洛克易半导体

ROCK
—eternal—

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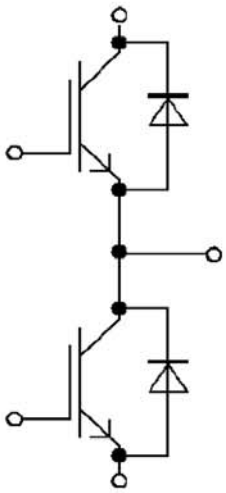
34mm Standard housing IGBT MODULE

CCGD100P120HD Planar-FS IGBT module

VCES	VCEsat		I_{cnom}/I_{CRM}
1200V	T_{vj}=25℃	2.3V	100A/200A
	Tvj=150℃	2.7V	

DESCRIPTION

34mm standard housing IGBT module with highspeed Planar-FS IGBT and Fast Recovery Diode chip.



FEATURES

- Half-bridge module
- Increased blocking voltage to 1200V
- Low switching losses
- Positive temperature coefficient
- Low reverse recovery charge
- high flexibility and reliability

APPLICATIONS

- Welding
- HighFrequencySwitchingApplication
- High Power Converters
- UPS systems

CHARACTERISTICS VALUES

MAXIMUM RATED VALUES(IGBT)

Parameter	Symbol	Conditions	Values	Units
Collector-emitter voltage	V_{CES}	T_{vj}=25℃, V_{GE}=0V	1200	V
Continuous collector current	I_{cnom}	T_c=100℃, T_{vjmax}=175℃	100	A
Repetitive peak collector current	I_{CRM}	t_p=1ms, T_{vj}=25℃	200	A
Gate-emitter peak voltage	V_{GES}	T_{vj}=25℃	±20	V
SC data	I_{SC}	V_{GE}≤15V, V_{CC}=800V V_{CEmax}=V_{CES}-L_{sCE}*di/dt t_p≤10μs, T_{vj}=150℃	400	A
Total power dissipation	P_{tot}	T_c=25℃, $T_{vj\,max}$=175℃	517	W

CHARACTERISTICS VALUES(IGBT)

Parameter	Symbol	Conditions		Values			Units
				Min.	Typ.	Max.	
Collector-emitter breakdown voltage	V_{BRCES}	VGE=0V,IC=100μA		1200			V
Collector-emitter saturation voltage	$V_{CE\,sat}$	I_C=100A, V_{GE}=15V, T_{vj}=25℃		2.1	2.3	2.5	V
		I_C=100A, V_{GE}=15V, T_{vj}=150℃			2.7		V
Gate-emitter threshold voltage	V_{GEth}	V_{CE}=V_{GE}, I_C=3mA, T_{vj}=25℃		5.5	6.0	6.5	V
Gate charge	Q_G	V_{GE}=-15V...+15V			0.7		nC
Integrated gate resistor	R_G	T_{vj}=25℃			5		Ω
Input capacitance	C_{ies}	T_{vj}=25℃,f=1MHz,V_{GE}=0V,V_{CE}=25V			4.58		nF
Reverse transfer capacitance	C_{res}	T_{vj}=25℃,f=1MHz,V_{GE}=0V,V_{CE}=25V			0.28		nF
Collector-emitter cut-off current	I_{CES}	V_{CE}=1200V, V_{GE}=0V, T_{vj}=25℃				500	μA
Gate-emitter leakage current	I_{GES}	V_{CE}=0V, V_{GE}=20V, T_{vj}=25℃				100	nA
Turn-on delay time, inductive load	$t_{d\,on}$	I_C=100A, V_{CE}=600V, V_{GE}=±15V, R_{Gon}=5Ω, R_{Goff}=5Ω,	T_{vj}=25℃		91		ns
			T_{vj}=150℃		98		ns
Rise time, inductive load	t_r		T_{vj}=25℃		65		ns
			T_{vj}=150℃		70		ns
Turn-off delay time, inductive load	$t_{d\,off}$		T_{vj}=25℃		262		ns
			T_{vj}=150℃		288		ns
Fall time, inductive load	t_f		T_{vj}=25℃		35		ns
			T_{vj}=150℃		102		ns
Turn-on energy loss per pulse	E_{on}	I_C=100A, V_{CE}=600V, V_{GE}=±15V, R_{Gon}=5Ω, R_{Goff}=5Ω, L_σ=45nH,	T_{vj}=25℃		10.3		mJ
			T_{vj}=150℃		19.2		mJ
Turn-off energy loss per pulse	E_{off}		T_{vj}=25℃		5.1		mJ
			T_{vj}=150℃		7.6		mJ

MAXIMUM RATED VALUES(FRD)

Parameter	Symbol	Conditions	Values	Units
Repetitive peak reverse voltage	V_{RRM}	T_{vj}=25℃	1200	V
Continuous forward current	I_F		100	A
Maximum repetitive forward current	I_{FRM}	Pulse, t_p=1ms, T_{vj}=25℃	200	A
I^2t-value	I^2t	V_R=0V, t_p=10ms, T_{vj}=125℃ V_R=0V, t_p=10ms, T_{vj}=150℃	1900 1800	A^2s

CHARACTERISTICS VALUES(FRD)

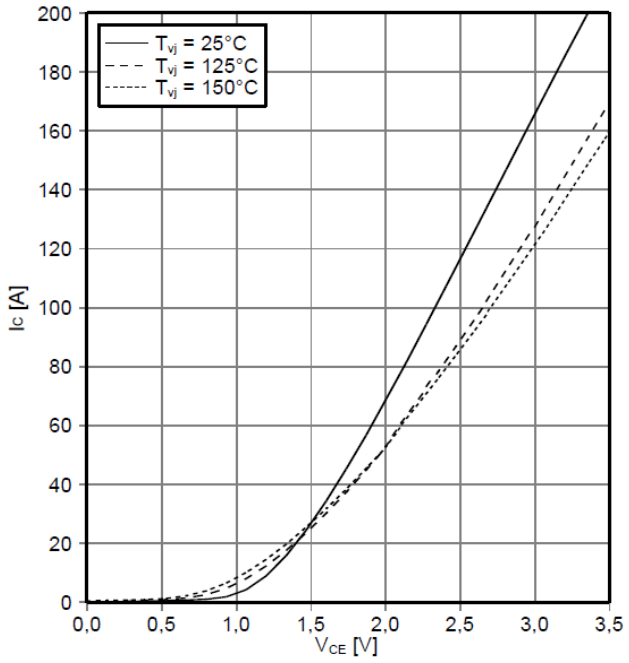
Parameter	Symbol	Conditions		Values			Units
				Min.	Typ.	Max.	
Breakdown voltage	$V_{(BR)}$	I_R=100μA,T_{vj}=25℃		1200			V
Reverse current	I_R	V_R=1200V,T_{vj}=25℃				100	μA
Forward voltage	V_F	I_F=60A, V_{GE}=0V,	T_{vj}=25℃	1.5	1.85	2.5	V
			T_{vj}=150℃		1.78		V
Peak reverse recovery current	I_{RM}	I_F=60A, V_R=600V, V_{GE}=-15V di_F/dt=1350A/μs L_σ=45nH,	T_{vj}=25℃		42		A
			T_{vj}=150℃		50		A
Reverse recovery time	t_{rr}		T_{vj}=25℃		152		ns
			T_{vj}=150℃		381		ns
Recovered charge	Q_r		T_{vj}=25℃		2.77		μC
			T_{vj}=150℃		8.27		μC
Reverse recovery energy	E_{rec}		T_{vj}=25℃		1.29		mJ
			T_{vj}=150℃		3.82		mJ

MODULE

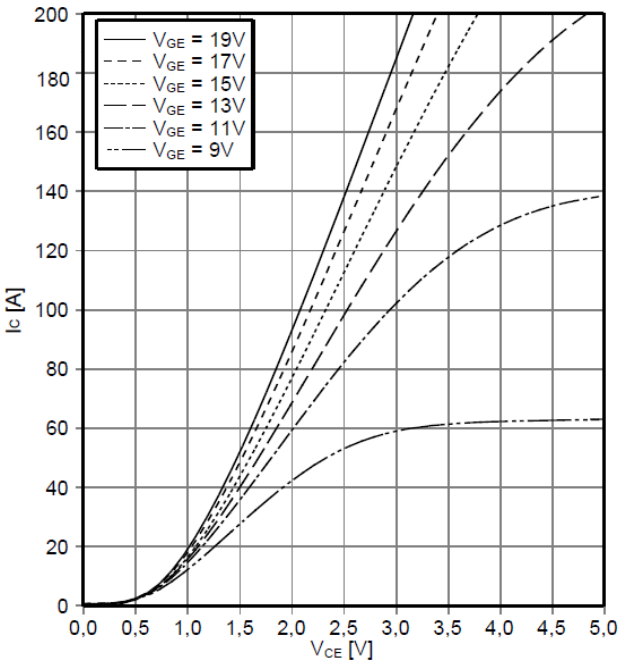
Parameter	Symbol	Conditions	Values			Units
			Min.	Typ.	Max.	
Maximum junction temperature	$T_{vj\ max}$				150	℃
Temperature under switching conditions	$T_{vj\ op}$		-40		150	℃
Storage temperature	T_{stg}		-40		125	℃
IGBT, thermal resistance, junction to case	$R_{thjc\ IGBT}$	Per IGBT			0.29	K/W
Diode, thermal resistance, junction to case	$R_{thjc\ Diode}$	Per diode			0.49	K/W
Stray inductance module	L_{sCE}			28		nH
Module lead resistance, terminals-chip	$R_{CC'+EE}$	T_{vj}=25℃, per switch		0.65		mΩ
Isolation test voltage	V_{isol}	AC, RMS, f=50Hz, t=1min		2.5		kV
Creepage distance	ds	Terminal to terminal		17.0		mm
		Terminal to base		20.0		mm
Clearance distance in air	da	Terminal to terminal		17.0		mm
		Terminal to base		9.5		mm
Comperative tracking index	CTI			>200		
Mounting torque for module mounting	M	Screw M6	3.0		5.0	N·m
Internal isolation	-	Basic insulation		Al_2O_3		-
Material of module baseplate	-			Cu		-
Dimensions	L x W x H			94x34x30.2		mm
Weight	G			160		g

CHARACTERISTICS DIAGRAMS

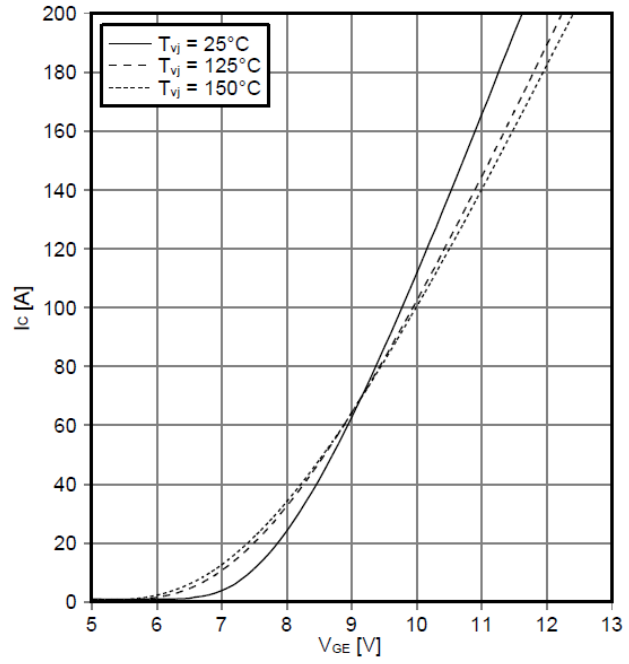
Output characteristic IGBT, Inverter(typical)
$I_C=f(V_{CE})$ $V_{GE}=15V$



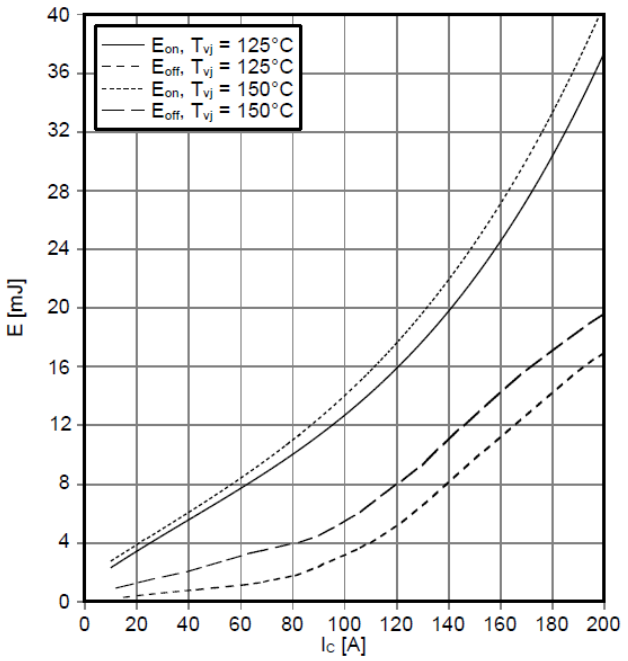
Output characteristic IGBT, Inverter(typical)
$I_C=f(V_{CE})$ $T_{vj}=150℃$



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

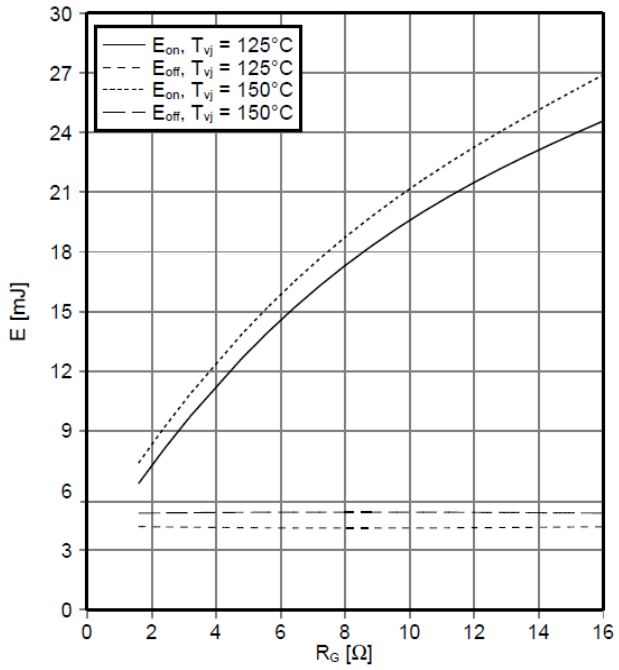


Switching losses IGBT, Inverter(typical)
$E_{on}=f(I_C)$, $E_{off}=f(I_C)$ $V_{GE}=\pm15V$, $R_{Gon}=5\Omega$, $R_{Goff}=5\Omega$, $V_{CE}=600V$



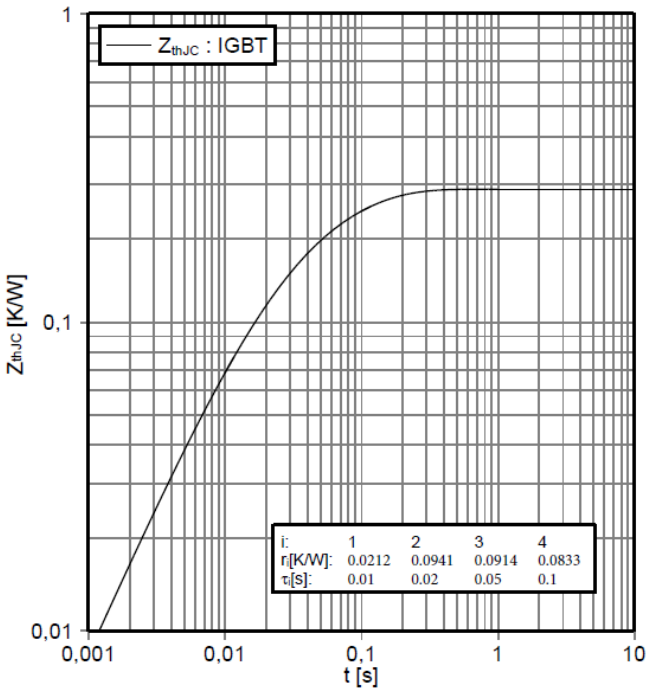
Switching losses IGBT, Inverter(typical)

$E_{on}=f(R_G)$, $E_{off}=f(R_G)$ $V_{GE}=\pm 15V$, $I_C=100A$, $V_{CE}=600V$



Transient thermal impedance IGBT, Inverter

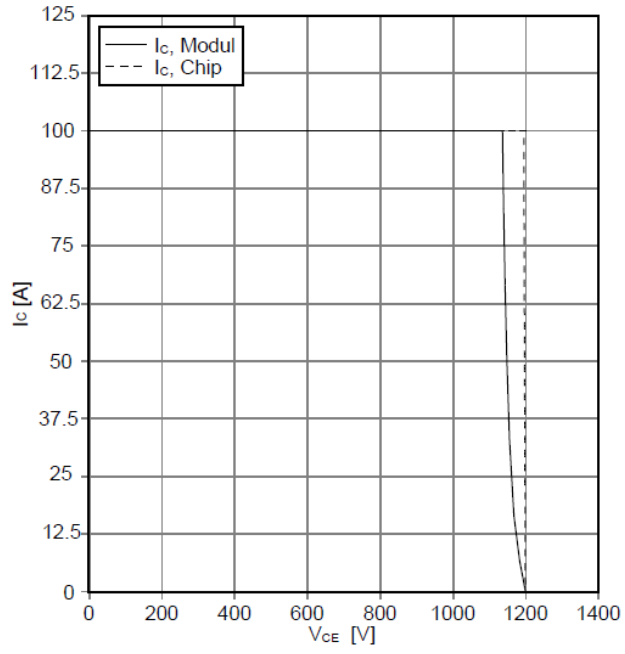
$Z_{thJC}=f(t)$



Reverse bias safe operating area IGBT, Inverter(RBSOA)

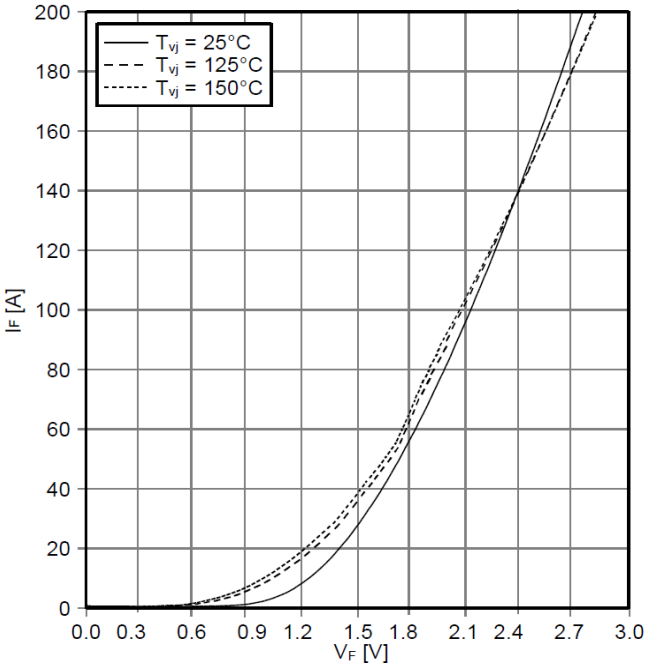
$I_C=f(V_{CE})$

$V_{GE}=\pm 15V$, $R_{Goff}=5\Omega$, $T_{vj}=150℃$



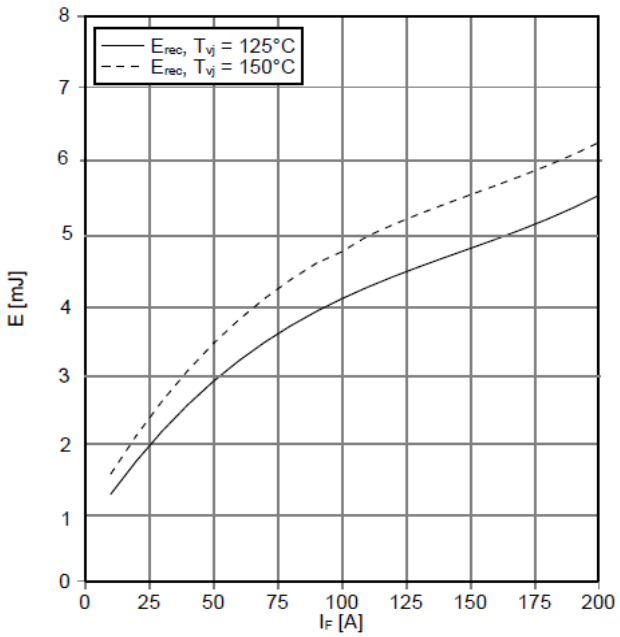
Forward characteristic of Diode, Inverter(typical)

$I_F=f(V_F)$



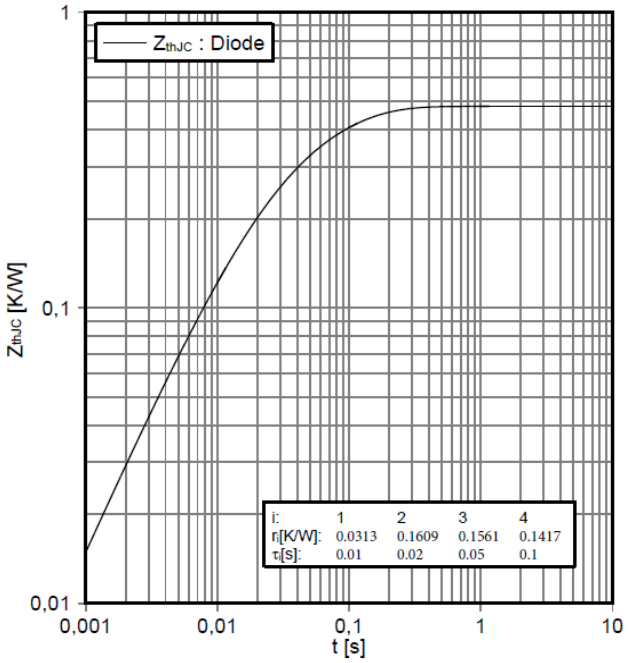
Switching losses Diode, Inverter(typical)

$E_{rec}=f(I_F)$ $R_{Gon}=5\,\Omega$, $V_{CE}=600V$

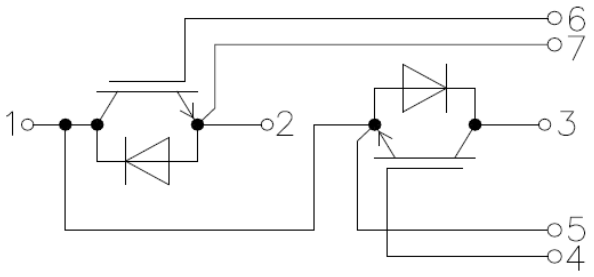


Transient thermal impedance Diode, Inverter

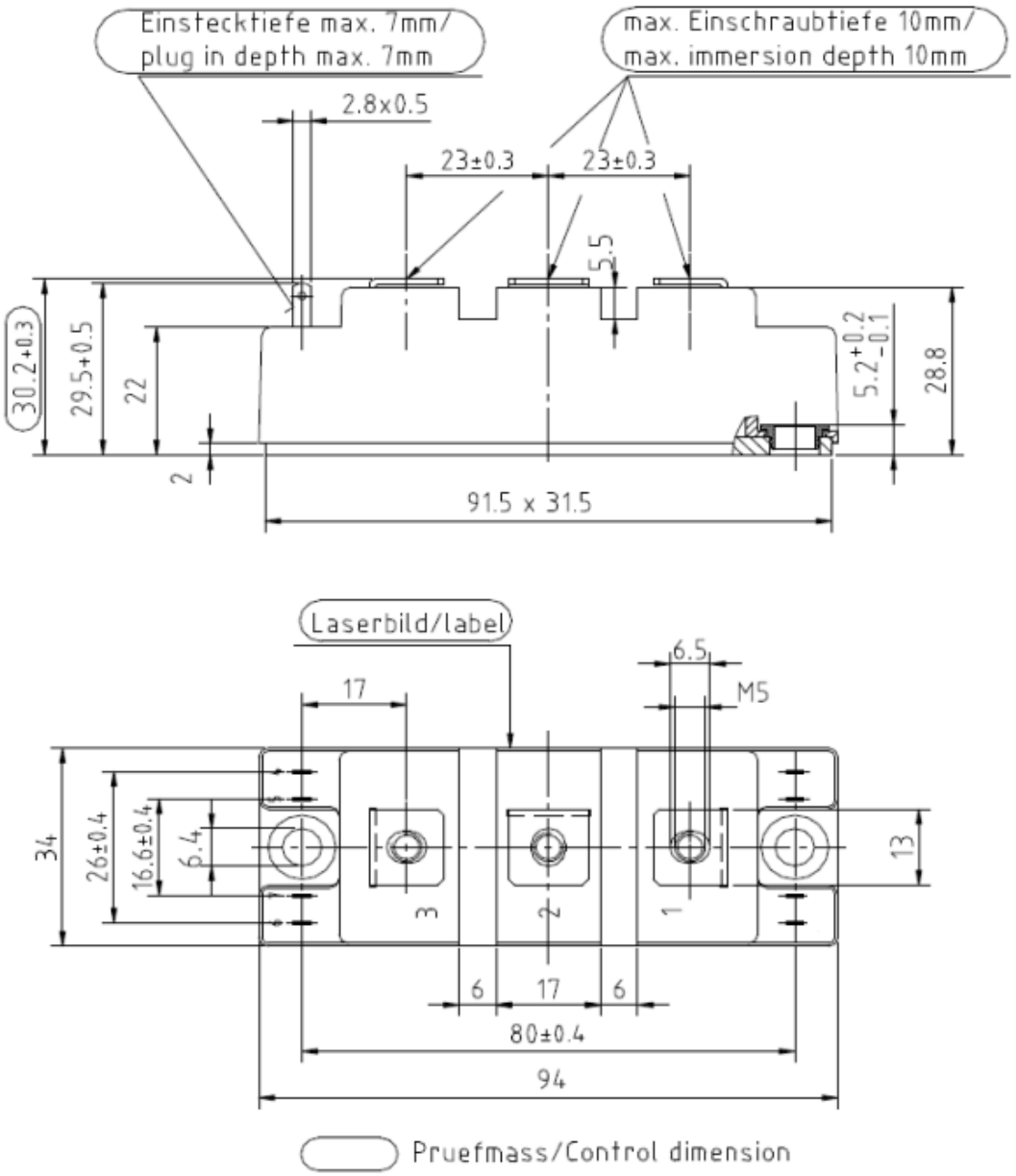
$Z_{thJC}=f(t)$



CIRCUIT DIAGRAM



PACKAGE OUTLINES



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