

75A 1200V Half bridge module

1 Description

These Insulated Gate Bipolar Transistor used advanced trench and Fieldstop technology design, provided excellent $V_{CE(sat)}$ 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 = 2.0V @ $I_c = 75A$ and $T_j = 25^\circ C$
- Extremely enhanced avalanche capability

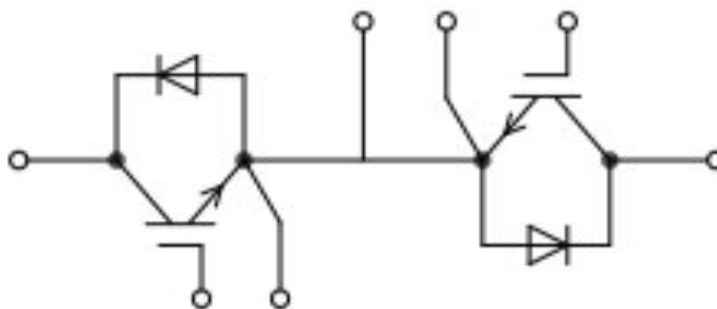
3 Applications

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



Type	V_{CE}	I_c	$V_{CE(sat)}, T_j=25^\circ C$	T_{jop}	Package
DGA75H120M2T	1200V	75A ($T_j=100^\circ C$)	2.0V (Typ)	175°C	34MM

4 Equivalent Circuit Schematic



5 Electrical Characteristics

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

Parameter	Symbol	Value	Units
Collector-to-Emitter Voltage	V_{CE}	1200	V
Gate-to-Emitter Voltage	V_{GE}	±30	V
DC Collector current	I_C	$T_j=25^\circ\text{C}$	150
		$T_j=100^\circ\text{C}$	75
Pulsed Collector Current #1	I_{CM}	300	A
Maximum Power Dissipation @Tc=25°C	P_D	500	W

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

5.2 Absolute Maximum Ratings (Diode) (Tc=25°C, 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	$I_{F(AV)}$	75	A
Repetitive Peak Surge Current	I_{FRM}	150	A
Nonrepetitive Peak Surge Current(single)	I_{FSM}	600	A
	tp=8.3ms		

5.3 IGBT Module

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

5.4 Thermal Characteristics (IGBT Module)

Parameter	Symbol	Rating	Units
Thermal Resistance Junction to Case	R_{thJC}	IGBT(single)	0.28
		Diode(single)	0.40
			°C/W

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

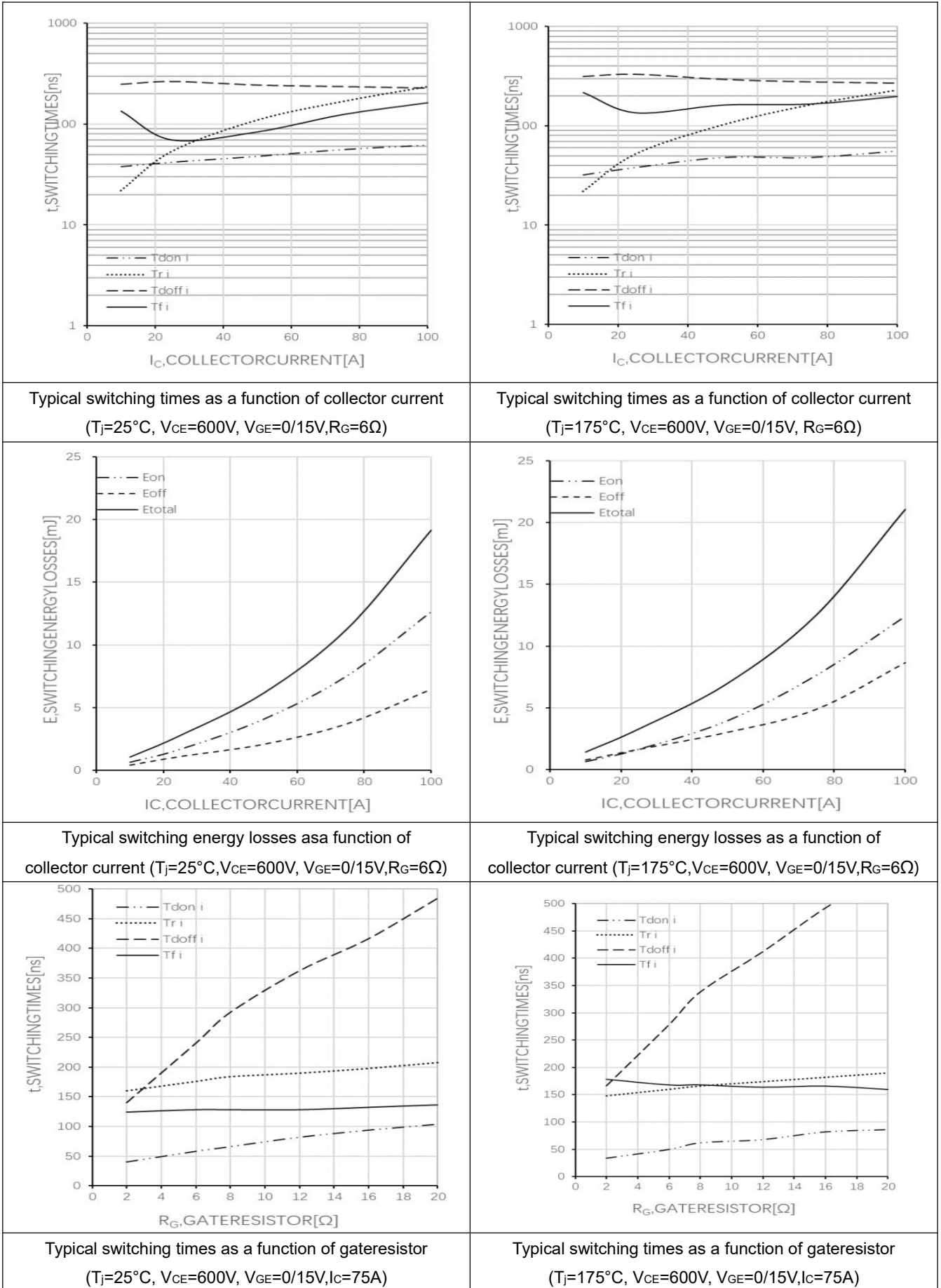
Parameter	Symbol	Conditions	Value			Units
			Min	Typ	Max	
Static Characteristics						
Collector-to-Emitter Breakdown Voltage	$V_{(BR)CES}$	$I_C=250\mu A, V_{GE}=0V, T_j=25^\circ C$	1200	--	--	V
Collector-to-Emitter Leakage Current	I_{CES}	$V_{CE}=1200V, V_{GE}=0V, T_j=25^\circ C$	--	--	20	μA
		$V_{CE}=1200V, V_{GE}=0V, T_j=150^\circ C$	--	--	1.0	mA
Gate-to-Emitter Leakage Current	I_{GES}	$V_{GE}=\pm 30V, V_{CE}=0V, T_j=25^\circ C$	--	--	± 200	nA
		$V_{GE}=\pm 30V, V_{CE}=0V, T_j=150^\circ C$	--	--	± 400	nA
Gate Threshold Voltage	$V_{GE(th)}$	$V_{CE}=V_{GE}, I_C=250\mu A$	4.5	5.8	7.5	V
Collector-emitter saturation voltage	V_{CEsat}	$V_{GE}=15V, I_C=75A, T_j=25^\circ C$	--	2.0	2.4	V
		$V_{GE}=15V, I_C=75A, T_j=150^\circ C$	--	2.5	-	V
Dynamic Characteristics						
Input Capacitance	C_{iss}	$V_{CE}=25V, V_{GE}=0V, f=1MHz, T_a=25^\circ C$	--	9380	--	pF
Output Capacitance	C_{oss}		--	230	--	
Reverse Transfer Capacitance	C_{rss}		--	110	--	
IGBT Characteristics						
Turn-on delay time	$t_{d(on)}$	$V_{CE}=600V, I_C=75A, R_g=10\Omega, V_{GE}=15V, \text{感性负载}, T_j=25^\circ C$	--	92	--	nS
Rise time	t_r		--	165	--	nS
Turn-off delay time	$t_{d(off)}$		--	260	--	nS
Fall time	t_f		--	92	--	nS
Turn-on energy	E_{on}		--	6.15	--	mJ
Turn-off energy	E_{off}		--	3.15	--	mJ
Total switching energy	E_{ts}		--	9.30	--	mJ
Turn-on delay time	$t_{d(on)}$	$V_{CE}=600V, I_C=75A, R_g=10\Omega, V_{GE}=15V, \text{感性负载}, T_j=175^\circ C$	--	76	--	nS
Rise time	t_r		--	140	--	nS
Turn-off delay time	$t_{d(off)}$		--	315	--	nS
Fall time	t_f		--	213	--	nS
Turn-on energy	E_{on}		--	5.63	--	mJ
Turn-off energy	E_{off}		--	4.46	--	mJ
Total switching energy	E_{ts}		--	10.09	--	mJ
Gate charge	Q_g	$V_{CE}=960V, I_C=75A, V_{GE}=15V$	--	340	--	nC

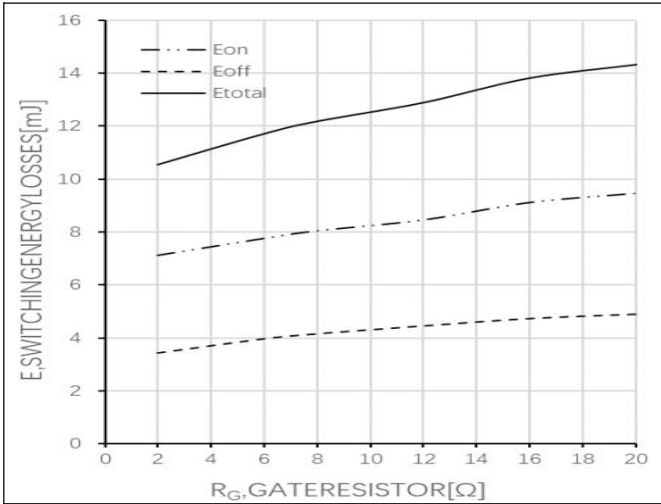
5.6 Electrical Characteristics (Diode) (Tc=25°C, unless otherwise specified)

Parameter	Symbol	Conditions	Value			Units
			Min	Typ	Max	
Diode forward voltage	V_F	$I_F=75A, T_j=25^\circ C$	--	2.7	3.5	V
		$I_F=75A, T_j=150^\circ C$	--	1.7	--	V
Diode reverse recovery time	t_{rr}	$I_F=0.5A, I_R=1.0A, I_{rr}=0.25A$	--	50	--	ns
Diode reverse recovery time	t_{rr}	$I_F=75A,$	--	105	--	ns
Diode peak reverse recovery current	I_{rrm}	$di/dt=200A/\mu s,$	--	5	--	A
Diode reverse recovery charge	Q_{rr}	$V_R=600V$	--	255	--	nC
Maximum Instantaneous Reverse	I_R	$V_R=1200V$	--	--	5.0	μA
		$V_R=1200V, T_C=150^\circ C$	--	--	1.0	mA

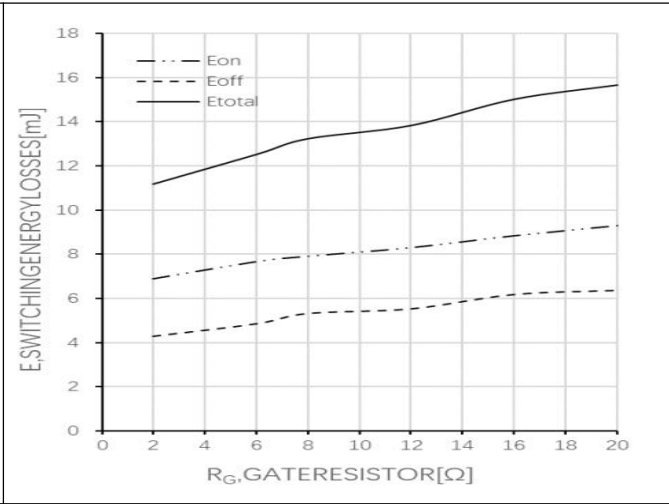
6 Typical Characteristic Curves

<p>A line graph showing collector current I_C [A] on the y-axis (0 to 140) versus collector-emitter voltage V_{CE} [V] on the x-axis (1 to 10). Three curves are shown for different collector-emitter voltages: $V_{CE}=11V$, $V_{CE}=9V$, and $V_{CE}=7V$. The curves show that I_C increases with V_{CE} and then saturates. Higher V_{CE} values result in higher saturation currents.</p>	<p>A line graph showing collector saturation voltage $V_{CE(sat)}$ [V] on the y-axis (0 to 5) versus junction temperature T_j [°C] on the x-axis (25 to 175). Three curves are shown for different collector currents: $I_C=37.5A$ (dashed), $I_C=75A$ (solid), and $I_C=100A$ (solid). All curves show that $V_{CE(sat)}$ increases with T_j. Higher I_C values result in higher $V_{CE(sat)}$.</p>
<p>Typical output characteristic ($T_j=25^\circ C$)</p>	<p>Typical collector-emitter saturation voltage as a function of junction temperature ($V_{GE}=15V$)</p>
<p>A semi-logarithmic graph showing capacitance C [pF] on the y-axis (1.E+02 to 1.E+05) versus collector-emitter voltage V_{CE} [V] on the x-axis (0 to 30). Three curves are shown: C_{iss} (solid), C_{oss} (dashed), and C_{rss} (dashed). C_{iss} is constant at approximately 1.E+04 pF. C_{oss} and C_{rss} decrease as V_{CE} increases.</p>	<p>A line graph showing gate-emitter voltage V_{GE} [V] on the y-axis (0 to 16) versus gate charge Q_{GE} [nC] on the x-axis (0 to 400). Two curves are shown for different collector-emitter voltages: $V_{CE}=960V$ (dashed) and $V_{CE}=240V$ (solid). Both curves show a linear increase in V_{GE} with Q_{GE} until they reach a plateau, after which they increase again.</p>
<p>Typical capacitance as a function of collector-emitter voltage</p>	<p>Typical gate charge</p>
<p>A line graph showing switching energy losses E [mJ] on the y-axis (0 to 14) versus junction temperature T_j [°C] on the x-axis (25 to 175). Three curves are shown: E_{on} (dotted), E_{off} (dashed), and E_{total} (solid). All curves show that energy losses increase with T_j.</p>	<p>A semi-logarithmic graph showing switching times t [ns] on the y-axis (1 to 1000) versus junction temperature T_j [°C] on the x-axis (25 to 175). Four curves are shown: $T_{don i}$ (dotted), $T_{r i}$ (dotted), $T_{doff i}$ (dashed), and $T_{f i}$ (solid). All curves show that switching times increase with T_j.</p>
<p>Typical switching energy losses as a function of junction temperature</p>	<p>Typical switching times as a function of junction temperature</p>

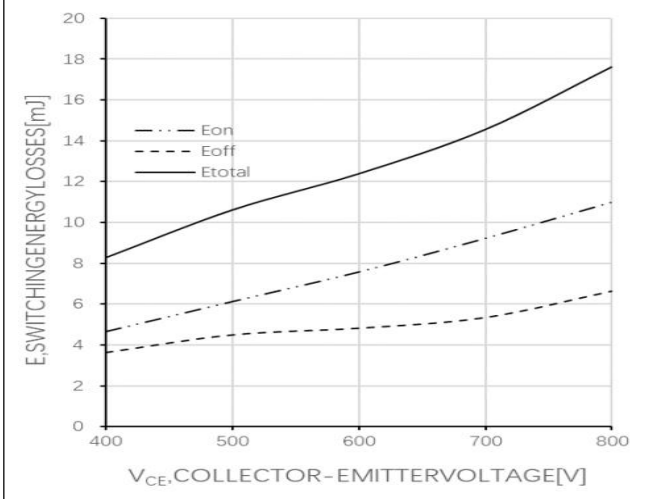




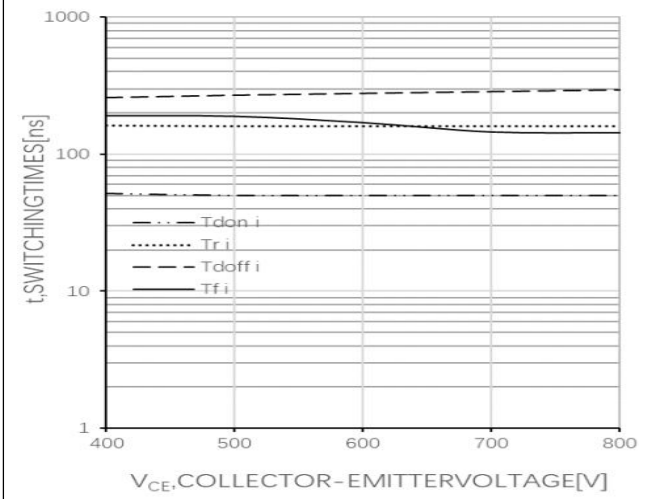
Typical switching energy losses as a function of gateresistor ($T_j=25^{\circ}\text{C}$, $V_{CE}=600\text{V}$, $V_{GE}=0/15\text{V}$, $I_c=75\text{A}$)



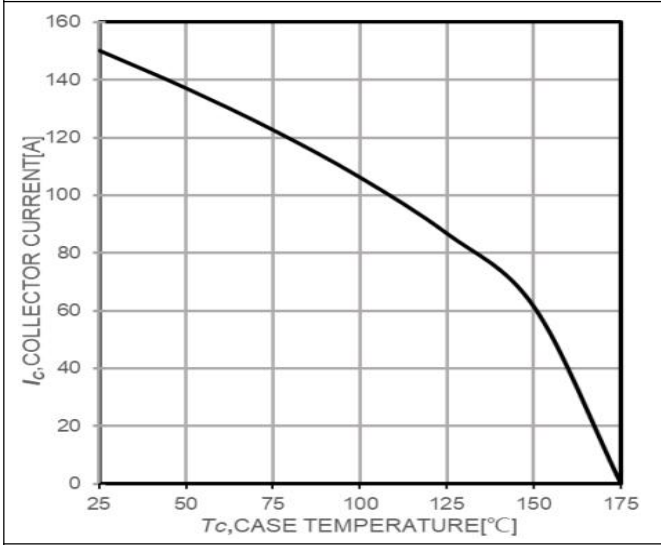
Typical switching energy losses as a function of gateresistor ($T_j=175^{\circ}\text{C}$, $V_{CE}=600\text{V}$, $V_{GE}=0/15\text{V}$, $I_c=75\text{A}$)



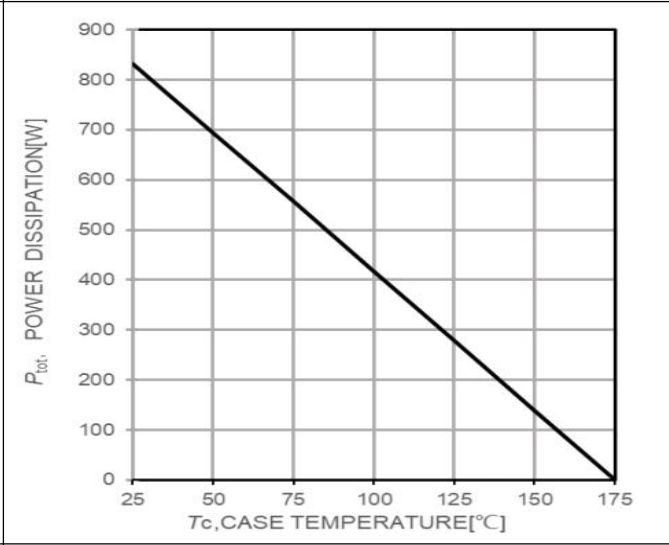
Typical switching energy losses as a function of collector emitter voltage ($T_j=175^{\circ}\text{C}$, $V_{CE}=600\text{V}$, $V_{GE}=0/15\text{V}$, $R_G=6\Omega$)



Typical switching times as a function of collector emitter voltage ($T_j=175^{\circ}\text{C}$, $V_{CE}=600\text{V}$, $V_{GE}=0/15\text{V}$, $R_G=6\Omega$)

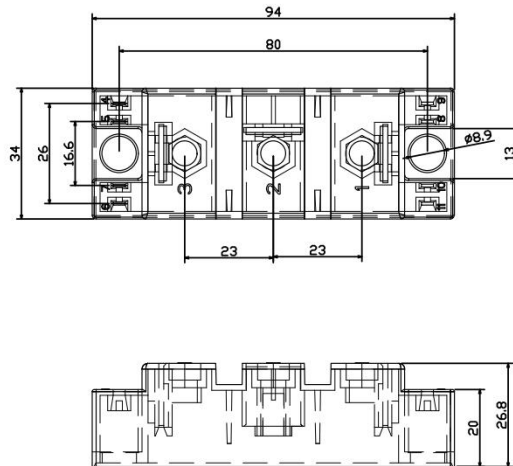


Collector current as a function of case temperature ($V_{GE}=15\text{V}$)

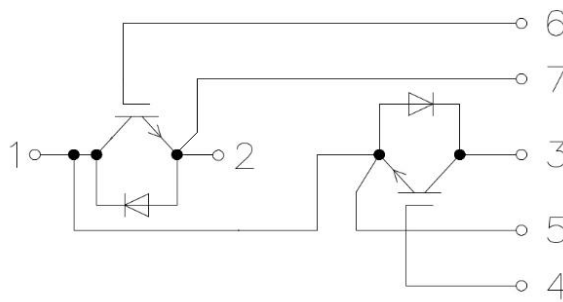


Power dissipation temperature characteristic

7 Dimensions



7.1 Circuit Schematic



8 Attentions

- Jiangsu Donghai Semiconductor Technology CO.,LTD. reserves the right to change the specification without prior notice! The customer should obtain the latest version of the information before making the order and verify that the information is complete and up to date.
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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	