IGBT Module

Features

- Low VCE（sat）trench IGBT
- Low switching losses
- 10us short circuit capability
- Fast & soft reverse recovery FRD
- Maximum junction temperature 175℃
- Temperature sense included
- Industry standard package with insulated copper base plateand soldering pins for PCB mounting

Typical Applications

- Inverter for motor drive
- AC and DC servo drive amplifier
- Uninterruptible power supply

IGBT-inverter Tc=25℃ unless otherwise noted

Maximum Rated Values

Symbol	Description	HYG30P120H1K1	Units
V_{CES}	Collector-Emitter Voltage Tj=25℃	1200	V
V_{GES}	Gate-Emitter Voltage Tj=25℃	20	V
I_C	Collector Current	40	A
	Collector Current TC=80℃	30	
I_{CM}	Pulsed Collector Current tp=1ms	50	A
P_{tot}	Tatal Power Dissipation Tj=175℃	200	W

Characteristics Values

Symbol	Parameter		Min.	Typ.	Max.	Units
$V_{(BR)CES}$	Collector-Emitter Breakdown Voltage	Tj=25℃	1200			V
I_{CES}	Collector Cut- Off Current	VCE=VCES, VGE=0V, Tj=25℃			0.1	mA
I_{GES}	Gate-Emitter Leakage Current	VGE=VGES, VCE=0V, Tj=25℃			400	nA
$V_{GE(th)}$	Gate to Emitter Threshold Voltage	IC=1.2mA, VGE=VCE, Tj=25℃	4.6	5.2	6.0	V
$V_{CE(sat)}$	Collector to Emitter Saturation Voltage	IC=25A, VGE=15V, Tj=25℃		2.1	2.5	V
		IC=25A, VGE=15V, Tj=125℃		2.4		
R_{Gint}	Integrated Gate Resistor			--		Ω
Q_g	Gate Charge	V_{CE}=600V, I_C=25A , V_{GE}=15V		0.17		μC
C_{ies}	Input Capacitance	V_{CE}=25V, V_{GE}=0V, f =1MHz		2.6		nF
C_{res}	Reverse Transfer Capacitance			0.06		nF
$t_{d(on)}$	Turn - on Delay Time	V_{CC}=600V,I_C=25A, T_{vj} =25°C		35		ns
		R_G =20Ω , T_{vj} =125°C		40		ns
t_r	Rise Time	V_{GE}=±15V, T_{vj} =25°C		40		ns
		Inductive Load T_{vj} =125°C		45		ns
$t_{d(off)}$	Turn - off Delay Time	V_{CC}=600V,I_C=25A, T_{vj} =25°C		240		ns
		R_G =20Ω , T_{vj} =125°C		270		ns
t_f	Fall Time	V_{GE}=±15V, T_{vj} =25°C		100		ns
		Inductive Load T_{vj} =125°C		130		ns
E_{on}	Turn - on Energy	V_{CC}=600V,I_C=25A, T_{vj} =25°C		1.9		mJ
		R_G =20Ω , T_{vj} =125°C		2.7		mJ
E_{off}	Turn - off Energy	V_{GE}=±15V, T_{vj} =25°C		1.7		mJ
		Inductive Load T_{vj} =125°C		2.1		mJ
I_{SC}	Short Circuit Current	t_{ps_c}≤10μS , V_{GE}=15V T_{vj}=125°C,V_{CC}=600V		125		A
R_{thJC}	Junction-to-Case Thermal Resistance （ **Per IGBT**）				0.62	K /W

DIODE-inverter Tc=25℃ unless otherwise noted

Maximum Rated Values

Symbol	Description	HYG30P120H1K1	Units
V_{RRM}	Repetitive Peak Reverse Voltage Tj=25℃	1200	V
I_F	DC Forward Current Tc=80℃	30	A
I_{FRM}	Repetitive Peak Forward Current	60	A

Characteristics Values

Symbol	Parameter		Min.	Typ.	Max.	Units
V_F	Forward Voltage	IF=25A , VGE=0V, T_{vj}=25°C IF=25A , VGE=0V, T_{vj} =125°C		1.85 1.95	2.15	V
t_{rr}	Reverse Recovery Time	IF=25A , VR=600V		120		ns
I_{RRM}	Max. Reverse Recovery Current	diF/dt=-600A/μs		37		A
E_{rec}	Reverse Recovery Charge	T_{vj} =125°C		1.6		mJ
R_{thJC}	Junction-to-Case Thermal Resistance （ **Per DIODE**）				1.2	K /W

DIODE-rectifier Tc=25℃ unless otherwise noted

Maximum Rated Values

Symbol	Description	HYG30P120H1K1	Units
V_{RRM}	Repetitive Peak Reverse Voltage Tj=25℃	1600	V
$I_{F(AV)}$	Average On-state Current per Diode Tc=80℃	25	A
I_{RMSM}	Maximum RMS Current at rectifier Output	tdb	A
I^2t	VR=0V,tp=10ms, Tj=45℃	310	A^2t
I_{FsM}	Surge Forward Current VR=0V,tp=10ms, Tj=45℃	252	A

Characteristics Values

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Units
V_F	Diode Forward Voltage	IF=25A	Tj=25℃			1.3	V
			Tj=125℃		1.0		
I_R	Reverse Current	VR=1600V	Tj=25℃			50	uA
			Tj=125℃			1	mA
R_{thJC}	Junction-to-Case Thermal Resistance （ **Per DIODE**）					1.35	K /W

IGBT-brake-chopper Tc=25℃ unless otherwise noted

Maximum Rated Values

Symbol	Description	HYG30P120H1K1	Units
V_{CES}	Collector-Emitter Voltage Tj=25℃	1200	V
V_{GES}	Gate-Emitter Voltage Tj=25℃	20	V
I_C	Collector Current	50	A
	Collector Current TC=80℃	25	
I_{CM}	Pulsed Collector Current tp=1ms	50	A
P_{tot}	Tatal Power Dissipation Tj=175℃	240	W

Characteristics Values

Symbol	Parameter		Min.	Typ.	Max.	Units
$V_{(BR)CES}$	Collector-Emitter Breakdown Voltage	Tj=25℃	1200			V
I_{CES}	Collector Cut- Off Current	VCE=VCES, VGE=0V, Tj=25℃			5	mA
I_{GES}	Gate-Emitter Leakage Current	VGE=VGES, VCE=0V, Tj=25℃			400	nA
$V_{GE(th)}$	Gate to Emitter Threshold Voltage	IC=1.2mA, VGE=VCE, Tj=25℃	5	5.8	7.5	V
$V_{CE(sat)}$	Collector to Emitter Saturation Voltage	IC=25A, VGE=15V, Tj=25℃		1.9	2.3	V
		IC=25A, VGE=15V, Tj=125℃		2.3		
R_{Gint}	Integrated Gate Resistor			--		Ω
Q_g	Gate Charge	V_{CE}=600V, I_C=25A , V_{GE}=15V		0.17		μC
C_{ies}	Input Capacitance	V_{CE}=30V, V_{GE}=0V, f =1MHz		2.6		nF
C_{res}	Reverse Transfer Capacitance			0.08		nF
$t_{d(on)}$	Turn - on Delay Time	V_{CC}=600V,I_C=25A, R_G =33Ω, V_{GE}=±15V, Inductive Load	Tvj =25°C	233		ns
			Tvj =125°C	310		ns
t_r	Rise Time		Tvj =25°C	66		ns
			Tvj =125°C	86		ns
$t_{d(off)}$	Turn - off Delay Time	V_{CC}=600V,I_C=25A, R_G =33Ω, V_{GE}=±15V, Inductive Load	Tvj =25°C	184		ns
			Tvj =125°C	217		ns
t_f	Fall Time		Tvj =25°C	208		ns
			Tvj =125°C	324		ns
E_{on}	Turn - on Energy	V_{CC}=600V,I_C=25A, R_G =33Ω, V_{GE}=±15V, Inductive Load	Tvj =25°C	3.06		mJ
			Tvj =125°C	3.16		mJ
E_{off}	Turn - off Energy		Tvj =25°C	1.16		mJ
			Tvj =125°C	1.78		mJ
I_{SC}	Short Circuit Current	t_{psc}≤10μS , V_{GE}=15V T_{vj}=125°C,V_{CC}=900V		240		A
R_{thJC}	Junction-to-Case Thermal Resistance （ **Per IGBT**）				0.62	K /W

DIODE-brake-chopper **Tc=25℃ unless otherwise noted**

Maximum Rated Values

Symbol	Description	HYG30P120H1K1	Units
V_{RRM}	Repetitive Peak Reverse Voltage Tj=25℃	1200	V
I_F	DC Forward Current Tc=80℃	30	A
I_{FRM}	Repetitive Peak Forward Current	60	A

Characteristics Values

Symbol	Parameter		Min.	Typ.	Max.	Units
V_F	Forward Voltage	IF=25A , VGE=0V, T_{vj} =25°C IF=25A , VGE=0V, T_{vj} =125°C		1.85 1.95	2.15	V
t_{rr}	Reverse Recovery Time	IF=25A , VR=600V		120		ns
I_{RRM}	Max. Reverse Recovery Current	diF/dt=-600A/μs		37		A
E_{rec}	Reverse Recovery Charge	T_{vj} =125°C		1.6		mJ
R_{thJC}	Junction-to-Case Thermal Resistance （ **Per DIODE**）				1.2	K /W

Electrical Characteristics of NTC Tc=25℃ unless otherwise noted

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
R25	Rated Resistance	Tc=25℃		5.0		kΩ
ΔR/R	Deviation of R100	Tc=100℃, R100=493Ω	-5		5	
P25	Power Dissipation	Tc=25℃			20	mW
B25/50	B value			3375		K

Module Characteristics

Symbol	Parameter	Min.	Typ.	Max.	Units
V_{ISO}	Isolation Voltage RMS,f=50Hz,t=1min		2500		V
T_{VJmax}	Maximum Junction Temperature			150	℃
T_{VJop}	Storage Temperature	-40		123	℃
Md	Mounting Screw:M5	3		6	N·m
T_{STG}	Storage Temperature range	-40		125	℃
Weight				190	g

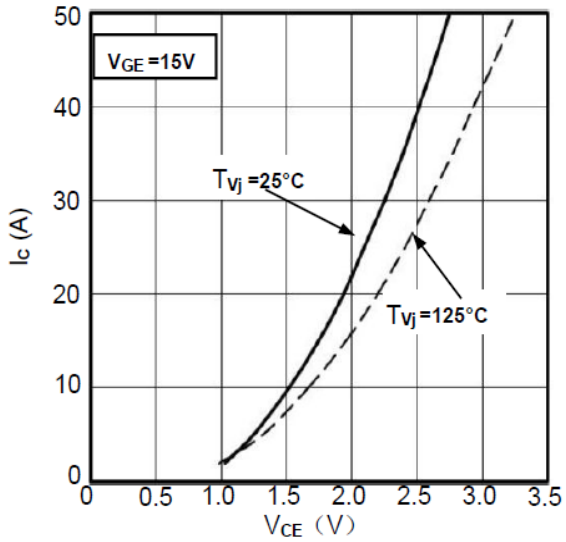

Figure1. Typical Output Characteristics

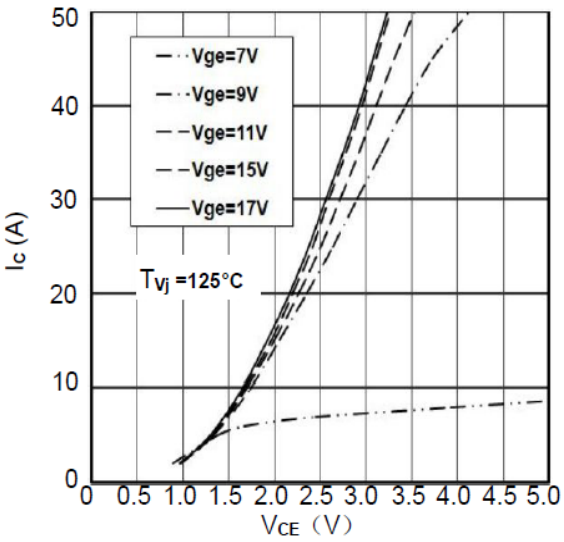

Figure2. Typical Output Characteristics

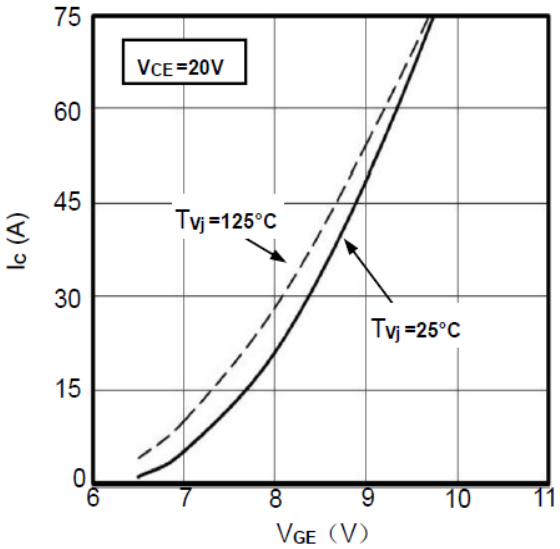

Figure3. Typical Transfer characteristics

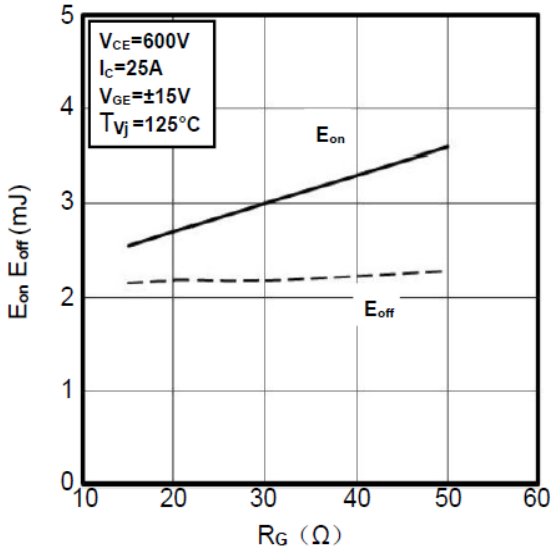

Figure4. Switching Energy vs. Gate Resistor

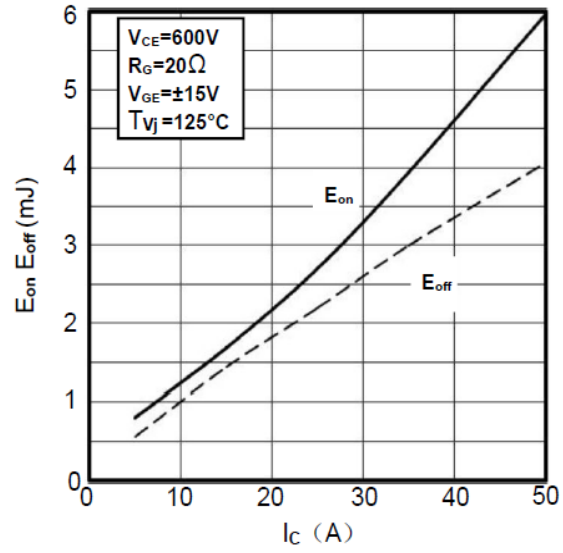

Figure5. Switching Energy vs. Collector Current

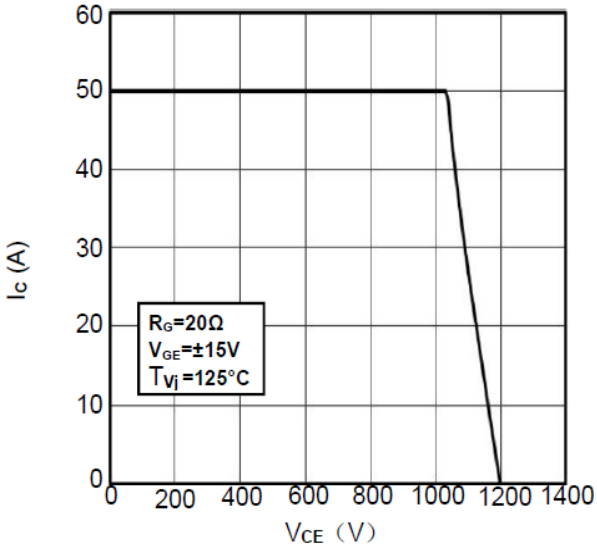

Figure6. Reverse Biased Safe Operating Area

The cruve graph is for reference only, can't be the basis for judgment(曲线图仅供参考)!

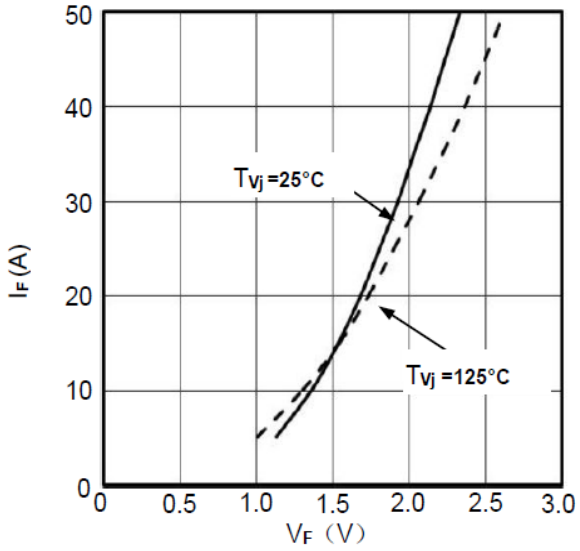

Figure7. Diode Forward Characteristics

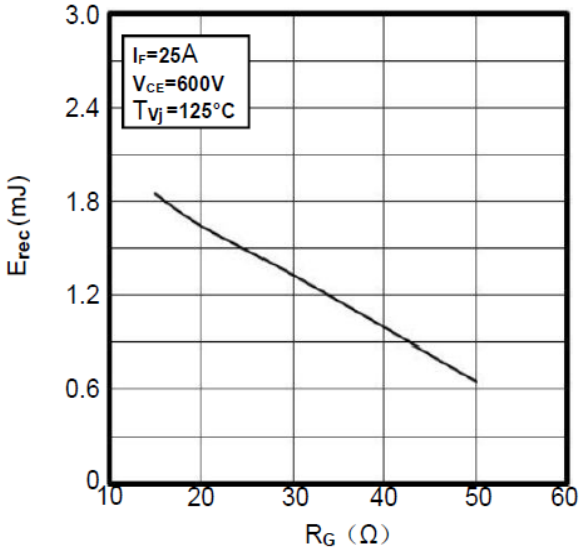

Figure8. Switching Energy vs. Gate Resisto

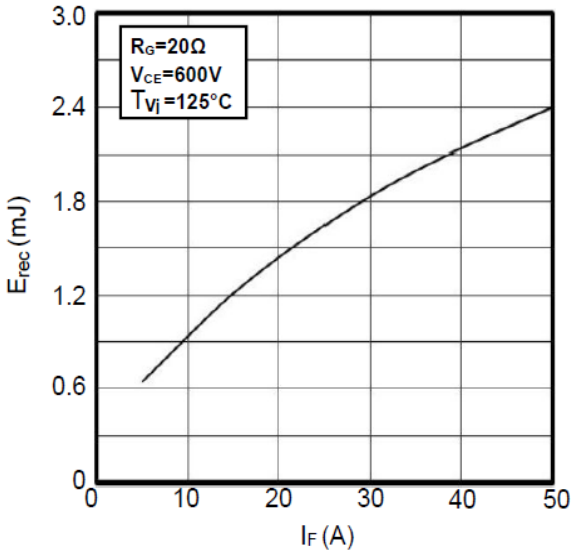

Figure9. Switching Energy vs. Forward Current

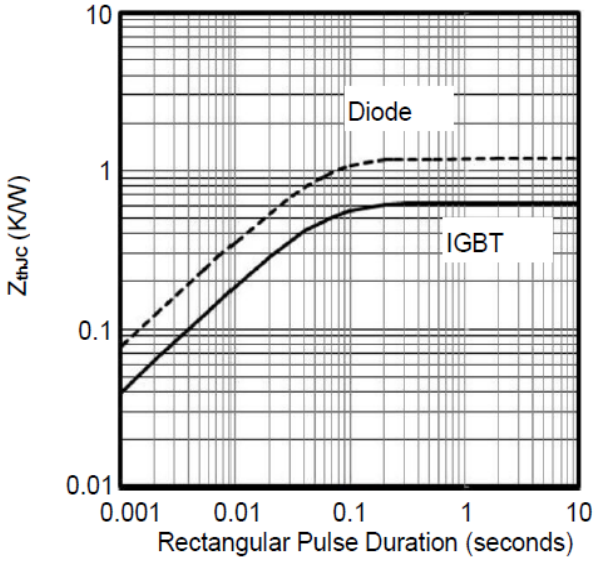

Figure10. Transient Thermal Impedance

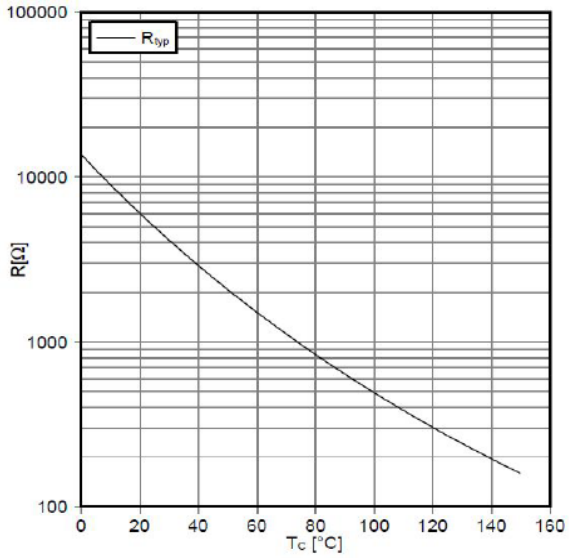

Figure11. NTC-Thermistor-temperature characteristic

The cruve graph is for reference only, can't be the basis for judgment(曲线图仅供参考)!

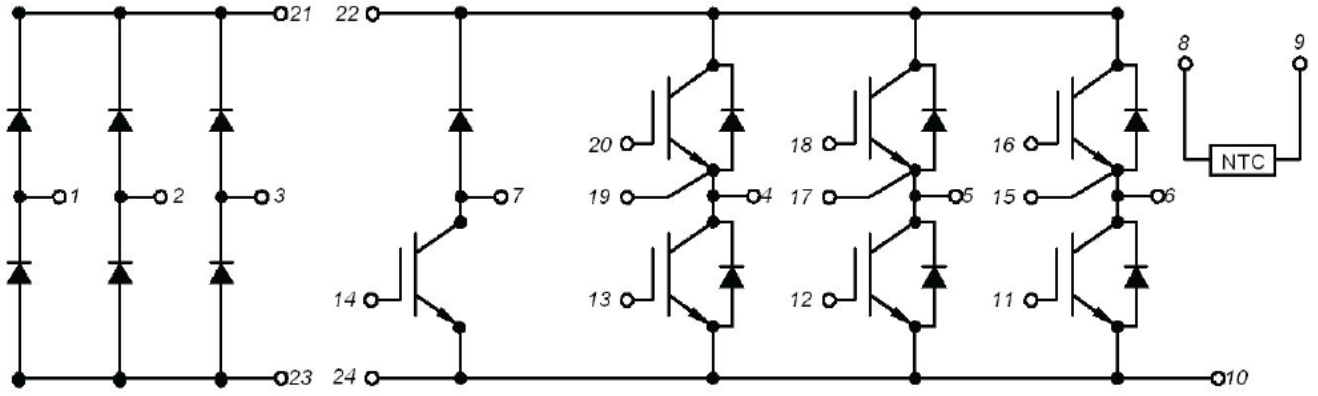

Figure11. Circuit Diagram

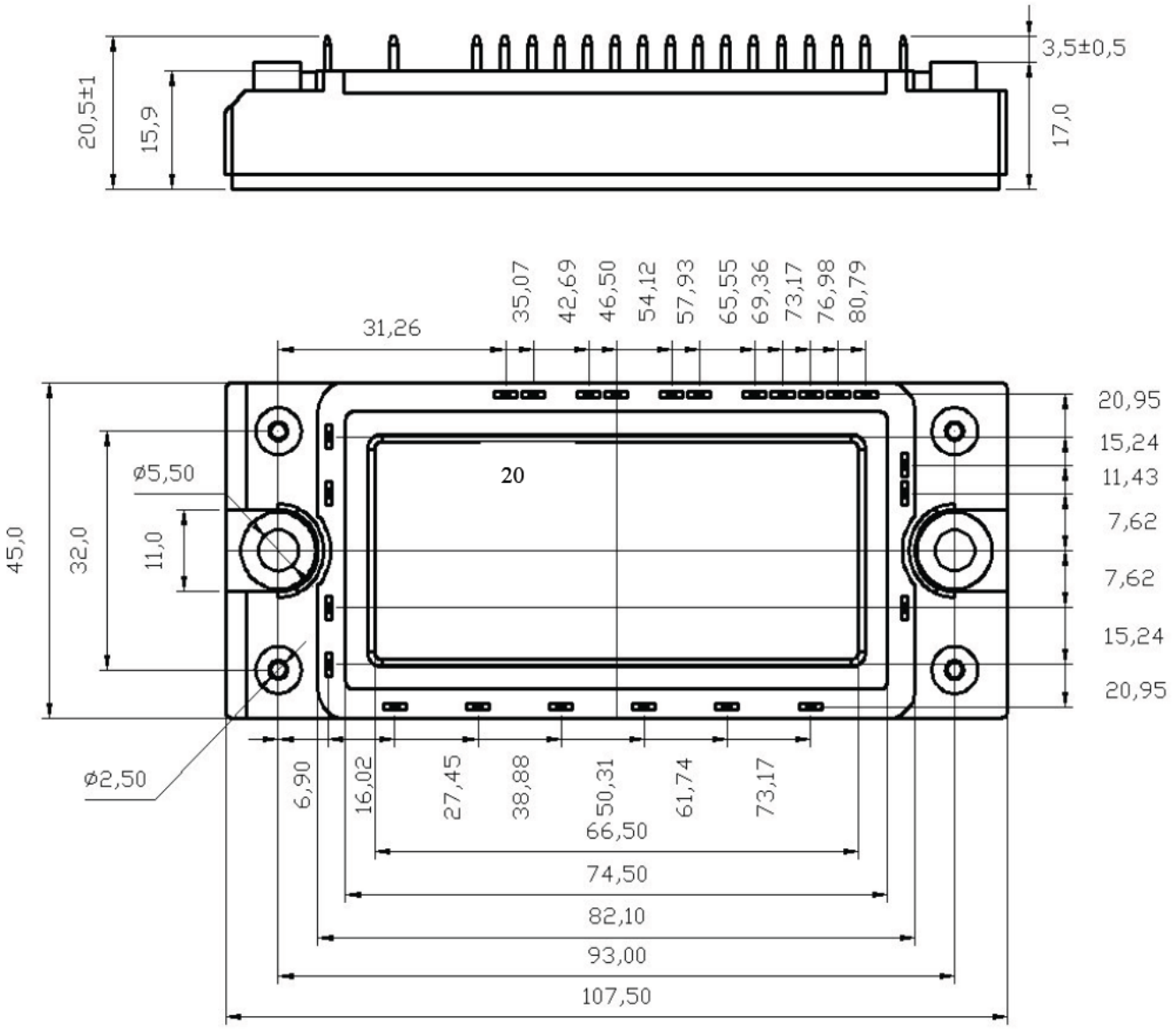

Figure12. Package Dimensions (mm)

REV. 6, 30-Dec-2014