1. Product Features

1.1 Electrical features

- V_{CES}=1200V
- $I_{C\ nom}$=100A / I_{CRM}=200A
- Low switching losses
- Low inductance
- Fast switching and short tail current
- High power and thermal cycling capability

1.2 Mechanical features

- Al_2O_3 substrate with low thermal resistance
- Copper base plate

Figure1 IGBT Module

2. Typical Applications

- High Frequency Switching Application
- Motor drives
- UPS system

3. Description

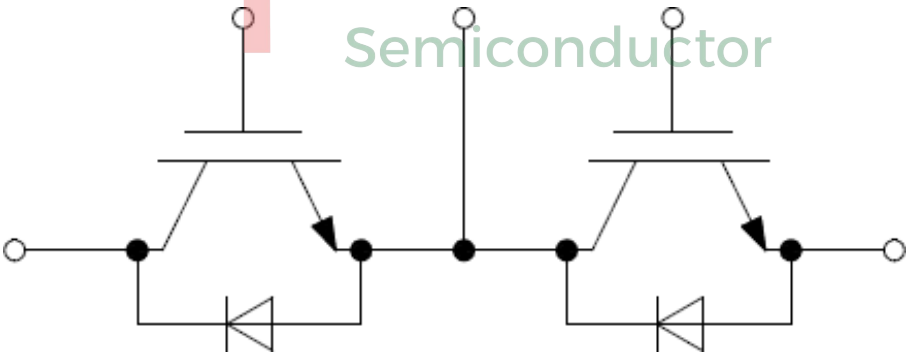


Figure2 Half Bridge

4. IGBT, Inverter

4.1 Maximum Rated Values

Parameter	Note or test condition	Symbol	Values	Unit
Collector-emitter voltage	T_{vj} = 25℃	V_{CES}	1200	V
Continuous DC collector current	T_c = 85℃, T_{vj} max = 150℃	$I_{C\ nom}$	100	A

Repetitive peak collector current	t_P = 1 ms	I_{CRM}	200	A
Total power dissipation	T_C = 25℃, $T_{vj\ max}$ = 175℃	P_{tot}	517	W
Gate-emitter peak voltage		V_{GES}	+/- 20	V

4.2 Characteristic value

Parameter	Note or test condition		Symbol	Values			Unit
				Min.	Typ.	Max.	
Collector-emitter saturation voltage		T_{vj} = 25℃	$V_{CE,sat}$		1.86		V
	I_C = 100 A, V_{GE} = 15 V	T_{vj} = 125℃			2.07		V
		T_{vj} = 150℃			2.14		V
Gate threshold voltage	I_C = 1.0mA, V_{CE} = V_{GE}, T_{vj} = 25℃		$V_{GE,th}$	5.0	5.5	6.0	V
Gate charge	V_{GE} = -15 V ... +15 V		Q_G		0.98		μC
Internal gate resistor	T_{vj} = 25℃		R_{Gint}		3.00		*
Input capacitance	f=1MHz, T_{vj}=25℃, V_{CE}=25V, V_{GE}=0V		C_{ies}		27.6		nF
Reverse transfer capacitance	f=1MHz, T_{vj}=25℃, V_{CE}=25V, V_{GE}=0V		C_{res}		0.22		nF
Collector-emitter cut-off current	V_{CE} = 1200 V, V_{GE} = 0 V, T_{vj} = 25℃		I_{CES}			1	mA
Gate-emitter leakage current	V_{CE} = 0 V, V_{GE} = 20 V, T_{vj} = 25℃		I_{GES}			100	nA
Turn-on delay time, inductive load	I_C = 100A, V_{CE} = 600V	T_{vj} = 25℃	$t_{d,on}$		0.24		us
	V_{GE} = +15/-15V	T_{vj} = 125℃			0.25		us
	$R_{G,on}$ = 15Ω	T_{vj} = 150℃			0.26		us
Rise time, inductive load	I_C = 100A, V_{CE} = 600V	T_{vj} = 25℃	t_r		0.09		us
	V_{GE} = +15/-15V	T_{vj} = 125℃			0.10		us
	$R_{G,on}$ = 15Ω	T_{vj} = 150℃			0.10		us

(table continues...)

Parameter	Note or test condition		Symbol	Values			Unit
				Min.	Typ.	Max.	
Turn-off delay time, inductive load	I_C = 100A, V_{CE} = 600V	T_{vj} = 25℃	$t_{d,off}$		0.38		us
	V_{GE} = +15/-15V	T_{vj} = 125℃			0.42		us
	$R_{G,on}$ = 15Ω	T_{vj} = 150℃			0.43		us
Fall time, inductive load	I_C = 100A, V_{CE} = 600V	T_{vj} = 25℃	t_f		0.18		us
	V_{GE} = +15/-15V	T_{vj} = 125℃			0.21		us
	$R_{G,on}$ = 15Ω	T_{vj} = 150℃			0.22		us
Turn-on energy loss per pulse	I_C = 100A, V_{CE} = 600V, L_s=30nH	T_{vj} = 25℃	E_{on}		10.4		mJ
	V_{GE} = +15/-15V, di/dt =1020A/μs	T_{vj} = 125℃			14.1		mJ
	$R_{G,on}$ = 15Ω (T_{vj} = 150℃)	T_{vj} = 150℃			15.4		mJ
	I_C = 100A, V_{CE} = 600V, L_s=30nH	T_{vj} = 25℃	E_{off}		5.78		mJ

Turn-off energy loss per pulse	V_{GE} = +15/-15V, dv/dt =5800V/μs	T_{vj} = 125℃			7.27		mJ
	$R_{G,off}$ = 15Ω (T_{vj} = 150℃)	T_{vj} = 150℃			7.37		mJ
SC data	V_{GE} ≤15V, V_{CC} =600 V, t_P ≤ 8 μs, T_{vj} = 150℃ , C_{GE} = 0.0uF , V_{CEmax} = V_{CES} - L_{sCE} ·di/dt		I_{SC}		818		A
Thermal resistance, junction to case	Per IGBT		$R_{th,JC}$			0.25	K/W

5. Diode, Inverter

5.1 Maximum Rated Values

Parameter	Note or test condition	Symbol	Values	Unit
Repetitive peak reverse voltage	T_{vj} = 25℃	V_{RRM}	1200	V
Continuous DC forward current		I_F	100	A
Repetitive peak forward current	t_P = 1 ms	I_{FRM}	200	A

5.2 Characteristic value

Parameter	Note or test condition		Symbol	Values			Unit
				Min.	Typ.	Max.	
Forward voltage		T_{vj} = 25℃	V_F		1.96		V
	I_F = 100 A, V_{GE} = 0 V	T_{vj} = 125℃			2.01		V
		T_{vj} = 150℃			1.94		V

(table continues...)

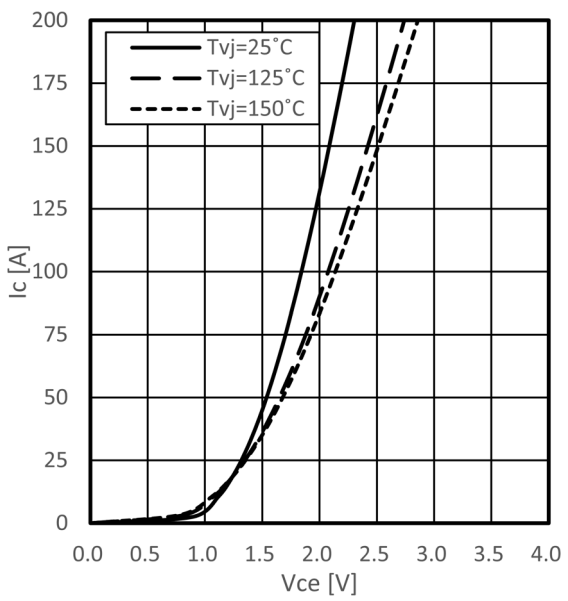
Parameter	Note or test condition		Symbol	Values			Unit
				Min.	Typ.	Max.	
Peak reverse recovery current	I_F = 100A, V_R = 600V	T_{vj} = 25℃	I_{RM}		68.7		A
	V_{GE} = -15V , - di_F/dt = 1030 A/μs	T_{vj} = 125℃			77.7		A
	$R_{G,off}$ = 15Ω (T_{vj} = 150℃)	T_{vj} = 150℃			81.6		A
Recovered charge	I_F = 100A, V_R = 600V	T_{vj} = 25℃	Q_r		4.68		μC
	V_{GE} = -15V , - di_F/dt = 1030 A/μs	T_{vj} = 125℃			9.13		μC
	$R_{G,off}$ = 15Ω (T_{vj} = 150℃)	T_{vj} = 150℃			10.4		μC
Reverse recovery energy	I_F = 100A, V_R = 600V	T_{vj} = 25℃	E_{rec}		0.55		mJ
	V_{GE} = -15V , - di_F/dt = 1030 A/μs	T_{vj} = 125℃			1.69		mJ
	$R_{G,off}$ = 15Ω (T_{vj} = 150℃)	T_{vj} = 150℃			1.90		mJ
Thermal resistance, junction to case	Per diode		$R_{th,JC}$			0.44	K/W

6. Module

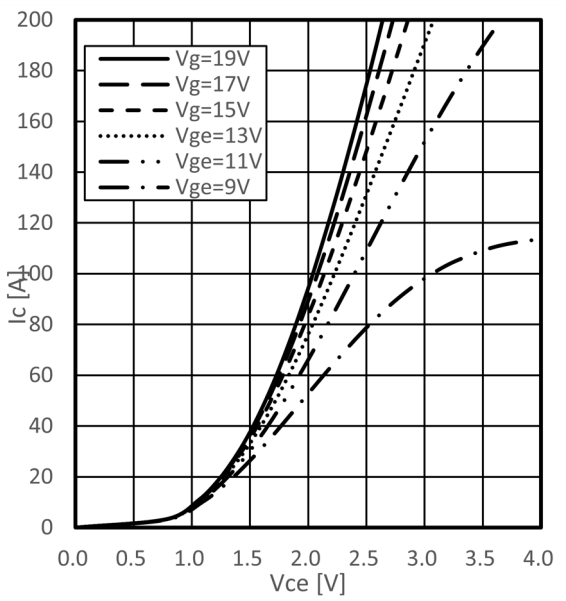
6.1 Characteristic value

Parameter	Note or test condition	Symbol	Values			Unit
			Min.	Typ.	Max.	
Isolation Voltage	RMS, f=50HZ,1min	V_{ISOL}			2500	V
Stray inductance module		L_{sCE}		30		nH
Operation Junction Temperature		T_{jop}	-40		150	℃
Storage Temperature Range		T_{stg}	-40		125	℃
Mounting Torque	Screw M6	M	3.0		5.0	N.m
Terminal Connection Torque	Screw M5	M	2.5		5.0	N.m
Weight of Module		G		160		g

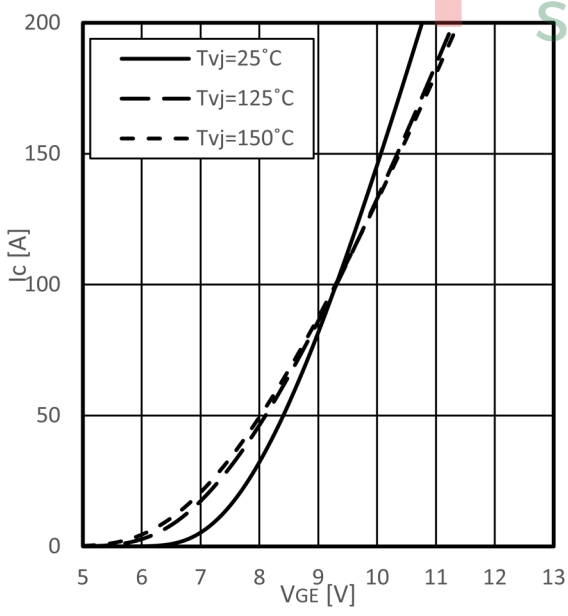
7. Characteristics Diagrams



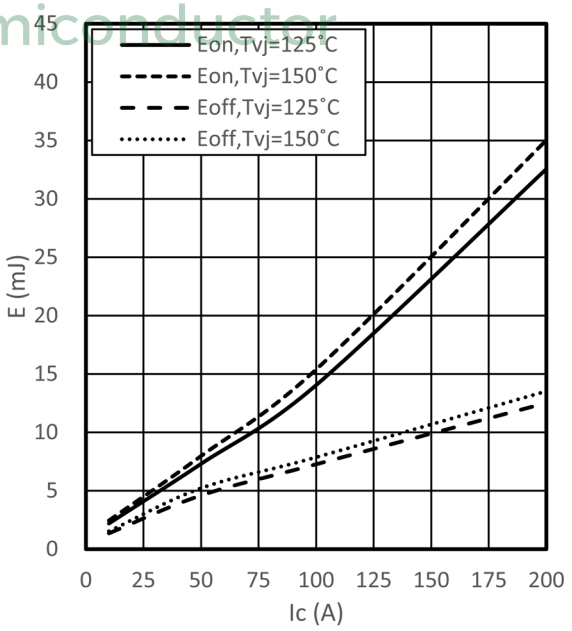
Output characteristic IGBT, Inverter (typical)
$I_C = f\ (V_{CE})$
$V_{GE} = 15V$



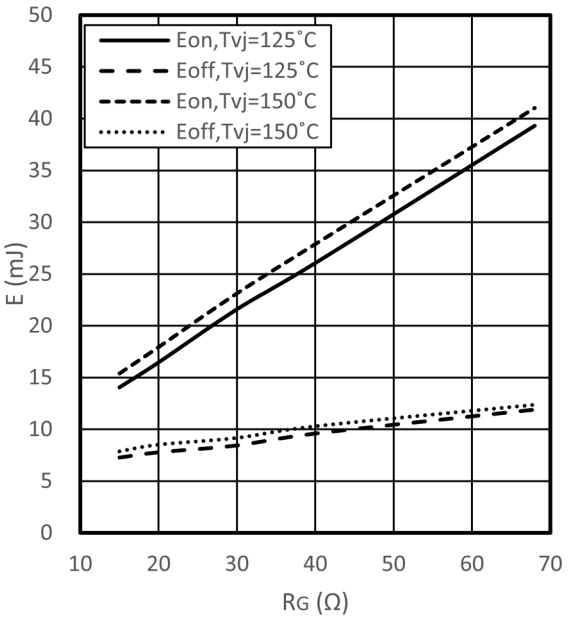
Output characteristic IGBT, Inverter (typical)
$I_C = f\ (V_{CE})$
$T_{vj} = 150°C$



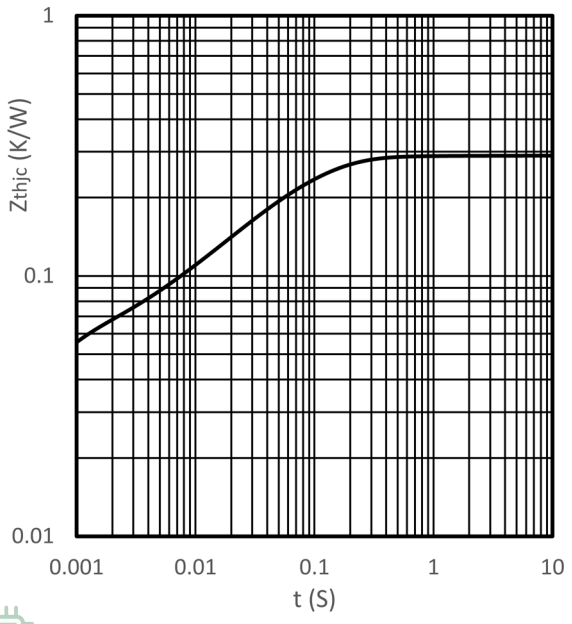
Transfer characteristic IGBT, Inverter (typical)
$I_C = f\ (V_{GE})$
$V_{CE} = 20V$



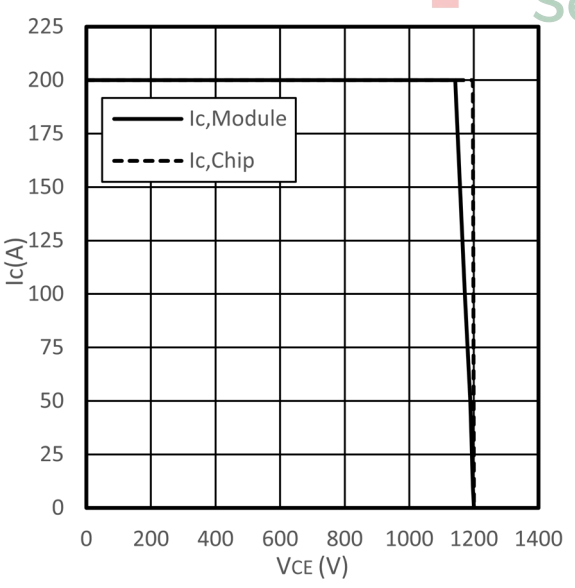
Switching losses IGBT, Inverter (typical)
$E_{on} = f\ (I_C)$, $E_{off} = f\ (I_C)$
$R_{Goff} = 15\ \Omega$, $R_{Gon} = 15\ \Omega$, $V_{CE} = 600\ V$, $V_{GE} = \pm 15V$



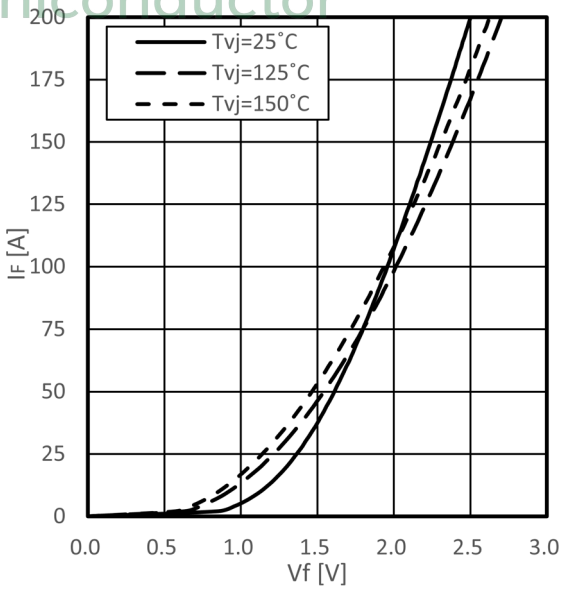
Switching losses IGBT, Inverter (typical)
$E_{on} = f\ (R_G)$
$I_C = 100\ A,\ V_{CE} = 600\ V,\ V_{GE} = \pm 15\ V$



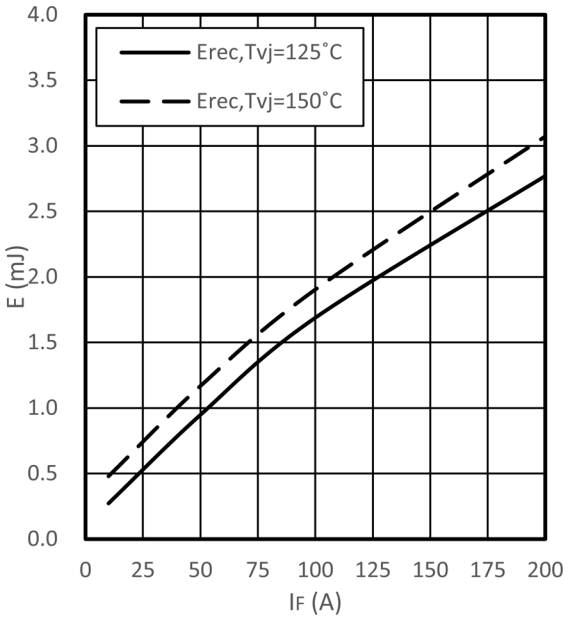
Transient thermal impedance IGBT, Inverter
$Z_{thJC} = f\ (t)$



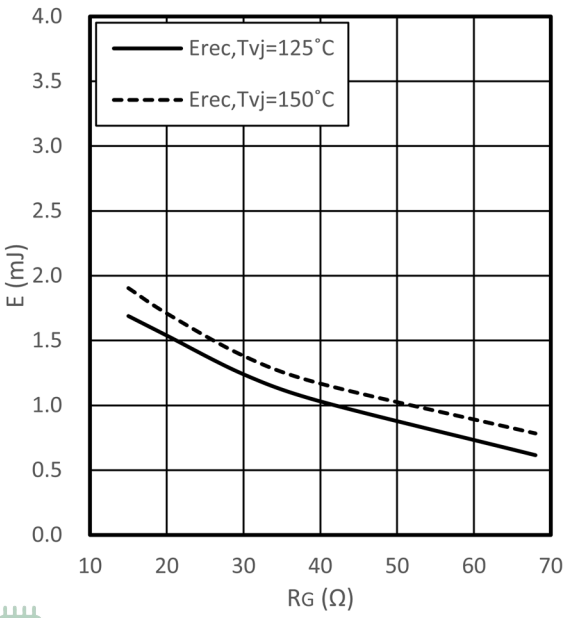
Reverse bias safe operating area IGBT, Inverter (RBSOA)
$I_C = f\ (V_{CE})$
$V_{GE} = 15\ V,\ R_{Goff} = 15\ \Omega,\ T_{vj} = 150\ °C$



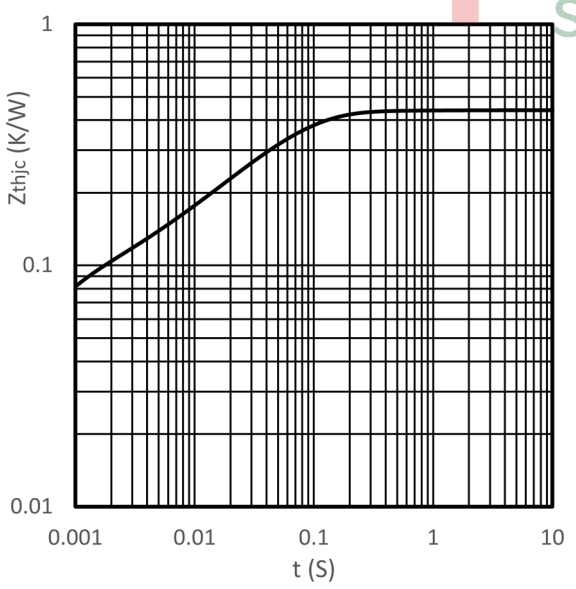
Forward characteristic of Diode, Inverter (typical)
$I_F = f\ (V_F)$



Switching losses Diode, Inverter (typical)
E_{rec} = f (I_F)
R_{Gon} = 15 Ω, V_{CE} = 600 V



Switching losses Diode, Inverter (typical)
E_{rec} = f (R_{Gon})
I_F = 100 A, V_{CE} = 600 V



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

8. Circuit Diagram

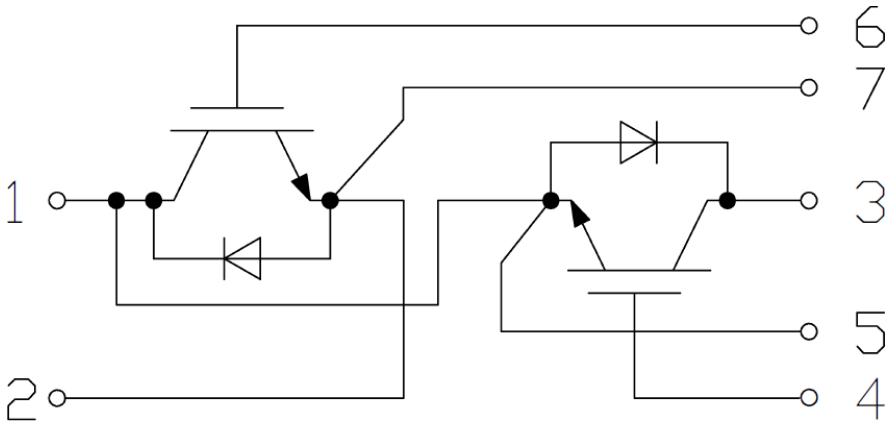


Figure 3

9. Package Outlines

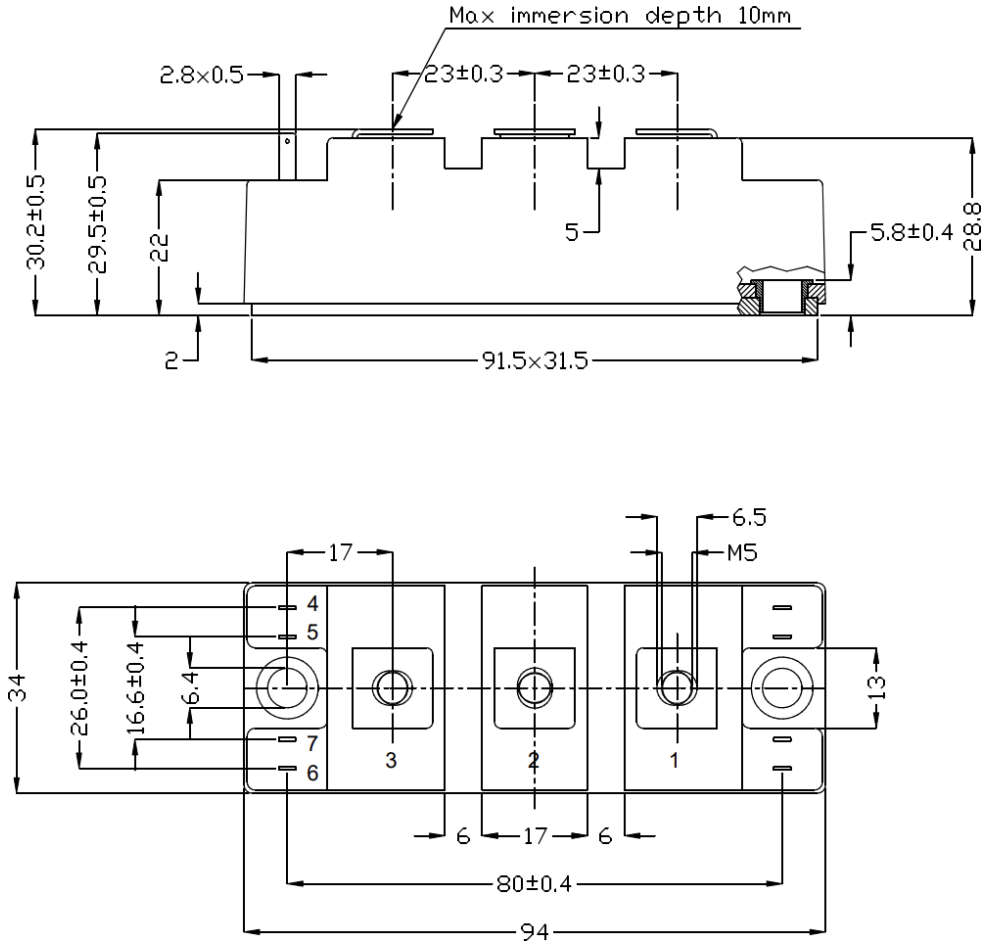


Figure 4