

150A 1200V 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

- Extremely enhanced avalanche capability
- Recommended operating frequency (5kHz~20kHz)
- FS Trench Technology,Positive temperature coefficient
- Low saturation voltage: $V_{CE(sat)}$,
typ = 1.8V@ $I_C = 150A$ and $T_j = 25^{\circ}C$

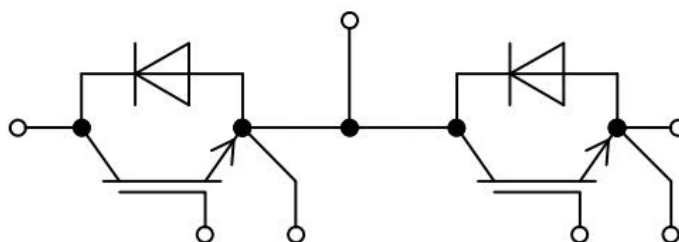
3 Applications

- Welding
- UPS
- Three-leve Inverter



Type	V_{CE}	I_C	$V_{CEsat}, T_j=25^{\circ}C$	T_{jop}	Package
DGA150H120L2T	1200V	150A ($T_j=100^{\circ}C$)	1.8V (Typ)	150 $^{\circ}C$	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}	1200	V
Gate-to-Emitter Voltage		V_{GE}	±25	V
DC Collector current	$T_j=100^{\circ}\text{C}$	I_C	150	A
Pulsed Collector Current #1		I_{CM}	1200	A
$T_{vj}=150^{\circ}\text{C}$, $V_{CC}=600\text{V}$, $V_{GE}=15\text{V}$, Short circuit withstand time,		T_{SC}	3	us

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

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

PARAMETER		SYMBOL	VALUE	UNIT
Peak Repetitive Reverse Voltage		V_{RRM}	1200	V
DC Blocking Voltage		V_R	1200	V
Average Rectified Forward Current		$I_{F(AV)}$	120	A
Repetitive Peak Surge Current	$t_p=1\text{ms}$	I_{FRM}	240	A
Nonrepetitive Peak Surge Current	$t_p=10\text{ms}$	I_{FSM}	600	A

5.3 IGBT Module

Parameter	Symbol	VALUE	Units
Junction Temperature Range	T_{jmax}	-40~175	℃
Operating Junction Temperature	T_{jop}	-40~150	℃
Storage Temperature Range	T_{stg}	-40~120	℃
Isolation Voltage $R_{MS}, f=50\text{Hz}, t=1\text{min}$	V_{ISO}	3500	V

5.4 Thermal Characteristics (IGBT Module)

Parameter		Symbol	Rating	Units
Thermal Resistance Junction to Case	IGBT	R_{thJC}	0.18	℃/W
	Diode		0.45	

5.5 Module characteristics

Parameter	Symbol	Conditions	VALUE	Units
Material of module baseplate			Cu+Ni	
Internal isolation		Basic insulation	Improved Al ₂ O ₃ ceramic	
Mounting torque of screws to heat sink	Ms	M5	3.0-6.0	N·m
Mounting torque of screws to terminals	Mt	M6	2.5-5.0	N·m
Comperative tracking index	C_{TI}		>175	
Strayinductancemodule	L_{sCE}		18	nH

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

Parameter	Symbol	Conditions	Value			Units
			Min	Typ	Max	
Static Characteristics						
Collector-to-Emitter Breakdown Voltage	$V_{(BR)CES}$	$I_C=0.25mA, V_{GE}=0V, T_j=25^{\circ}C$	1200	--	--	V
Collector-to-Emitter Leakage Current	I_{CES}	$V_{CE}=1200V, V_{GE}=0V, T_j=25^{\circ}C$	--	--	100	μA
		$V_{CE}=1200V, V_{GE}=0V, T_j=150^{\circ}C$	--	--	5.0	mA
Gate-to-Emitter Leakage	I_{GES}	$V_{GE}=\pm 25V, V_{CE}=0V, T_j=25^{\circ}C$	--	--	± 200	nA
Gate Threshold Voltage	$V_{GE(th)}$	$V_{CE}=V_{GE}, I_C=1mA$	4.5	5.2	6.5	V
Collector-emitter saturation voltage	V_{CEsat}	$V_{GE}=15V, I_C=150A, T_j=25^{\circ}C$	--	1.8	2.4	V
		$V_{GE}=15V, I_C=150A, T_j=150^{\circ}C$	--	2.3	--	V
Dynamic Characteristics						
Input Capacitance	C_{iss}	$V_{CE}=25V, V_{GE}=0V, f=1MHz, T_a=25^{\circ}C$	--	2.50	--	nF
Output Capacitance	C_{oss}		--	0.45	--	
Reverse Transfer Capacitance	C_{rss}		--	0.15	--	
IGBT Characteristics						
Turn-on delay time	$t_{d(on)}$	$V_{CE}=600V, I_C=150A, R_g=5.0\Omega, V_{GE}=\pm 15V, \text{感性负载}, T_j=25^{\circ}C$	--	108	--	nS
Rise time	t_r		--	225	--	nS
Turn-off delay time	$t_{d(off)}$		--	385	--	nS
Fall time	t_f		--	238	--	nS
Turn-on energy	E_{on}		--	15.8	--	mJ
Turn-off energy	E_{off}		--	12.4	--	mJ
Total switching energy	E_{ts}		--	27.9	--	mJ
Turn-on delay time	$t_{d(on)}$	$V_{CE}=600V, I_C=150A, R_g=5.0\Omega, V_{GE}=\pm 15V, \text{感性负载}, T_j=175^{\circ}C$	--	96	--	nS
Rise time	t_r		--	213	--	nS
Turn-off delay time	$t_{d(off)}$		--	464	--	nS
Fall time	t_f		--	338	--	nS
Turn-on energy	E_{on}		--	15.6	--	mJ
Turn-off energy	E_{off}		--	15.5	--	mJ
Total switching energy	E_{ts}		--	31.1	--	mJ
Gate charge	Q_g	$V_{CE}=600V, V_{GE}=-15V\text{to}15V$	--	0.7	--	μC

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

Parameter	Symbol	Conditions	Value			Units
			Min	Typ	Max	
Diode forward voltage	V_F	$I_F=120A, T_J=25^{\circ}C$	--	1.9	2.5	V
		$I_F=120A, T_J=150^{\circ}C$	--	1.7	--	V
Diode reverse recovery time	t_{rr}	$V_{CE}=600V, I_C=120A, R_g=5\Omega, V_{GE}=\pm 15V, TC=25^{\circ}C$	--	464	--	ns
Diode peak reverse recovery current	I_{rrm}		--	30	--	A
Diode reverse recovery charge	Q_{rr}		--	8.2	--	uC
Reverse recovery energy	E_{rec}		--	3.2	--	mJ
Diode reverse recovery time	t_{rr}	$V_{CE}=600V, I_C=120A, R_g=5\Omega, V_{GE}=\pm 15V, TC=150^{\circ}C$	--	726	--	ns
Diode peak reverse recovery current	I_{rrm}		--	56	--	A
Diode reverse recovery charge	Q_{rr}		--	21	--	uC
Reverse recovery energy	E_{rec}		--	8.4	--	mJ

6 Typical Characteristic Curves

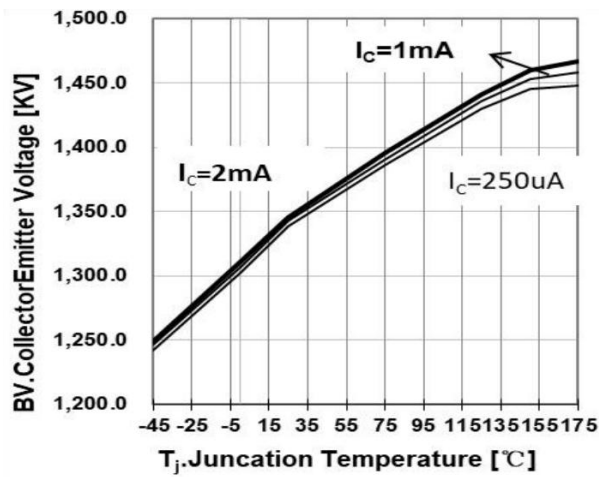


Fig1. Collector-to-Emitter Breakdown Voltage
Temperature characteristic

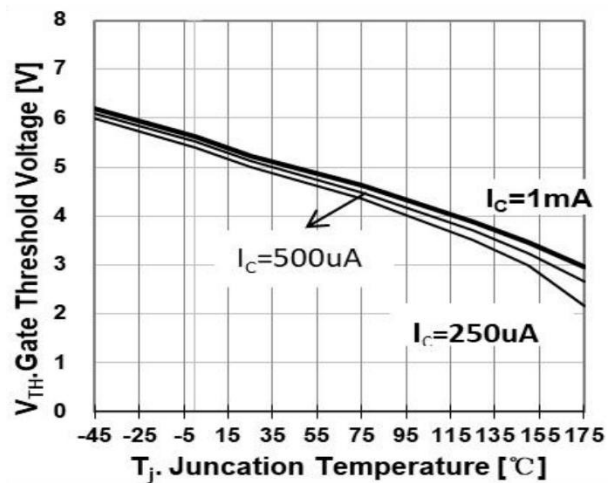


Fig2. Gate Threshold Voltage Temperature
characteristic

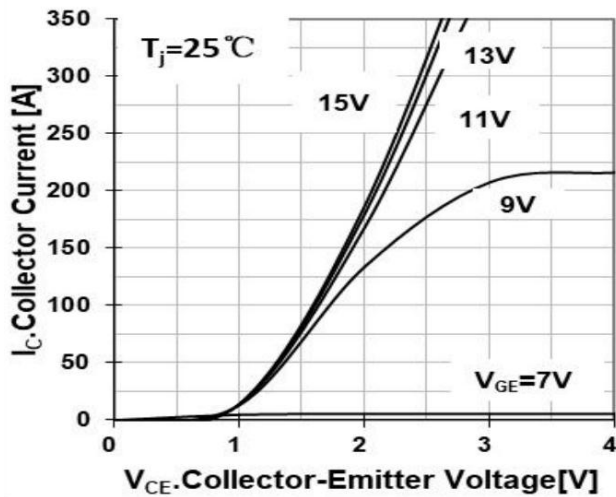


Fig3. Typical output characteristic

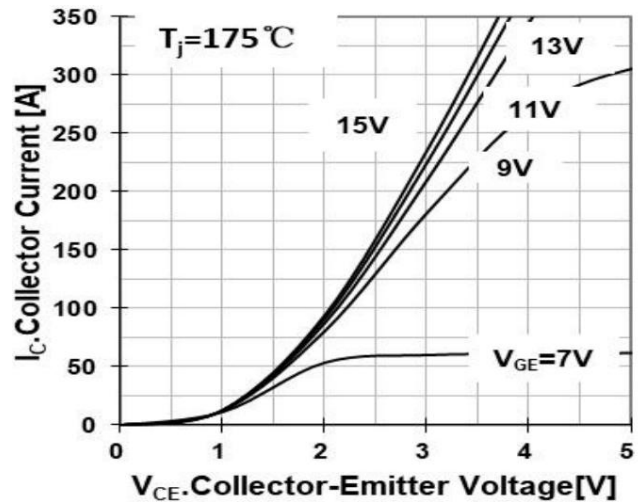


Fig4. Typical output characteristic

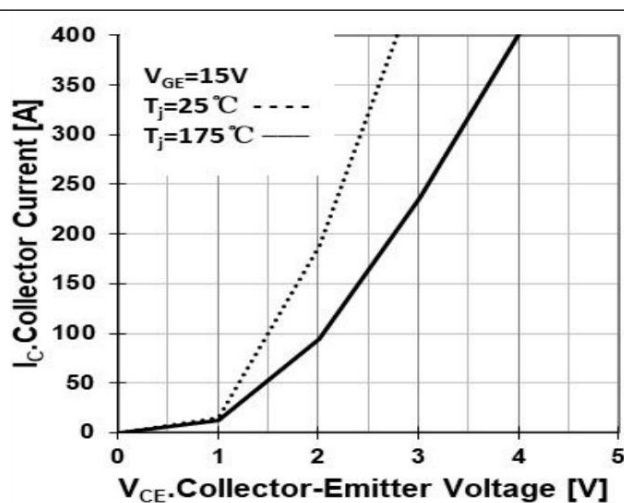


Fig5. Collector-emitter saturation voltage
Characteristic

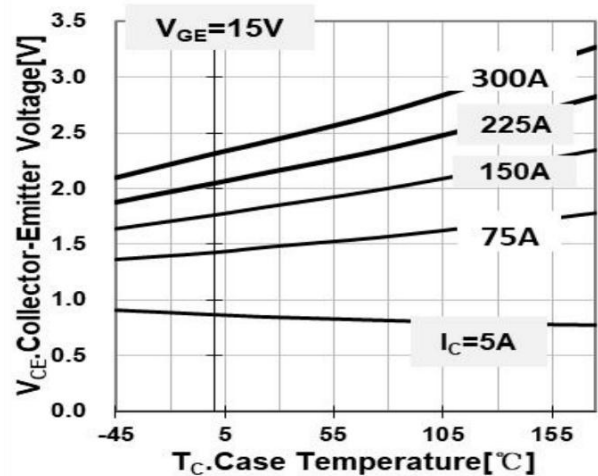


Fig6. Collector-emitter saturation voltage
Temperature Characteristic

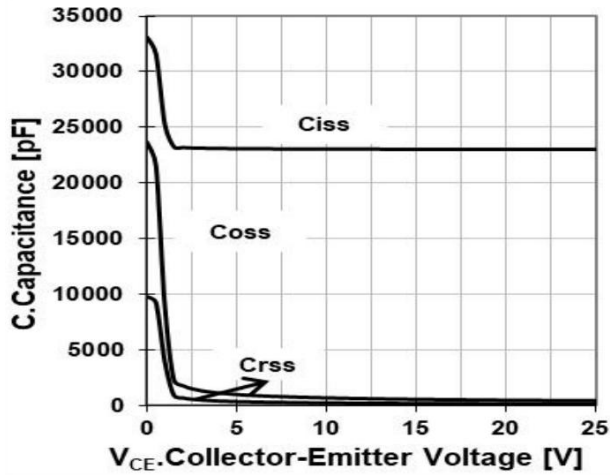


Fig7. Typical capacitance as a function of collector-emitter voltage

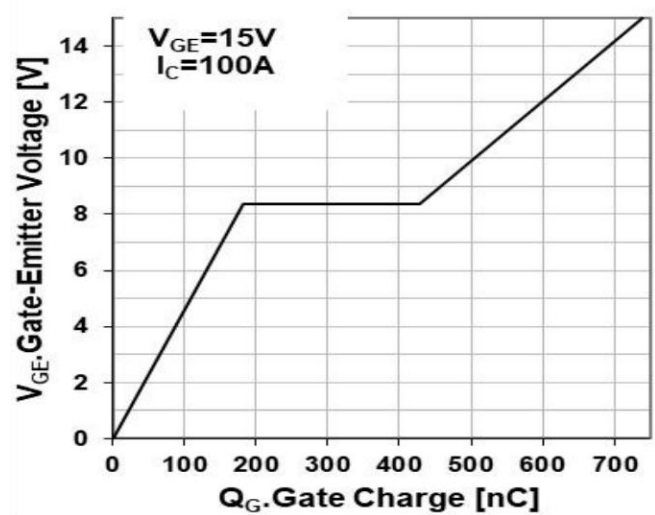


Fig8. Typical gate charge

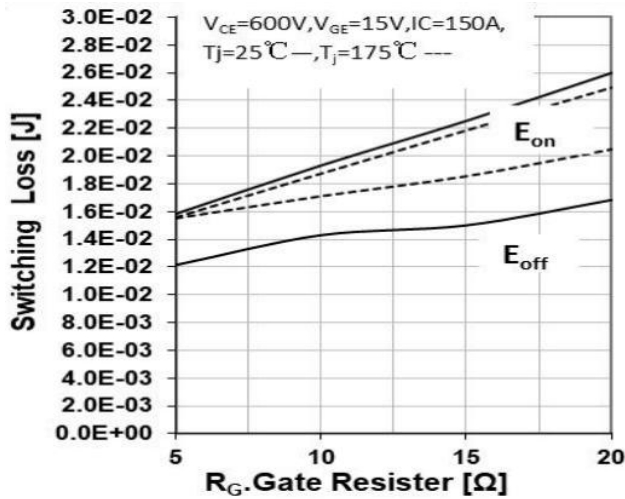


Fig9. Typical switching energy losses as a function of gate resistor

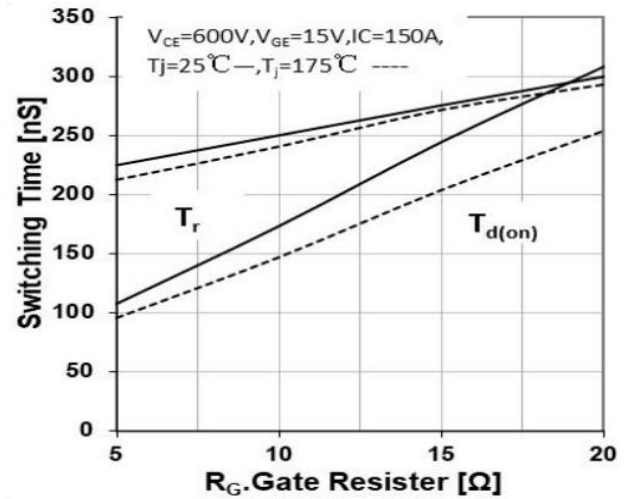


Fig10. Typical switching times as a function of gate resistor

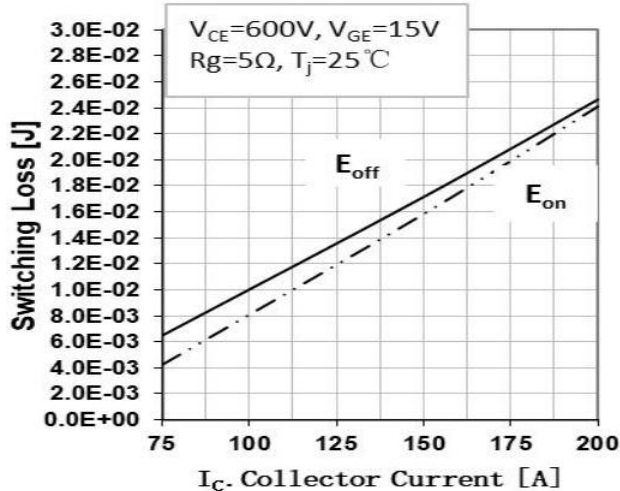


Fig11. Typical switching energy losses as a function of Collector Current

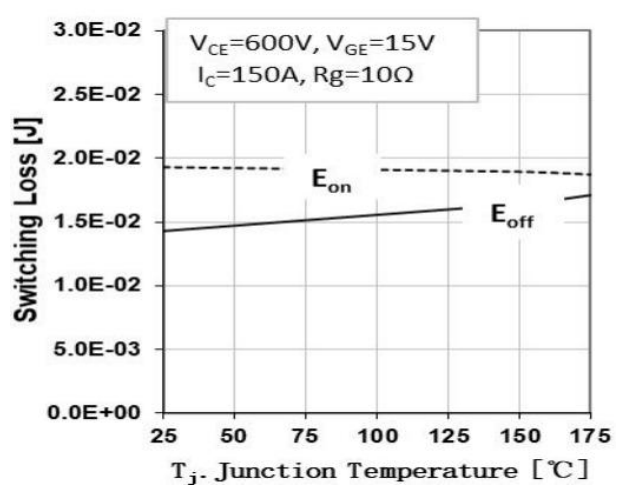


Fig12. Typical switching energy losses as a function of Junction Temperature

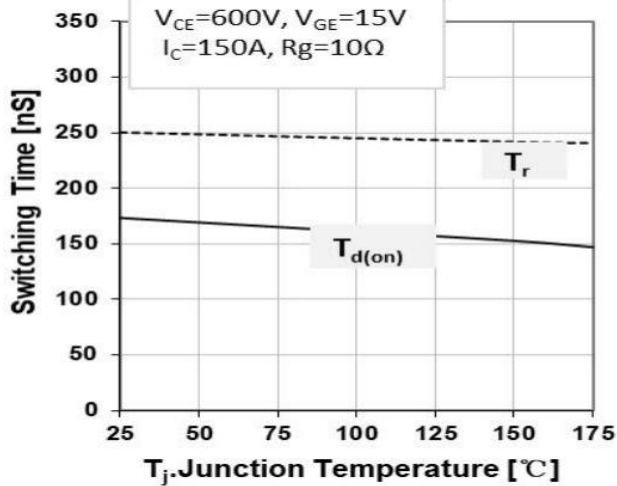


Fig13. Typical switching times as a function of Junction Temperature

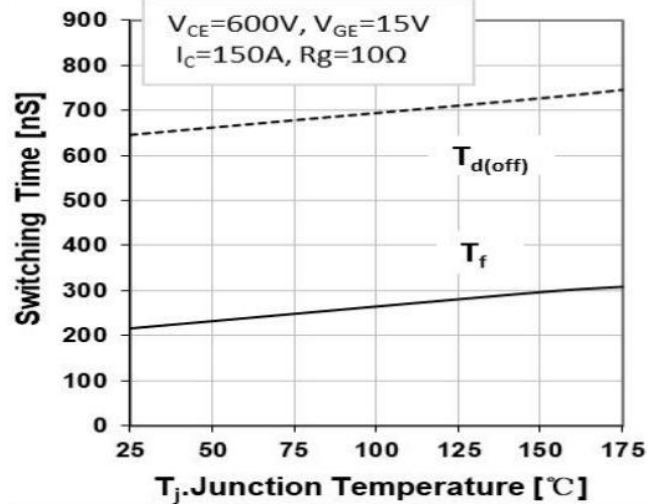


Fig14. Typical switching times as a function of Junction Temperature

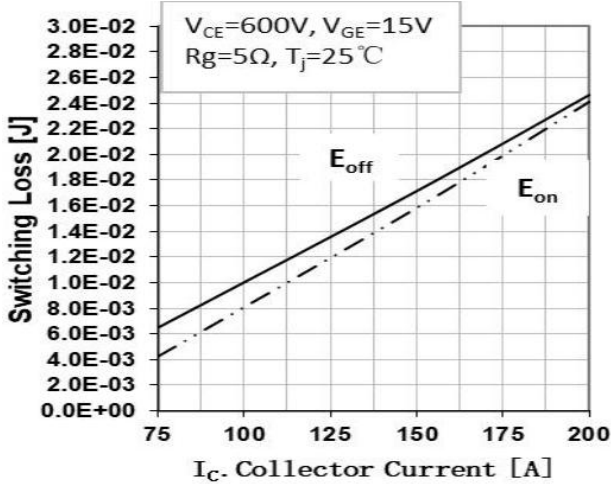


Fig15. Typical switching energy losses as a function of Junction Temperature

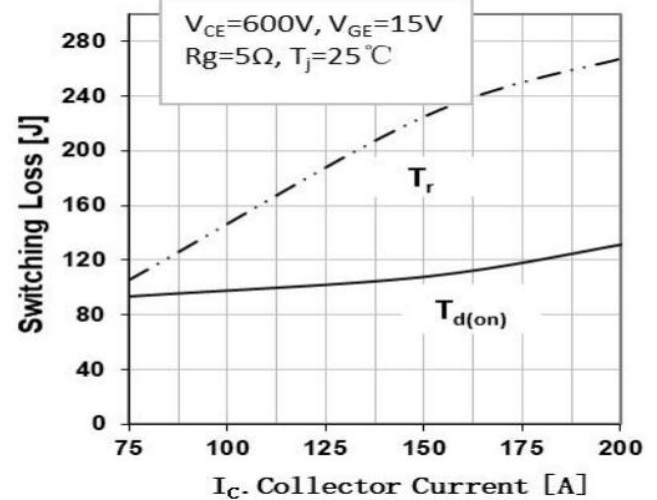


Fig16. Typical switching times as a function of Collector Current

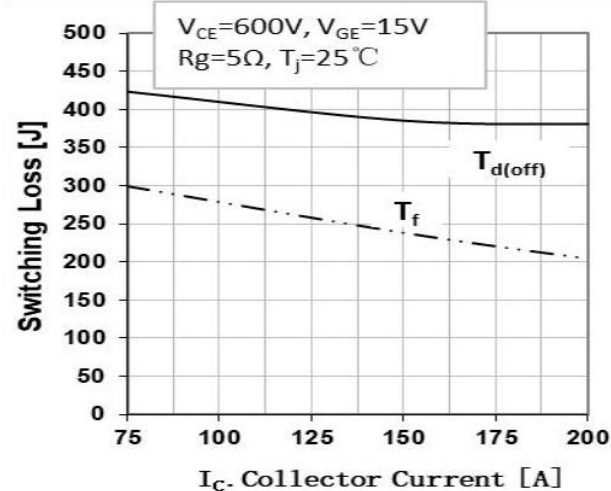
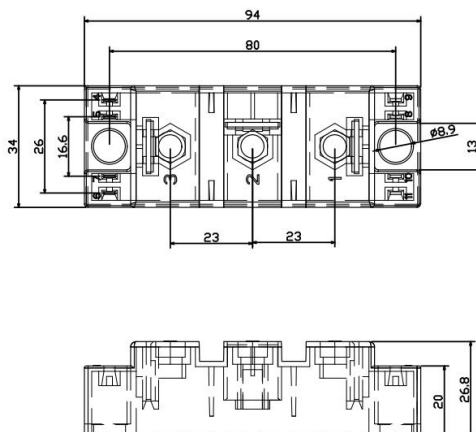
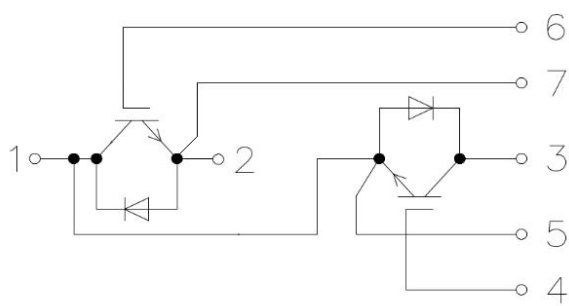


Fig17. Typical switching times as a function of Collector Current

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
2024.6.25	1.0	Original	