

1. Product Features

1.1 Electrical features

- $V_{CES}=1700V$
- $I_{C\ nom}=100A / I_{CRM}=200A$
- Low switching losses
- Low inductance
- Fast switching and short tail current
- High power and thermal cycling capability



Figure1 IGBT Module

1.2 Mechanical features

- Al_2O_3 substrate with low thermal resistance
- Copper base plate

2. Typical Applications

- High Frequency Switching Application
- Motor drives
- UPS system

3. Description

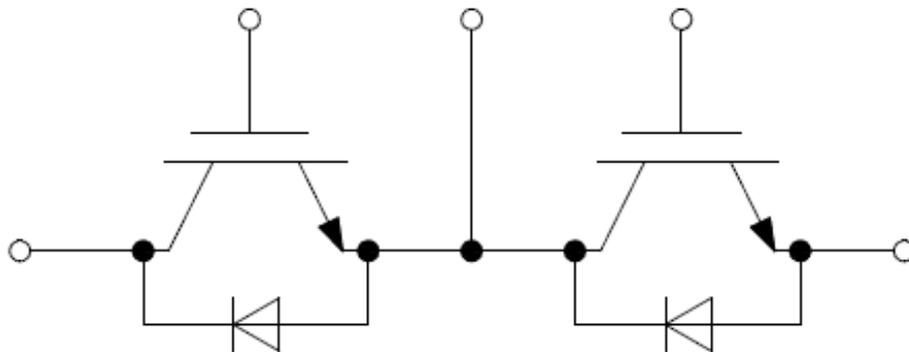


Figure 2 Half Bridge

4. IGBT, Inverter

4.1 Maximum Rated Values

Parameter	Note or test condition	Symbol	Values	Unit
Collector-emitter voltage 集电极—发射极间电压	$T_{vj} = 25^{\circ}\text{C}$	V_{CES}	1700	V
Continuous DC collector current 连续集电极电流	$T_C = 115^{\circ}\text{C}, T_{vj} \text{ max} = 150^{\circ}\text{C}$	$I_{C \text{ nom}}$	100	A
Repetitive peak collector current 集电极峰值电流	$t_P = 1 \text{ ms}$	I_{CRM}	200	A
Total power dissipation 总功率损耗	$T_C = 25^{\circ}\text{C}, T_{vj} \text{ max} = 175^{\circ}\text{C}$	P_{tot}	833	W
Gate-emitter peak voltage 栅极—发射极峰值电压		V_{GES}	+/- 20	V

4.2 Characteristic value

Parameter	Note or test condition	Symbol	Values			Unit
			Min.	Typ.	Max.	
Collector-emitter saturation voltage 集电极—发射极饱和电压	$I_C = 100 \text{ A}, V_{GE} = 15 \text{ V}$	$V_{CE, \text{sat}}$		$T_{vj} = 25^{\circ}\text{C}$	1.66	V
				$T_{vj} = 125^{\circ}\text{C}$	1.91	V
				$T_{vj} = 150^{\circ}\text{C}$	1.98	V
Gate threshold voltage 栅极阈值电压	$I_C = 6 \text{ mA}, V_{CE} = V_{GE}, T_{vj} = 25^{\circ}\text{C}$	$V_{GE, \text{th}}$	5.1	5.7	6.3	V
Gate charge 栅极电荷	$V_{GE} = -15 \text{ V} \dots +15 \text{ V}$	Q_G		0.99		μC
Internal gate resistor 内部栅极电阻	$T_{vj} = 25^{\circ}\text{C}$	R_{Gint}		5.40		Ω
Input capacitance 输入电容	$f=1\text{MHz}, T_{vj}=25^{\circ}\text{C}, V_{CE}=25\text{V}, V_{GE}=0\text{V}$	C_{ies}		13.7		nF
Reverse transfer capacitance 反向传输电容	$f=1\text{MHz}, T_{vj}=25^{\circ}\text{C}, V_{CE}=25\text{V}, V_{GE}=0\text{V}$	C_{res}		0.40		nF
Collector-emitter cut-off current 集电极-发射极截止电流	$V_{CE} = 1700 \text{ V}, V_{GE} = 0 \text{ V}, T_{vj} = 25^{\circ}\text{C}$	I_{CES}			1	mA
Gate-emitter leakage current 栅极-发射极漏电流	$V_{CE} = 0 \text{ V}, V_{GE} = 20 \text{ V}, T_{vj} = 25^{\circ}\text{C}$	I_{GES}			100	nA
Turn-on delay time, inductive load 开通延迟时间	$I_C = 100\text{A}, V_{CE} = 900\text{V}$ $V_{GE} = +15/-15\text{V}$ $R_{G, \text{on}} = 6.8\Omega$	$t_{d, \text{on}}$		$T_{vj} = 25^{\circ}\text{C}$	0.21	μs
				$T_{vj} = 125^{\circ}\text{C}$	0.27	μs
				$T_{vj} = 150^{\circ}\text{C}$	0.28	μs
Rise time, inductive load 上升时间	$I_C = 100\text{A}, V_{CE} = 900\text{V}$ $V_{GE} = +15/-15\text{V}$ $R_{G, \text{on}} = 6.8\Omega$	t_r		$T_{vj} = 25^{\circ}\text{C}$	0.04	μs
				$T_{vj} = 125^{\circ}\text{C}$	0.04	μs
				$T_{vj} = 150^{\circ}\text{C}$	0.04	μs

(table continues...) 待续

Parameter	Note or test condition		Symbol	Values			Unit
				Min.	Typ.	Max.	
Turn-off delay time, inductive load 关断延迟时间	$I_C = 100A, V_{CE} = 900V$ $V_{GE} = +15/-15V$ $R_{G,on} = 6.8\Omega$	$T_{vj} = 25^\circ C$	$t_{d,off}$		0.44		us
		$T_{vj} = 125^\circ C$			0.56		us
		$T_{vj} = 150^\circ C$			0.60		us
Fall time, inductive load 下降时间	$I_C = 100A, V_{CE} = 900V$ $V_{GE} = +15/-15V$ $R_{G,on} = 6.8\Omega$	$T_{vj} = 25^\circ C$	t_f		0.13		us
		$T_{vj} = 125^\circ C$			0.15		us
		$T_{vj} = 150^\circ C$			0.15		us
Turn-on energy loss per pulse 开通损耗能量	$I_C = 100A, V_{CE} = 900V, L_s = 30nH$ $V_{GE} = +15/-15V, di/dt = 1265A/\mu s$ $R_{G,on} = 6.8\Omega (T_{vj} = 150^\circ C)$	$T_{vj} = 25^\circ C$	E_{on}		14.2		mJ
		$T_{vj} = 125^\circ C$			19.9		mJ
		$T_{vj} = 150^\circ C$			22.9		mJ
Turn-off energy loss per pulse 关断损耗能量	$I_C = 100A, V_{CE} = 900V, L_s = 30nH$ $V_{GE} = +15/-15V, dv/dt = 4180V/\mu s$ $R_{G,off} = 6.8\Omega (T_{vj} = 150^\circ C)$	$T_{vj} = 25^\circ C$	E_{off}		17.6		mJ
		$T_{vj} = 125^\circ C$			20.4		mJ
		$T_{vj} = 150^\circ C$			21.6		mJ
SC data 短路数据	$V_{GE} \leq 15V, V_{CC} = 900V, t_p \leq 8\mu s, T_{vj} = 150^\circ C,$ $C_{GE} = 0.0\mu F, V_{CEmax} = V_{CES} - L_{sCE} \cdot di/dt$		I_{sc}		979		A
Thermal resistance, junction to case 结-外壳热阻	Per IGBT		$R_{th,jc}$			0.180	K/W

5. Diode, Inverter

5.1 Maximum Rated Values

Parameter	Note or test condition	Symbol	Values	Unit
Repetitive peak reverse voltage 反向重复峰值电压	$T_{vj} = 25^\circ C$	V_{RRM}	1700	V
Continuous DC forward current 连续正向直流电流		I_F	100	A
Repetitive peak forward current 正向重复峰值电流	$t_p = 1\text{ ms}$	I_{FRM}	200	A

5.2 Characteristic value

Parameter	Note or test condition		Symbol	Values			Unit
				Min.	Typ.	Max.	
Forward voltage 正向电压	$I_F = 100A, V_{GE} = 0V$	$T_{vj} = 25^\circ C$	V_F		1.98		V
		$T_{vj} = 125^\circ C$			2.18		V
		$T_{vj} = 150^\circ C$			2.13		V

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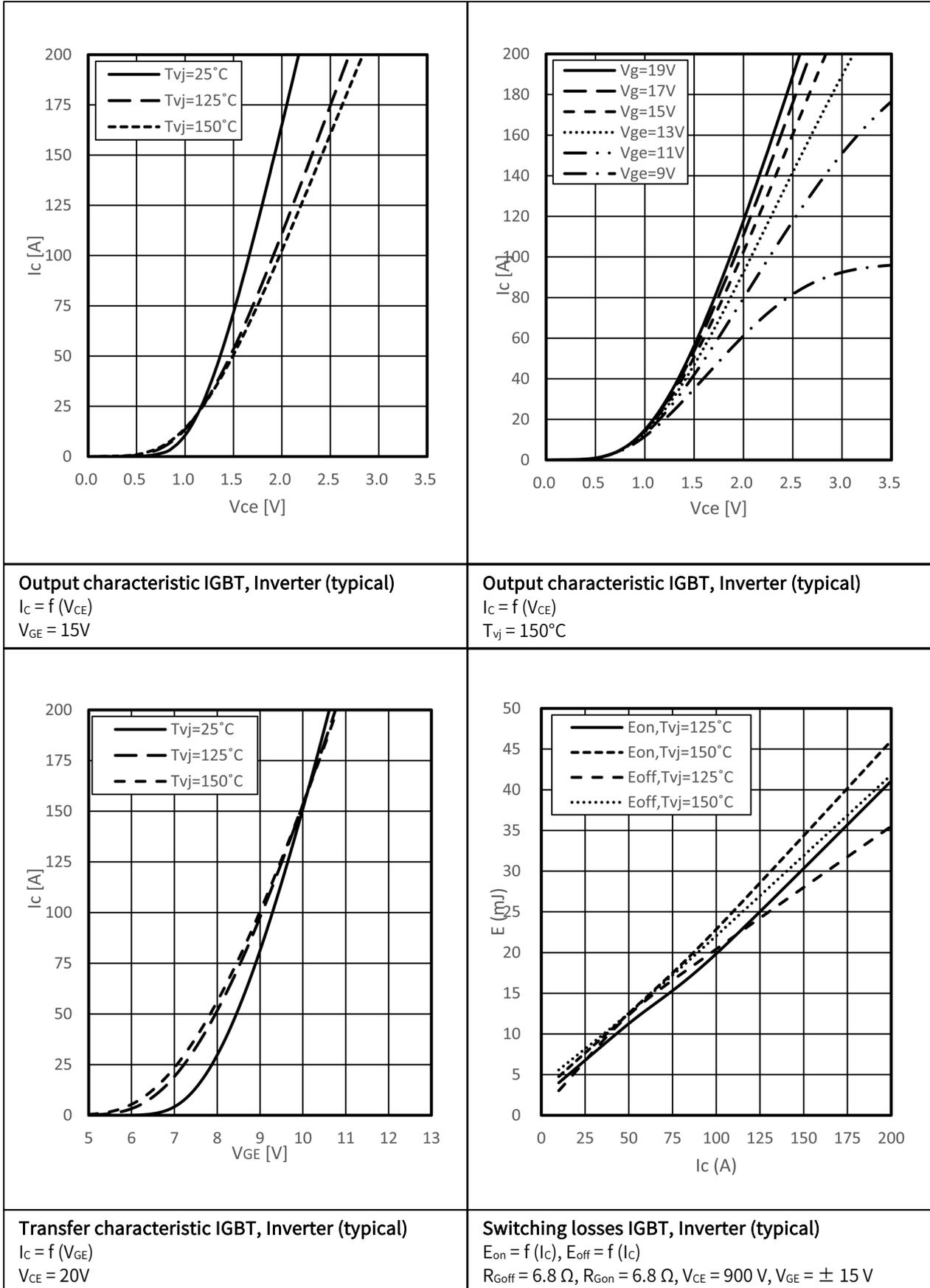
Parameter	Note or test condition		Symbol	Values			Unit
				Min.	Typ.	Max.	
Peak reverse recovery current 反向恢复峰值电流	$I_F = 100A, V_R = 900V$	$T_{vj} = 25^\circ C$	I_{RM}		134		A
	$V_{GE} = -15V, -di_F/dt = 2000 A/\mu s$	$T_{vj} = 125^\circ C$			140		A
	$R_{G,off} = 6.8\Omega (T_{vj} = 150^\circ C)$	$T_{vj} = 150^\circ C$			148		A
Recovered charge 恢复电荷	$I_F = 100A, V_R = 900V$	$T_{vj} = 25^\circ C$	Q_r		14.7		μC
	$V_{GE} = -15V, -di_F/dt = 2000 A/\mu s$	$T_{vj} = 125^\circ C$			28.3		μC
	$R_{G,off} = 6.8\Omega (T_{vj} = 150^\circ C)$	$T_{vj} = 150^\circ C$			34.3		μC
Reverse recovery energy 反向恢复损耗 (每脉冲)	$I_F = 100A, V_R = 900V$	$T_{vj} = 25^\circ C$	E_{rec}		7.22		mJ
	$V_{GE} = -15V, -di_F/dt = 2000 A/\mu s$	$T_{vj} = 125^\circ C$			15.9		mJ
	$R_{G,off} = 6.8\Omega (T_{vj} = 150^\circ C)$	$T_{vj} = 150^\circ C$			20.1		mJ
Thermal resistance, junction to case 结-外壳热阻	Per diode		$R_{th,Jc}$			0.425	K/W

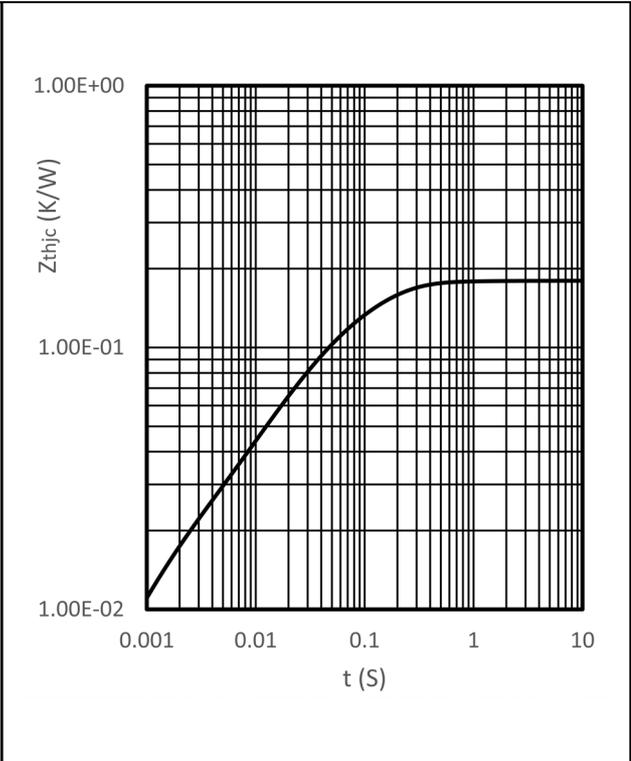
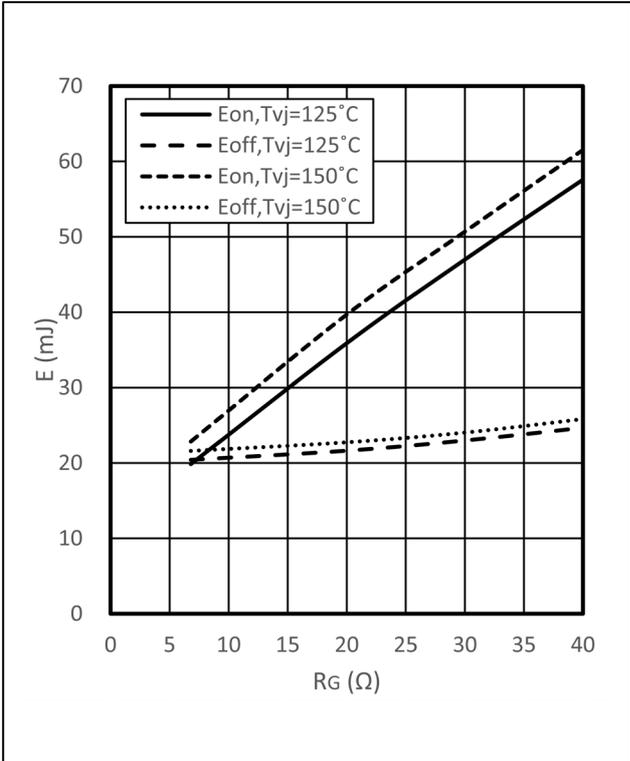
6. Module

6.1 Characteristic value

Parameter	Note or test condition	Symbol	Values			Unit
			Min.	Typ.	Max.	
Isolation Voltage 隔离电压	RMS, f=50HZ,1min	V_{ISOL}			4000	V
Stray inductance module 杂散电感		L_{sCE}		30		nH
Operation Junction Temperature 结温		T_{jop}	-40		150	$^\circ C$
Storage Temperature Range 存储温度范围		T_{stg}	-40		125	$^\circ C$
Mounting Torque 安装扭矩	Screw M6	M	3.0		5.0	N.m
Terminal Connection Torque 端子扭矩	Screw M5	M	2.5		5.0	N.m
Weight of Module 重量		G		160		g

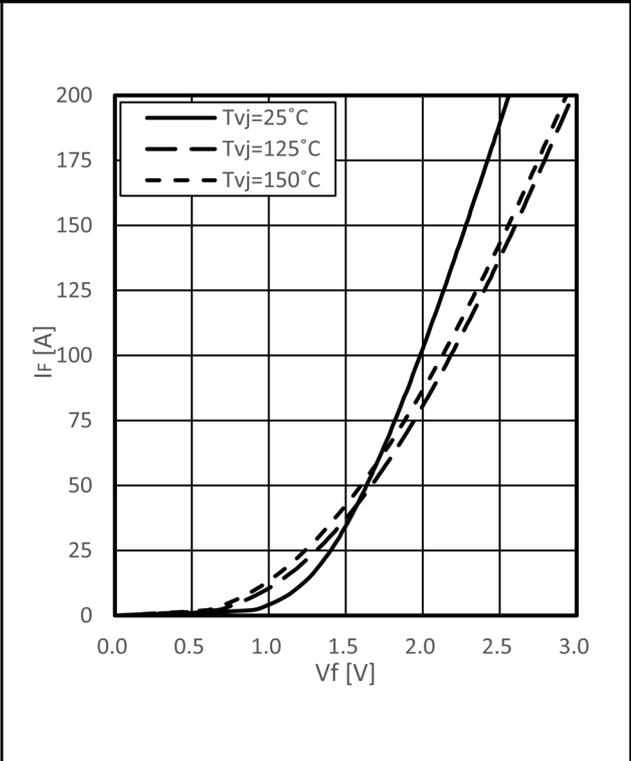
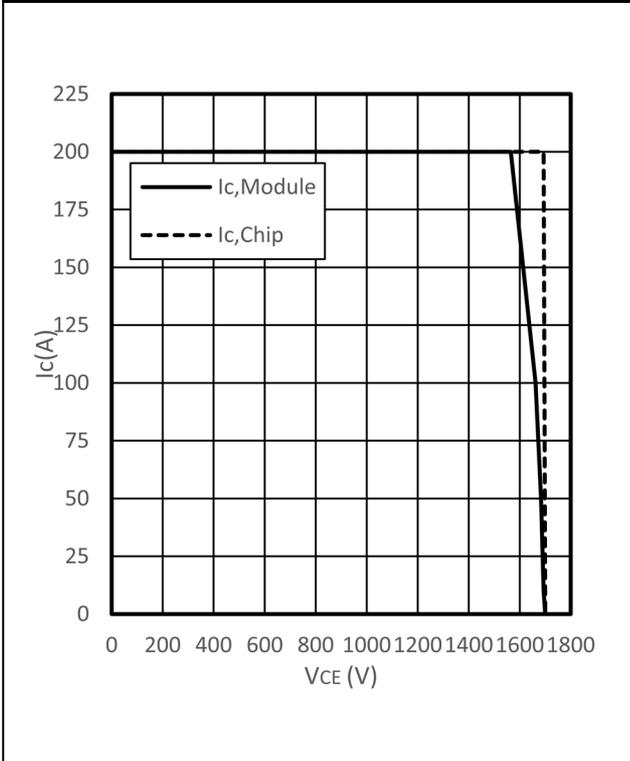
7. Characteristics Diagrams





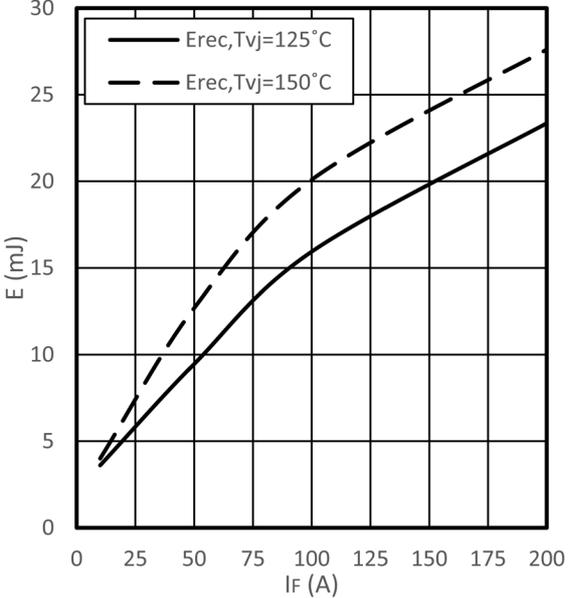
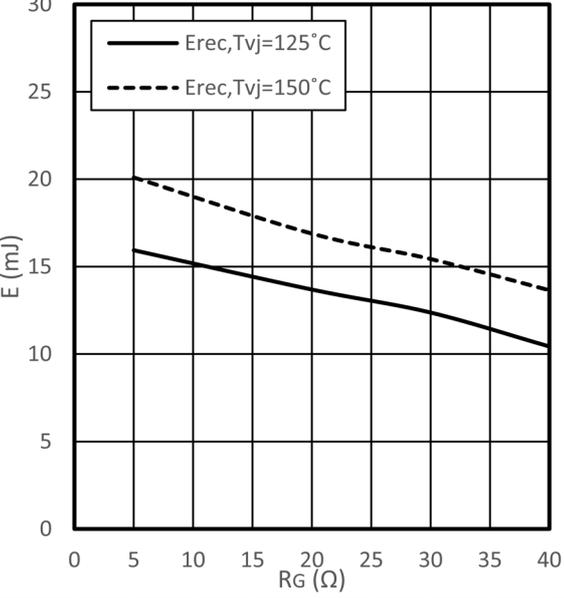
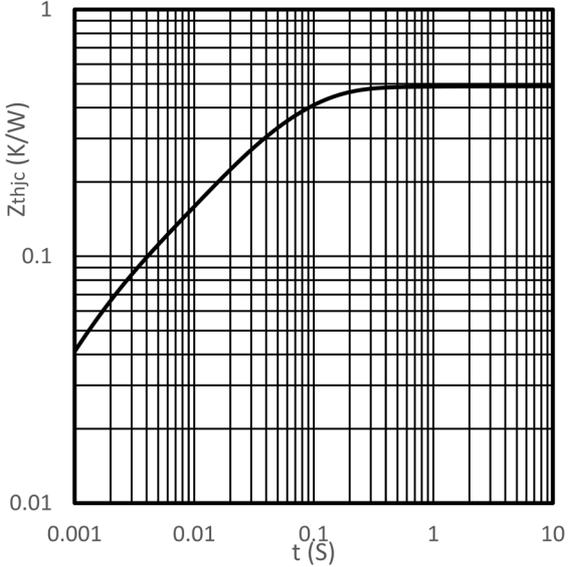
Switching losses IGBT, Inverter (typical)
 $E_{on} = f(R_G)$
 $I_C = 100\text{ A}, V_{CE} = 900\text{ V}, V_{GE} = \pm 15\text{ V}$

Transient thermal impedance IGBT, Inverter
 $Z_{thJC} = f(t)$



Reverse bias safe operating area IGBT, Inverter (RBSOA)
 $I_C = f(V_{CE})$
 $V_{GE} = 6.8\text{ V}, R_{Goff} = 6.8\ \Omega, T_{vj} = 150\text{ °C}$

Forward characteristic of Diode, Inverter (typical)
 $I_F = f(V_F)$

	
<p>Switching losses Diode, Inverter (typical) $E_{rec} = f(I_F)$ $R_{Gon} = 6.8 \Omega, V_{CE} = 900 V$</p>	<p>Switching losses Diode, Inverter (typical) $E_{rec} = f(R_{Gon})$ $I_F = 100 A, V_{CE} = 900 V$</p>
	
<p>Transient thermal impedance Diode, Inverter $Z_{thjC} = f(t)$</p>	

8. Circuit Diagram

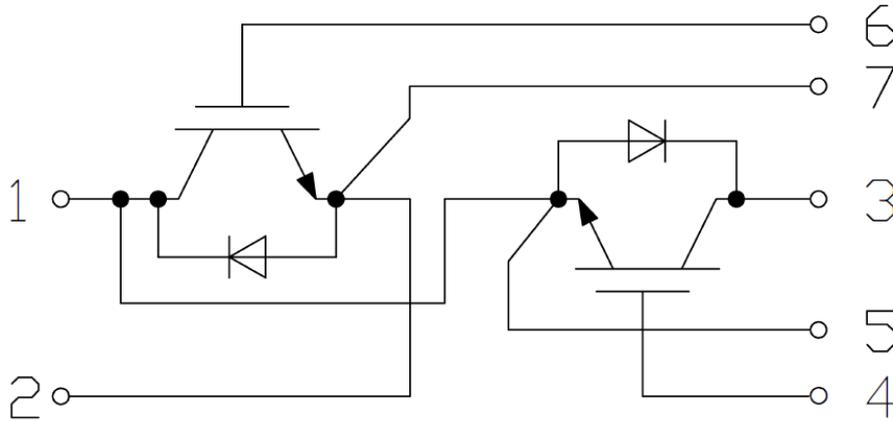


Figure 3

9. Package Outlines

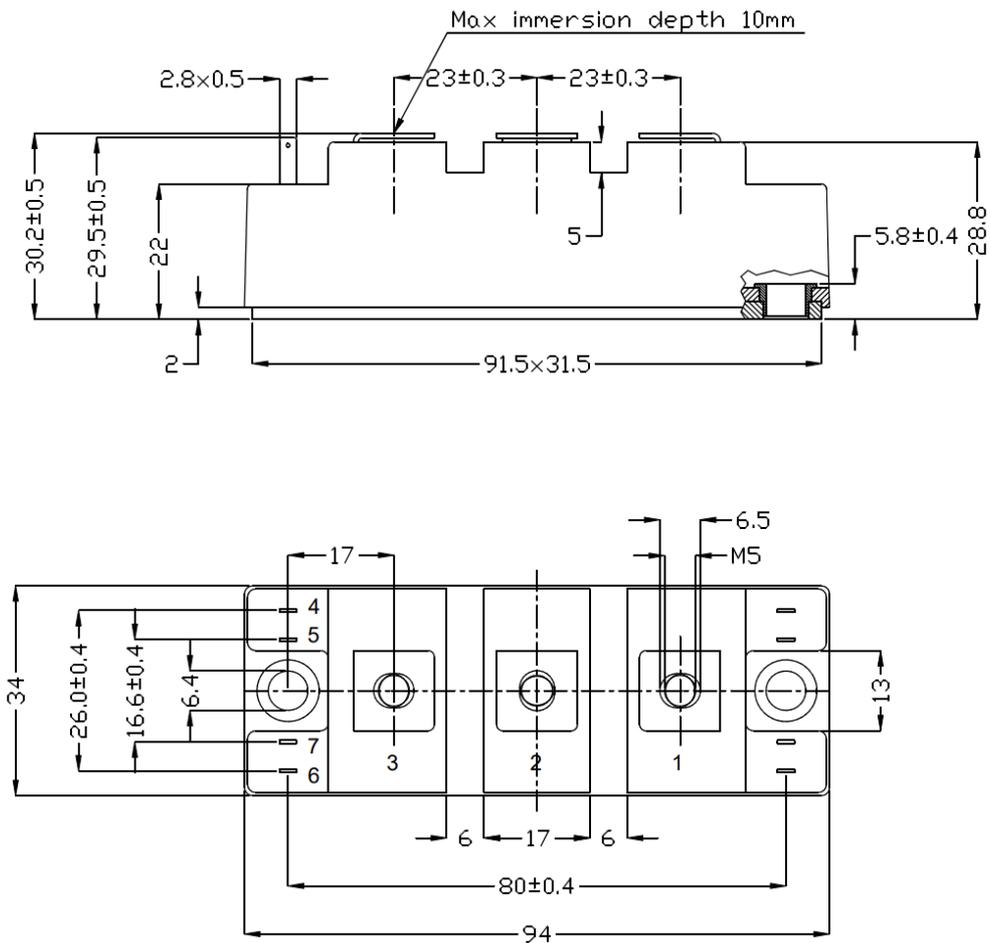


Figure 4