

1. Applications

- Electric power transmission and distribution
- Motor Controllers
- High-Power Switching

2. Features

- (1) High reliability due to hermetic sealing structure.
- (2) Double side cooling type.

3. Packaging and Internal Circuit

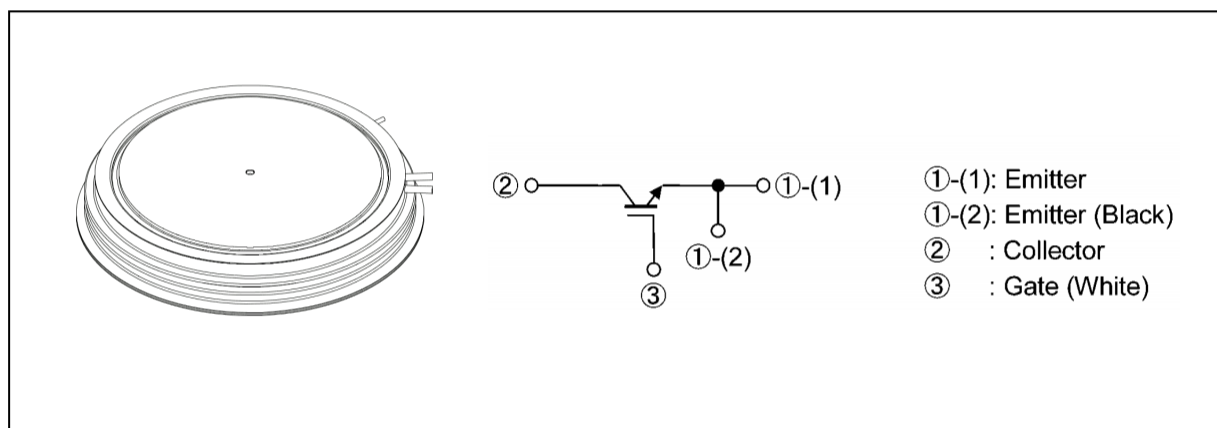
1. 应用

- * 电力输配
- * 电机控制器
- * 大功率开关

2. 特性

- * 全密封结构, 可靠性高
- * 双面冷却

3. 封装及内部线路



4. 绝对最大额定值

4. Absolute Maximum Ratings (Note) ($T_c = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)

Characteristics	Symbol	Note	Test Condition	Rating	Unit
Collector-emitter voltage	V_{CES}			4500	V
Gate-emitter voltage	V_{GES}			± 20	V
Collector current (DC)	I_C	(Note 1)		3000	A
Collector current (pulsed)	I_{CP}	(Note 2)		6000	A
Collector power dissipation	P_C	(Note 3)	$T_f = 25\text{ }^{\circ}\text{C}$	22568	W
Junction temperature	T_j			-40 to 150	$^{\circ}\text{C}$
Operating junction temperature	$T_{j(opr)}$			-40 to 125	$^{\circ}\text{C}$
Case Temperature	T_c			-40 to 85	$^{\circ}\text{C}$
Storage temperature	T_{stg}			-40 to 125	$^{\circ}\text{C}$
Mounting force	—			59 to 70	kN

Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings.

Note 1: $T_f = 105\text{ }^{\circ}\text{C}$

Note 2: Pulse width and repetition rate should be such that junction temperature (T_j) does not exceed maximum T_j rating.

Note 3: Refer to the application notes.

5. 热特性值

5. Thermal Characteristics (Note)

Characteristics	Symbol	Note	Test Condition	Max	Unit
Thermal resistance (junction-to-fin)	$R_{th(j-f)}$	(Note4)	Double side	5.23	K/kW

Note4: Conductive thermal compound is added.

6. 电特性值

6. Electrical Characteristics

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Gate-emitter leakage current	I_{GES}	$V_{GE} = \pm 20\text{ V}, V_{CE} = 0\text{ V}, T_j = 25\text{ }^{\circ}\text{C}$	—	—	± 100	nA
Collector-emitter cut-off current	I_{CES}	$V_{CE} = 4500\text{ V}, V_{GE} = 0\text{ V}, T_j = 125\text{ }^{\circ}\text{C}$	—	—	150	mA
Gate-emitter cut-off voltage	$V_{GE(off)}$	$I_C = 3.0\text{ A}, V_{CE} = 5\text{ V}, T_j = 25\text{ }^{\circ}\text{C}$	—	7.80	—	V
Collector-emitter saturation voltage	$V_{CE(sat)}$	$I_C = 3000\text{ A}, V_{GE} = 15\text{ V}, T_j = 25\text{ }^{\circ}\text{C}$	—	3.05	—	V
		$I_C = 3000\text{ A}, V_{GE} = 15\text{ V}, T_j = 150\text{ }^{\circ}\text{C}$	—	3.10	3.75	
Input capacitance	C_{ies}	$V_{CE} = 10\text{ V}, V_{GE} = 0\text{ V}, f = 100\text{ kHz}, T_j = 25\text{ }^{\circ}\text{C}$	—	402	—	nF
Switching time (rise time)	t_r	$V_{CC} = 2800\text{ V}, I_C = 3000\text{ A}, V_{GE} = \pm 15\text{ V}, R_{G(on)} = 2.2\text{ }\Omega, R_{G(off)} = 39\text{ }\Omega, T_j = 150\text{ }^{\circ}\text{C}$ (Inductive load, Diode:3000GXHH32, $L_s \approx 300\text{ nH}$) See Fig. 6.1 and Fig. 6.2	—	0.64	—	μs
Switching time (turn-on delay time)	$t_{d(on)}$		—	0.48	—	μs
Switching time (turn-on time)	t_{on}		—	0.92	—	μs
Switching time (fall time)	t_f		—	2.60	—	μs
Switching time (turn-off delay time)	$t_{d(off)}$		—	13.40	—	μs
Switching time (turn-off time)	t_{off}		—	15.60	—	μs
Turn-on switching loss	E_{on}		—	9.20	—	J
Turn-off switching loss	E_{off}		—	22.00	—	J
Short-circuit pulse width	t_{psc}	$V_{CC} = 3400\text{ V}, V_{GE} = \pm 15\text{ V}, R_{G(on)} = 2.2\text{ }\Omega, R_{G(off)} = 39\text{ }\Omega, L_s \approx 150\text{ nH}, T_j = 125\text{ }^{\circ}\text{C}$	—	—	10	μs

IEGT3000A/4500V

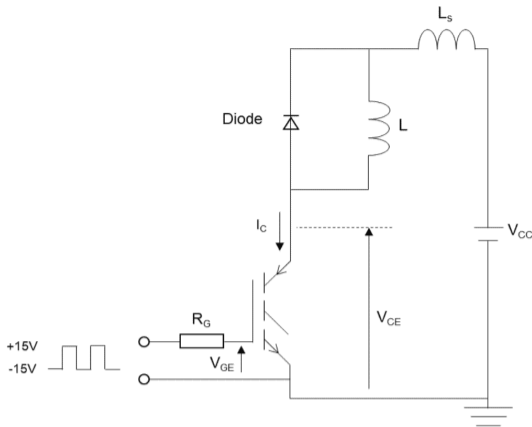


Fig. 6.1 Test Circuit

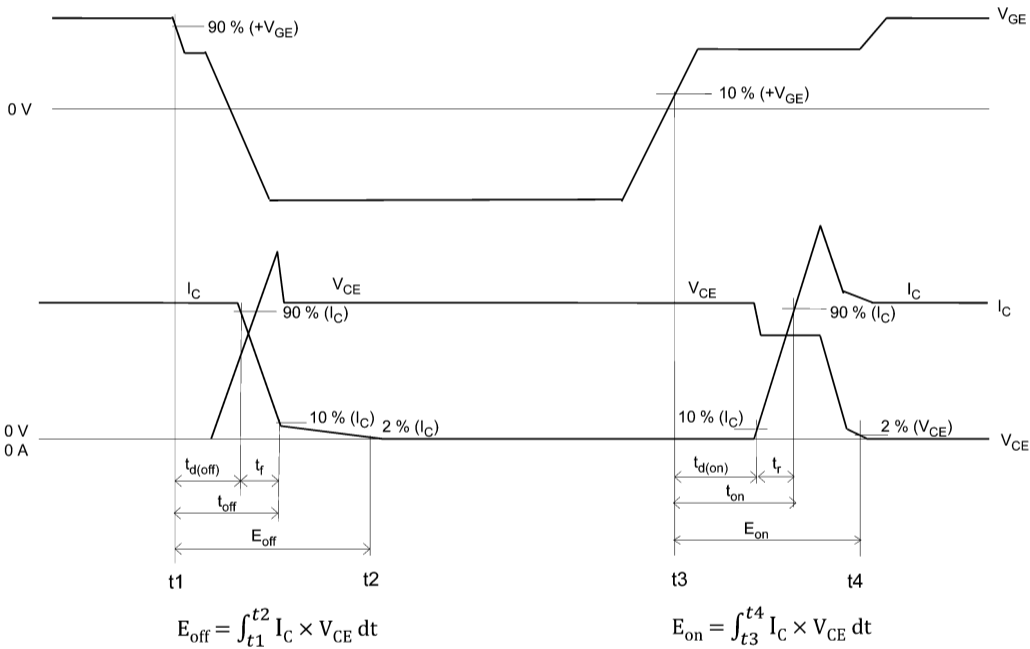


Fig. 6.2 Timing Chart

7. 特性曲线

7. Characteristics Curves (Note)

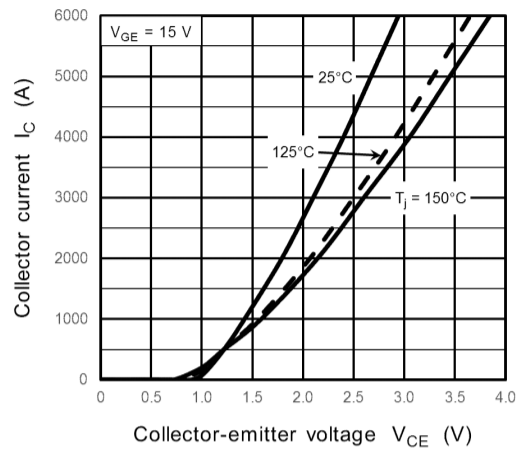


Fig. 7.1 $I_C - V_{CE}$

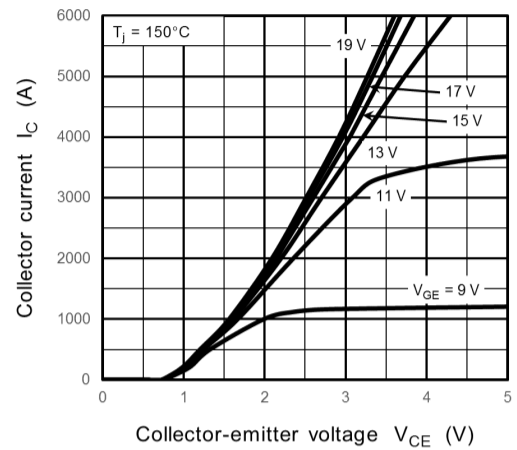


Fig. 7.2 $I_C - V_{CE}$

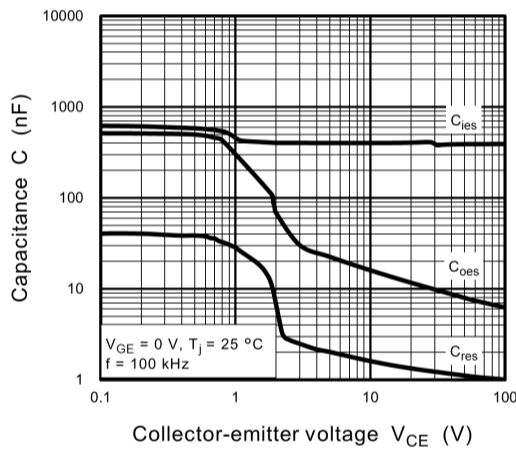


Fig. 7.3 Capacitance - V_{CE}

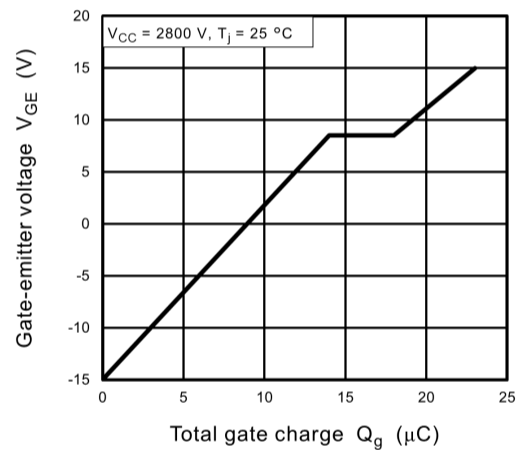


Fig. 7.4 $V_{GE} - Q_g$

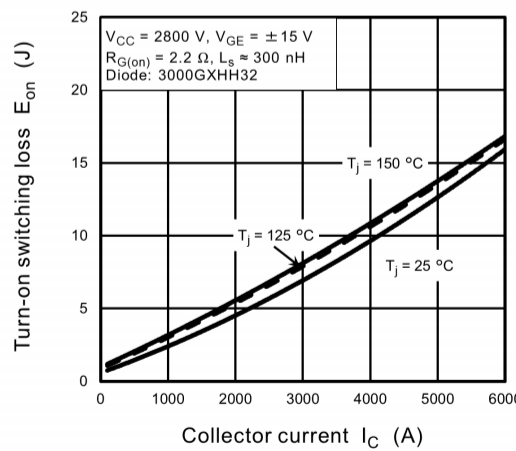


Fig. 7.5 $E_{on} - I_C$

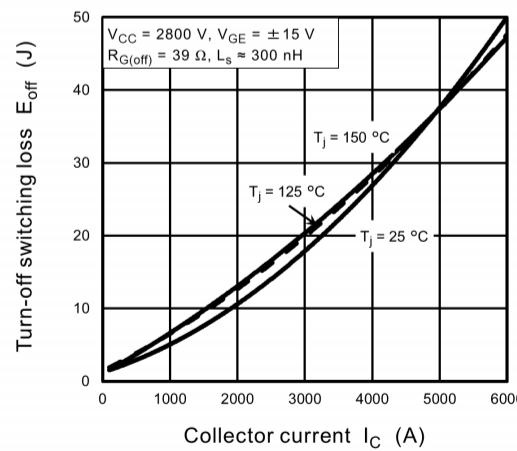


Fig. 7.6 $E_{off} - I_C$

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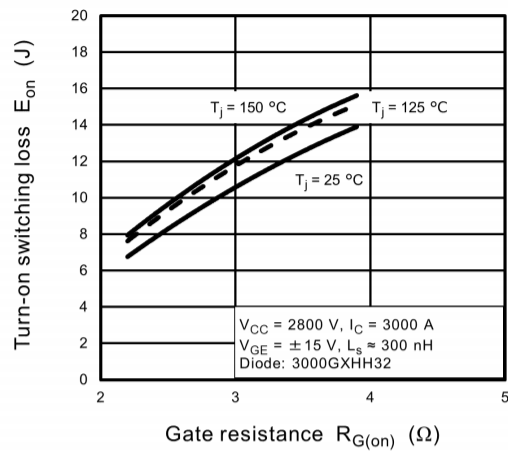


Fig. 7.7 E_{on} - $R_{G(on)}$

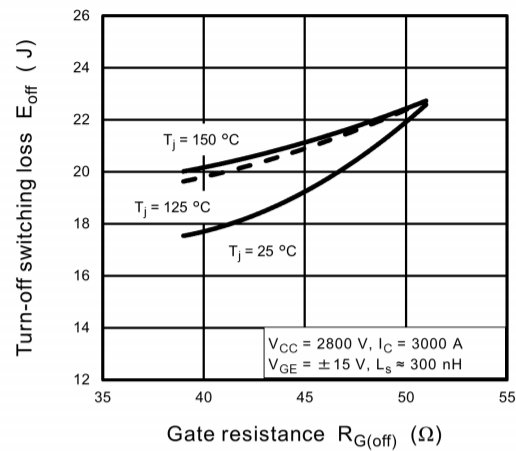


Fig. 7.8 E_{off} - $R_{G(off)}$

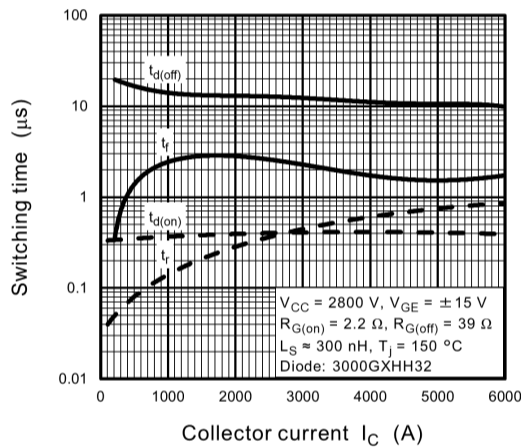


Fig. 7.9 Switching time - I_C

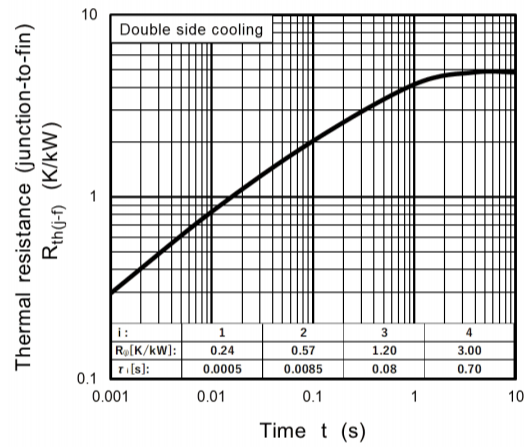


Fig. 7.10 $R_{th(j-f)}$ - t (Guaranteed value)

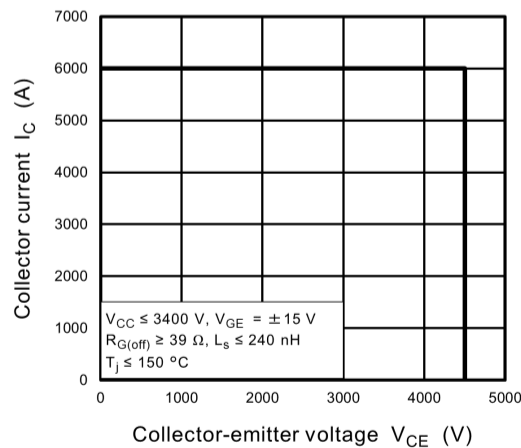


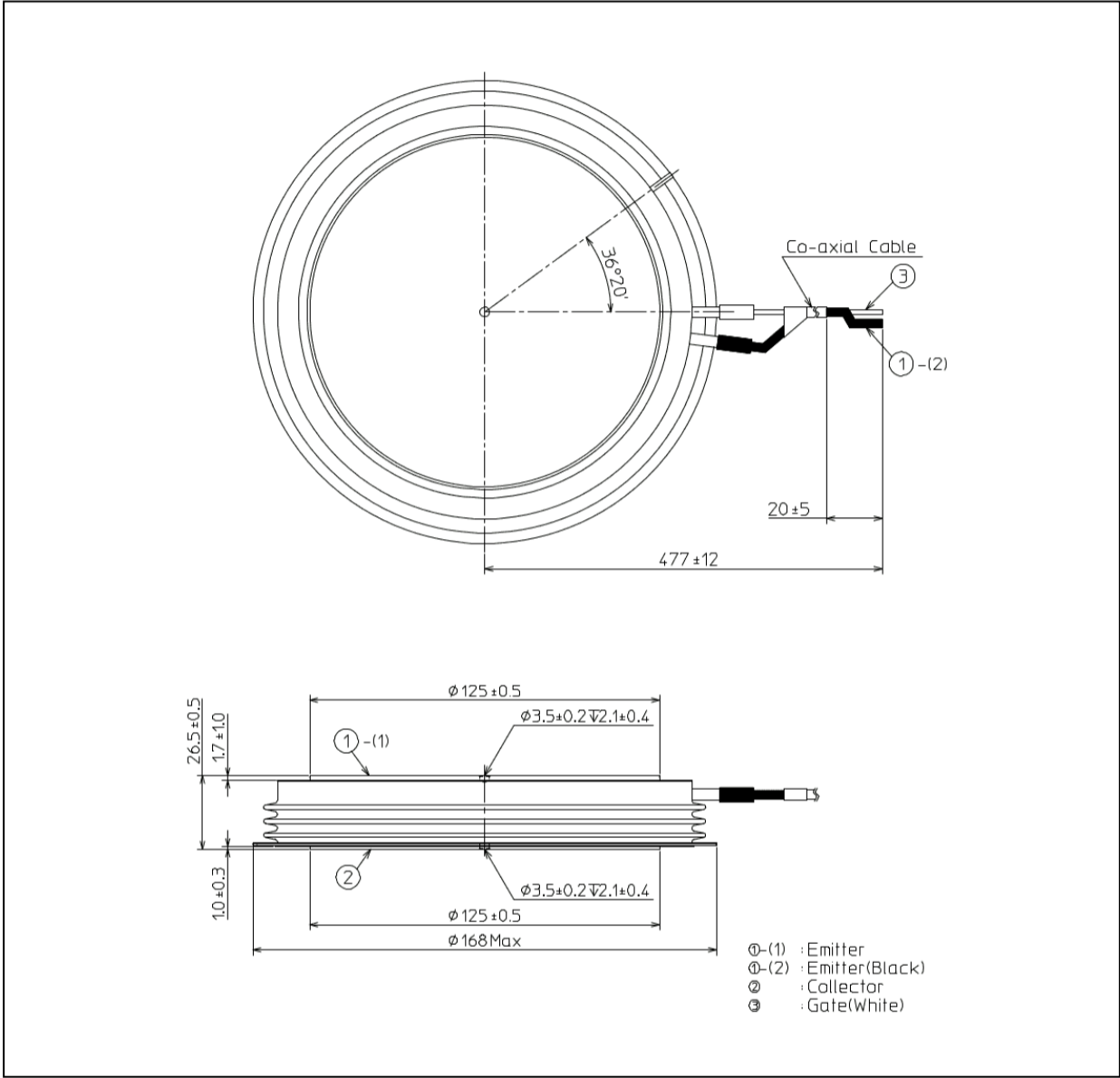
Fig. 7.11 RBSOA (Guaranteed value)

Note: The above characteristics curves are presented for reference only and not guaranteed by production test, unless otherwise noted.

IEGT3000A/4500V

Package Dimensions

Unit: mm



Weight: 2700 g (typ.)