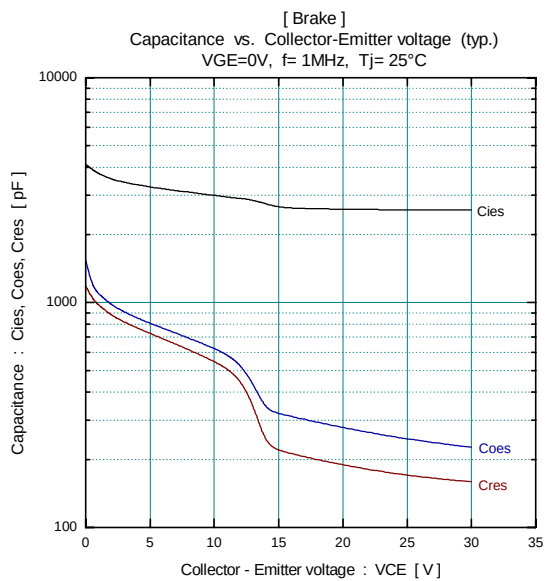
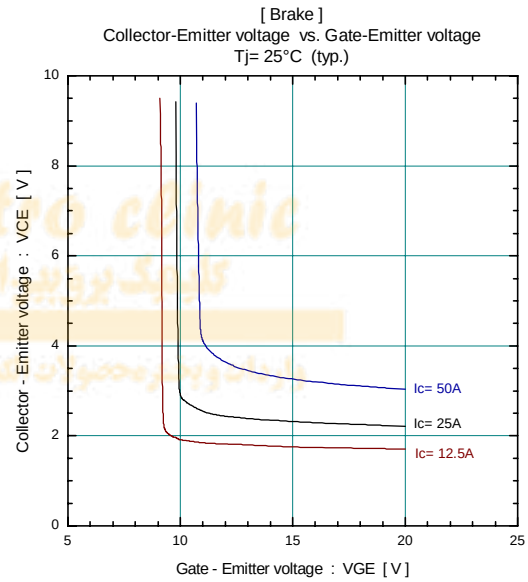
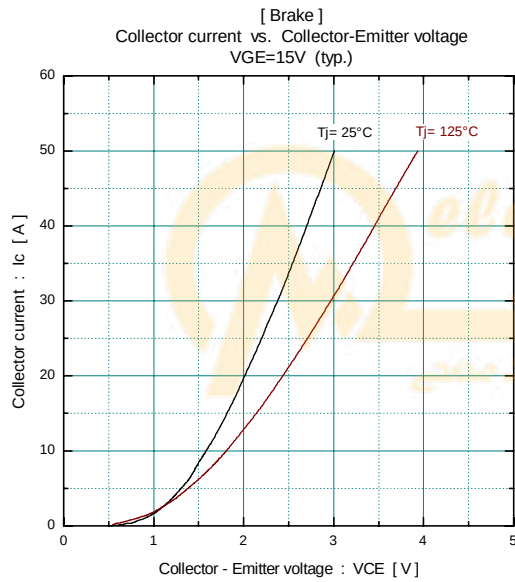
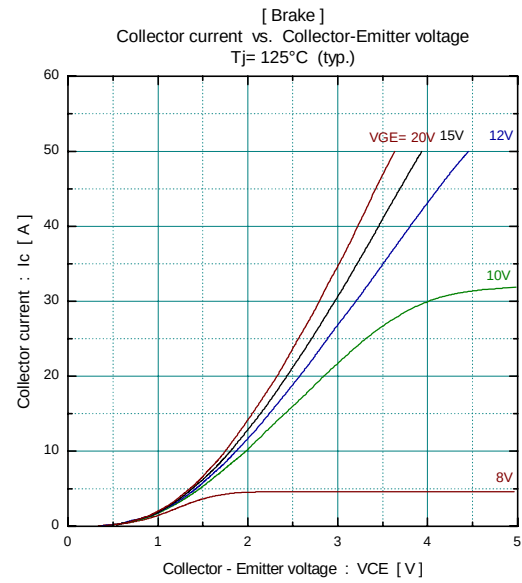
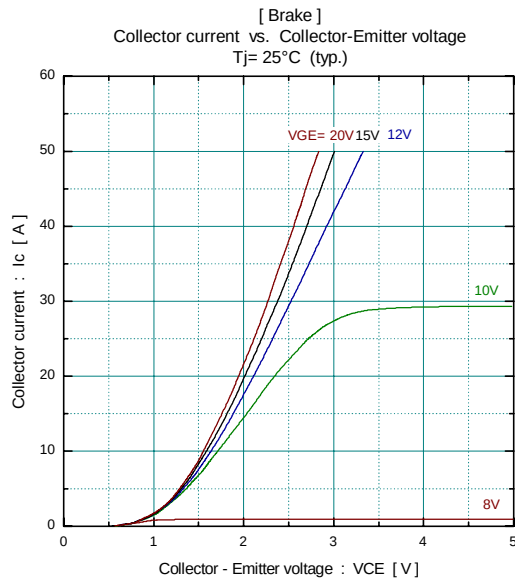
* This is the value which is defined mounting on the additional cooling fin with thermal compound

■ Characteristics (Representative)

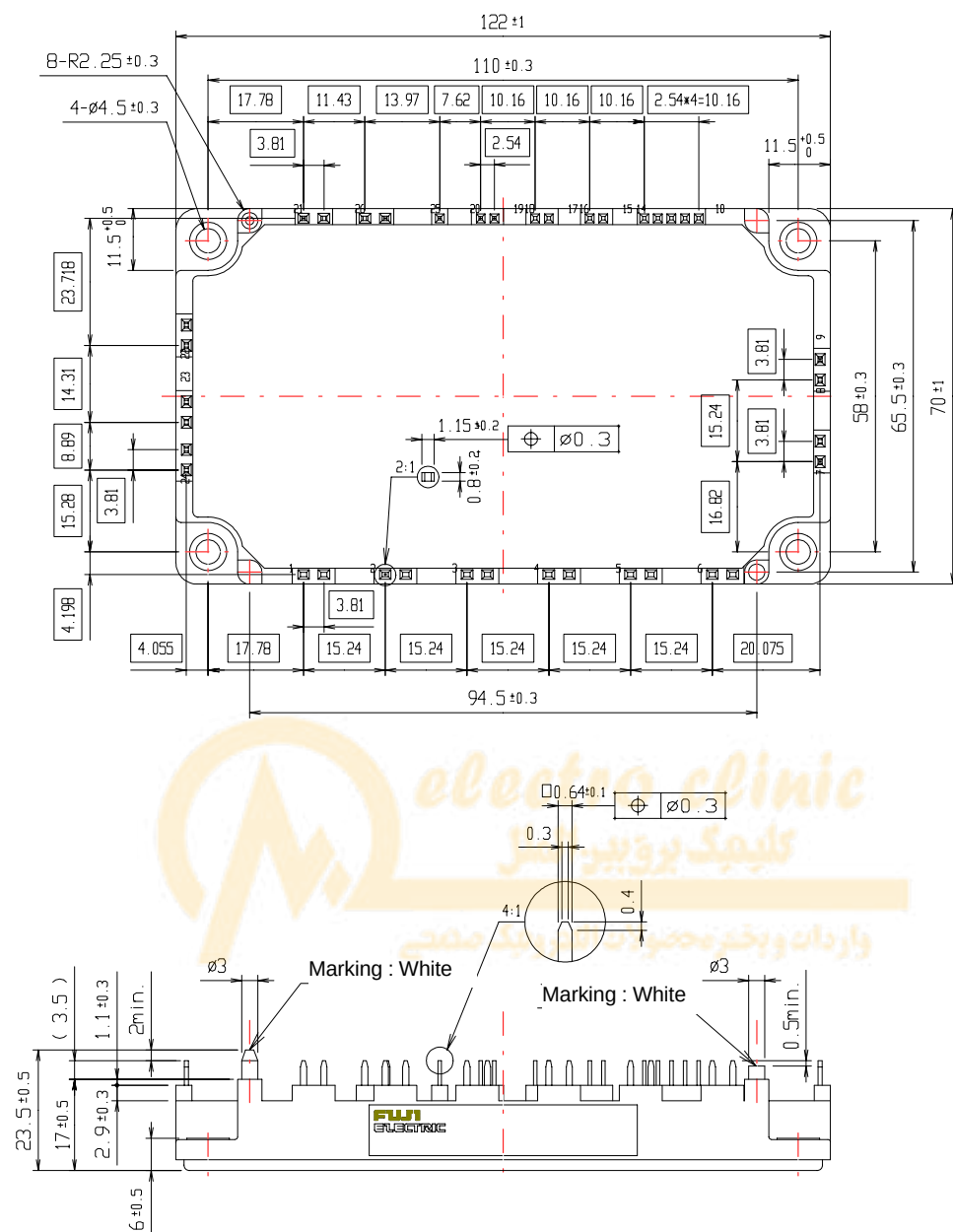








■ Outline Drawings, mm



■ Equivalent Circuit Schematic

