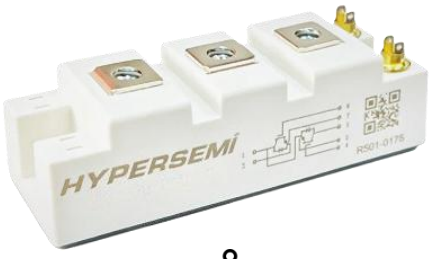
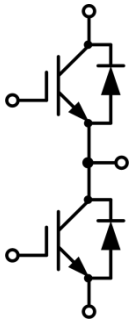
34mm Half Bridge IGBT Module

V_{CES}= 750V, I_C= 150A, $V_{CE(sat)}$= 1.55V





Features

- 750V Trench/Field Stop Technology
- Low switching loss
- Vcesat has a positive temperature coefficient

Applications

- High Power Converters
- UPS systems

IGBT, Inverter

Maximum Ratings

Parameter	Symbol	Test Condition	Value	Unit
Collector-emitter voltage	V_{CES}	T_{vj}=25℃, V_{GE}=0V	750	V
Continuous collector current	I_C	T_C=100℃, $T_{vj\ max}$= 150℃	150	A
Repetitive peak collector current	I_{CRM}	t_p= 1ms, T_{vj}=25℃	300	A
Gate-emitter peak voltage	V_{GES}	T_{vj}=25℃	±20	V
SC data	I_{SC}	V_{GE}≤15V, V_{CC}=400V,t_p≤8μs, V_{CEmax}=V_{CES}-L_{sCE}*di/dt ,T_{vj}= 150℃	750	A
Total power dissipation	P_{tot}	T_C=25°C, $T_{vj\ max}$ = 150℃	280	W

Characteristics Values

Parameter	Symbol	Test Condition	Value			Unit
			Min.	Typ.	Max.	
Collector-emitter breakdown voltage	V_{BRCES}	V_{GE}=0V, I_C= 100μA	750			V
Collector-emitter saturation voltage	$V_{CE\ sat}$	I_C=150A, V_{GE}=15V, T_{vj}=25℃		1.55	1.73	
		I_C=150A, V_{GE}=15V, T_{vj}=125℃		1.70	1.88	
		I_C=150A, V_{GE}=15V, T_{vj}=150℃		1.75	2.05	
Gate-emitter threshold voltage	V_{GEth}	V_{CE}=V_{GE}, I_C= 10mA, T_{vj}=25℃	5.0	6.2	7.0	
Gate charge	Q_G	V_{GE}=-15V...+15V		2.2		μC
Integrated gate resistor	R_G	T_{vj}=25℃		3.5		Ω
Input capacitance	C_{ies}	T_{vj}=25℃,f= 1MHz,V_{GE}=0V,V_{CE}=25V		9.50		nF
Reverse transfer capacitance	C_{res}	T_{vj}=25℃,f= 1MHz,V_{GE}=0V,V_{CE}=25V		0.35		
Collector-emitter cut-off current	I_{CES}	V_{CE}=750V, V_{GE}=0V, T_{vj}=25℃			500	μA

Gate-emitter leakage current	I_{GES}	V_{CE}=0V, V_{GE}=20V, T_{vj}=25℃				200	nA
Turn-on delay time,inductive load	$t_{d\ on}$	I_C=150A, V_{CE}=400V, V_{GE}=±15V, R_{Gon}=3.3Ω, R_{Goff}=3.3Ω	T_{vj}=25℃		110		ns
			T_{vj}=125℃		120		
			T_{vj}=150℃		135		
Rise time, inductive load	t_r		T_{vj}=25℃		50		
			T_{vj}=125℃		66		
			T_{vj}=150℃		68		
Turn-off delay time,inductive load	$t_{d\ off}$		T_{vj}=25℃		310		
			T_{vj}=125℃		350		
			T_{vj}=150℃		361		
Fall time, inductive load	t_f		T_{vj}=25℃		60		
			T_{vj}=125℃		80		
			T_{vj}=150℃		90		
Turn-on energy loss per pulse	E_{on}	I_C=150A, V_{CE}=400V, V_{GE}=±15V, R_{Gon}=3.3Ω, R_{Goff}=3.3Ω, L_S=35nH,di/dt=4800A/μs	T_{vj}=25℃		1.28		mJ
			T_{vj}=125℃		1.76		
			T_{vj}=150℃		2.32		
Turn-off energy loss per pulse	E_{off}		T_{vj}=25℃		4.15		
			T_{vj}=125℃		5.25		
			T_{vj}=150℃		5.32		
Thermal resistance,junction to case	R_{thJC}	Per IGBT			0.45	0.50	K/W

Diode, Inverter
Maximum Ratings

Parameter	Symbol	Test Condition	Value	Unit
Repetitive peak reverse voltage	V_{RRM}	T_{vj}=25℃	750	V
Continuous forward current	I_F		150	A
Maximum repetitive forward current	I_{FRM}	Pulse, t_p= 1ms, T_{vj}=25℃	300	A
I^2t-value	I^2t	V_R=0V, t_p= 10ms, T_{vj}= 125℃	18500	A^2s
		V_R=0V, t_p= 10ms, T_{vj}= 150℃	16000	

Characteristics Values

Parameter	Symbol	Test Condition		Value			Unit
				Min.	Typ.	Max.	
Forward voltage	V_F	I_F=150A, V_{GE}=0V,	T_{vj}=25℃		1.58		V
			T_{vj}=125℃		1.63		
			T_{vj}=150℃		1.65		

Peak reverse recovery current	I_{RM}	I_F=150A, V_R=300V, V_{GE}=-15V di_F/dt=2400A/μs	T_{vj}=25℃		85		A
			T_{vj}=125℃		108		
			T_{vj}=150℃		115		
Recovered charge	Q_r		T_{vj}=25℃		6.60		μC
			T_{vj}=125℃		10.8		
			T_{vj}=150℃		12.8		
Reverse recovery energy	E_{rec}		T_{vj}=25℃		1.55		mJ
			T_{vj}=125℃		2.20		
			T_{vj}=150℃		2.80		
Thermal resistance,junction to case	R_{thJC}	Per diode			0.50	0.58	K/W

Characteristics Values(Module)

Parameter	Symbol	Test Condition	Value			Unit
			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	℃
Stray inductance module	L_{sCE}			20		nH
Module lead resistance, terminals-chip	$R_{CC'+EE}$	T_{vj}=25℃, per switch		0.75		mΩ
Isolation test voltage	V_{ISOL}	RMS, f=50Hz, t=1min		2.5		kV
Creepage distance	ds	Terminal to heat sink		17		mm
		Terminal to terminal		20		mm
Clearance distance in air	da	Terminal to heat sink		17		mm
		Terminal to terminal		9.5		mm
Comperative tracking index	CTI		>200			
Mounting torque for module mounting	M	Screw M6	3.0		5.0	N
Internal isolation	-	Basic insulation	Al_2O_3			-
Weight	G		160			g

Typical Characteristics

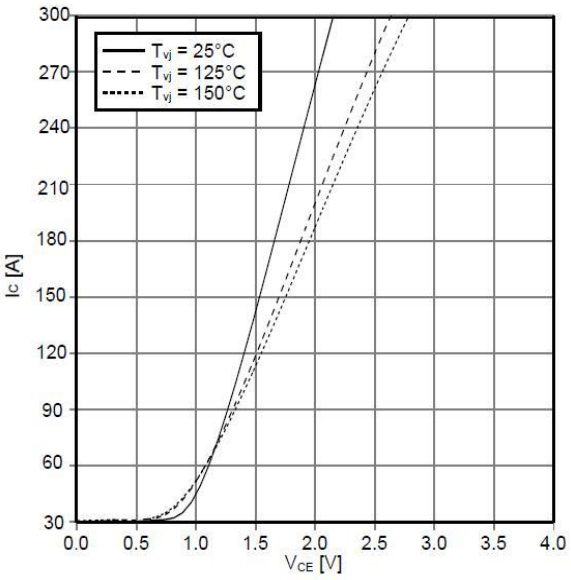


Fig 1. Output characteristic IGBT, Inverter(typical)
$I_C=f(V_{CE})$, V_{GE}=15V

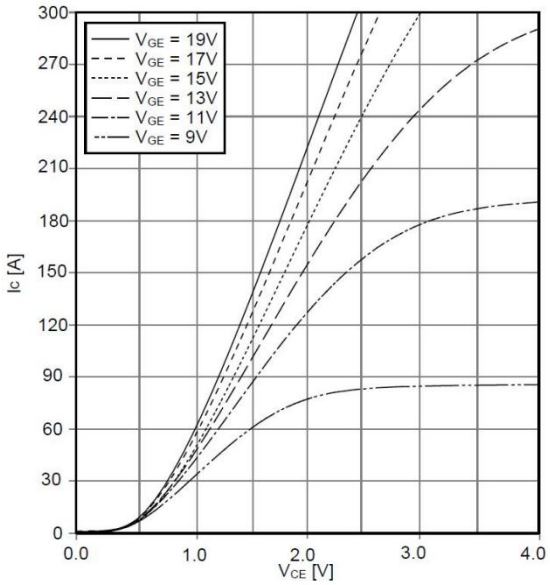


Fig 1. Output characteristic IGBT, Inverter(typical)
$I_C=f(V_{CE})$, T_vj=150℃

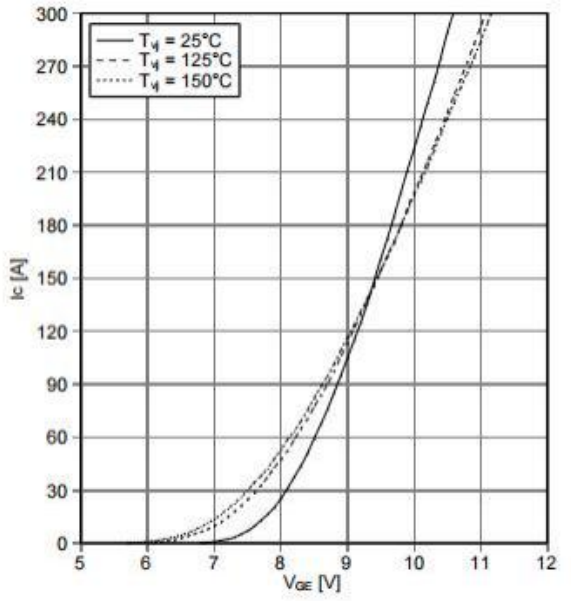


Fig 2. Transfer characteristic IGBT, Inverter(typical)
$I_C=f(V_{GE})$, V_{CE}=15V

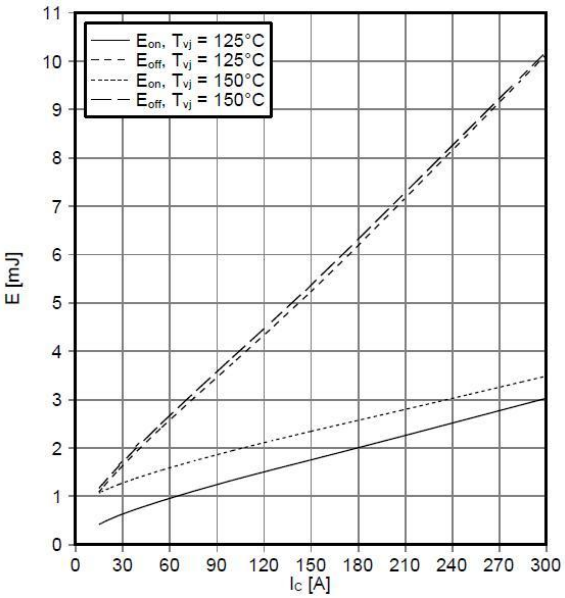


Fig 4. Switching losses IGBT, Inverter(typical)
$E_{on}=f(I_C)$,$E_{off}=f(I_C)$,V_{GE}=15V,R_{Gon}=3.3Ω,R_{Goff}=3.3Ω,V_{CE}=400V

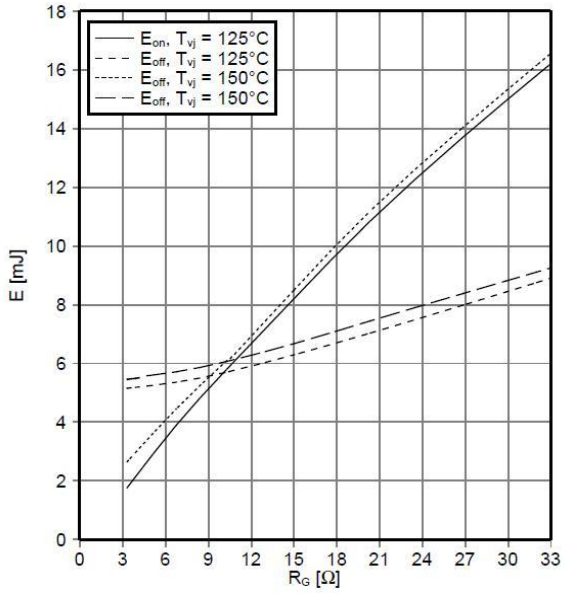


Fig 5. Switching losses IGBT, Inverter(typical)
$E_{on}=f(R_G)$, $E_{off}=f(R_G)$, $V_{GE}=\pm15V$, $I_C=150A$, $V_{CE}=400V$

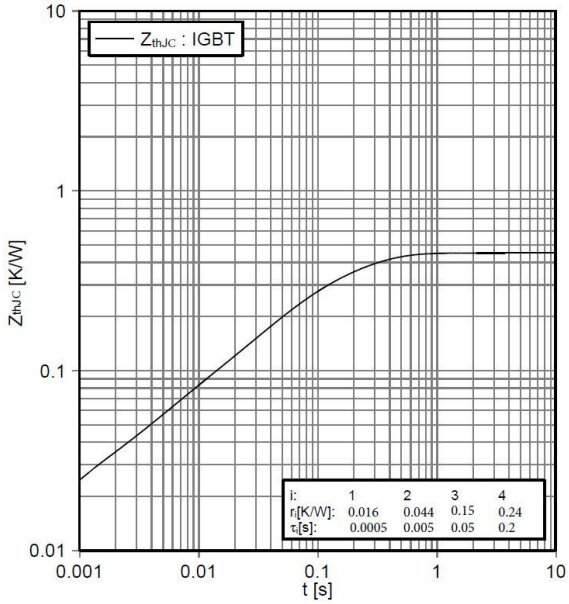


Fig 6. Transient thermal impedance IGBT, Inverter $Z_{thJC}=f(t)$

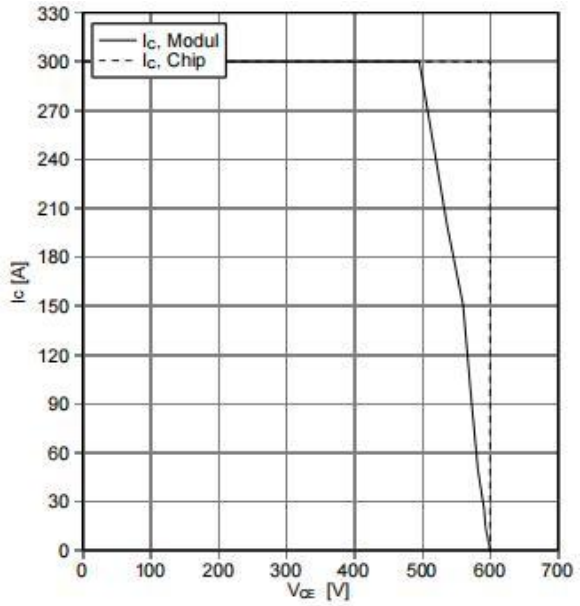


Fig 7. Reverse bias safe operating area IGBT, Inverter(RBSOA)
$I_C=f(V_{CE})$, $V_{GE}=15V$, $R_{Goff}=3.3\Omega$, $T_{vj}=150℃$

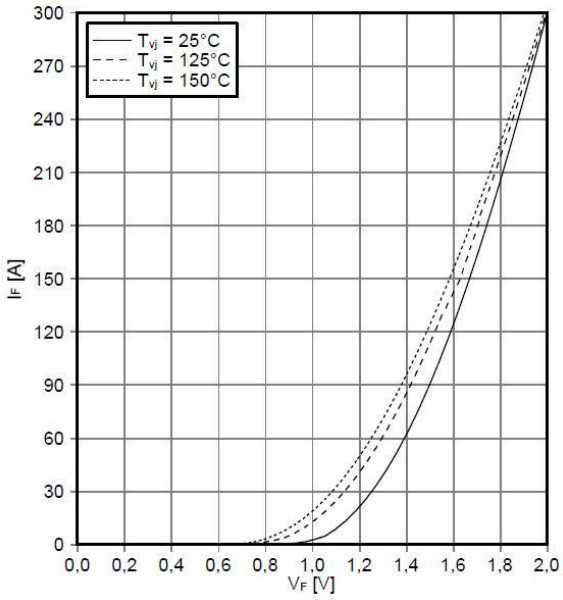


Fig 8. Forward characteristic of Diode, Inverter(typical) $I_F=f(V_F)$

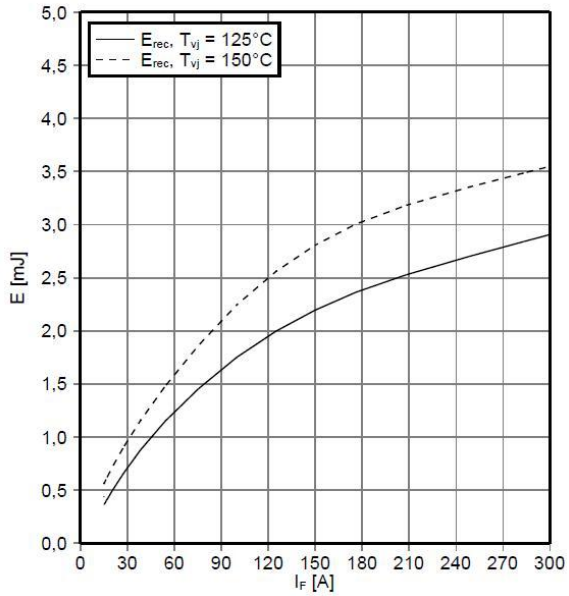


Fig 9. Switching losses Diode, Inverter(typical)
$E_{rec}=f(I_F)$, $R_{Gon}=3.3\Omega$, $V_{CE}=300V$

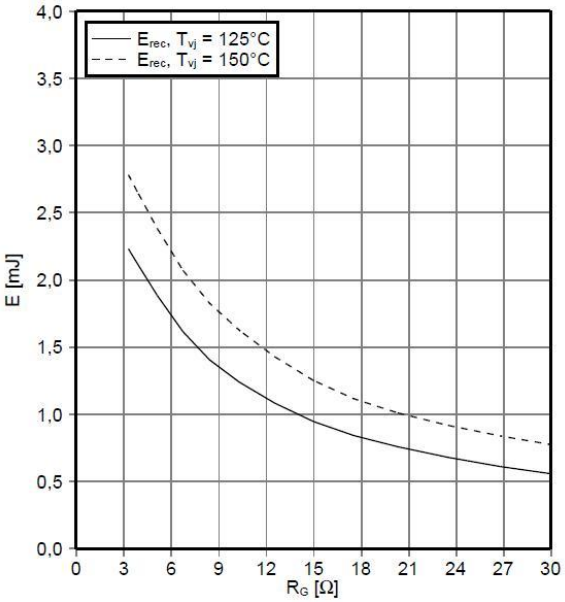


Fig 10. Switching losses Diode, Inverter(typical)
$E_{rec}=f(I_F)$,$I_F=150A$,, $V_{CE}=300V$

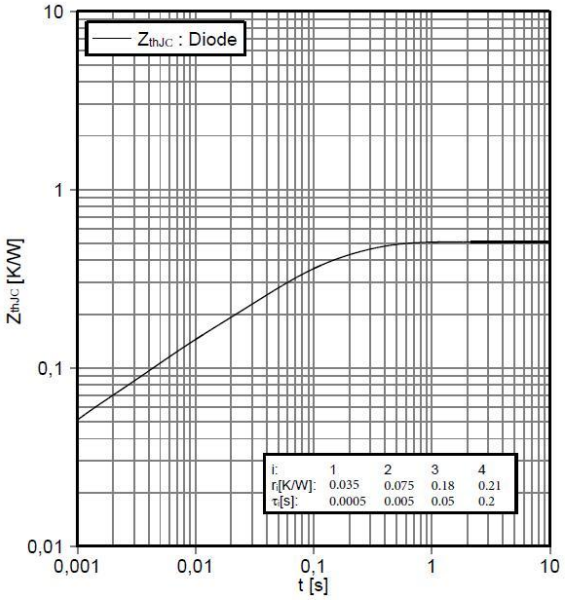
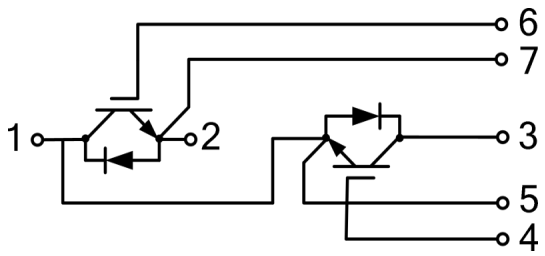
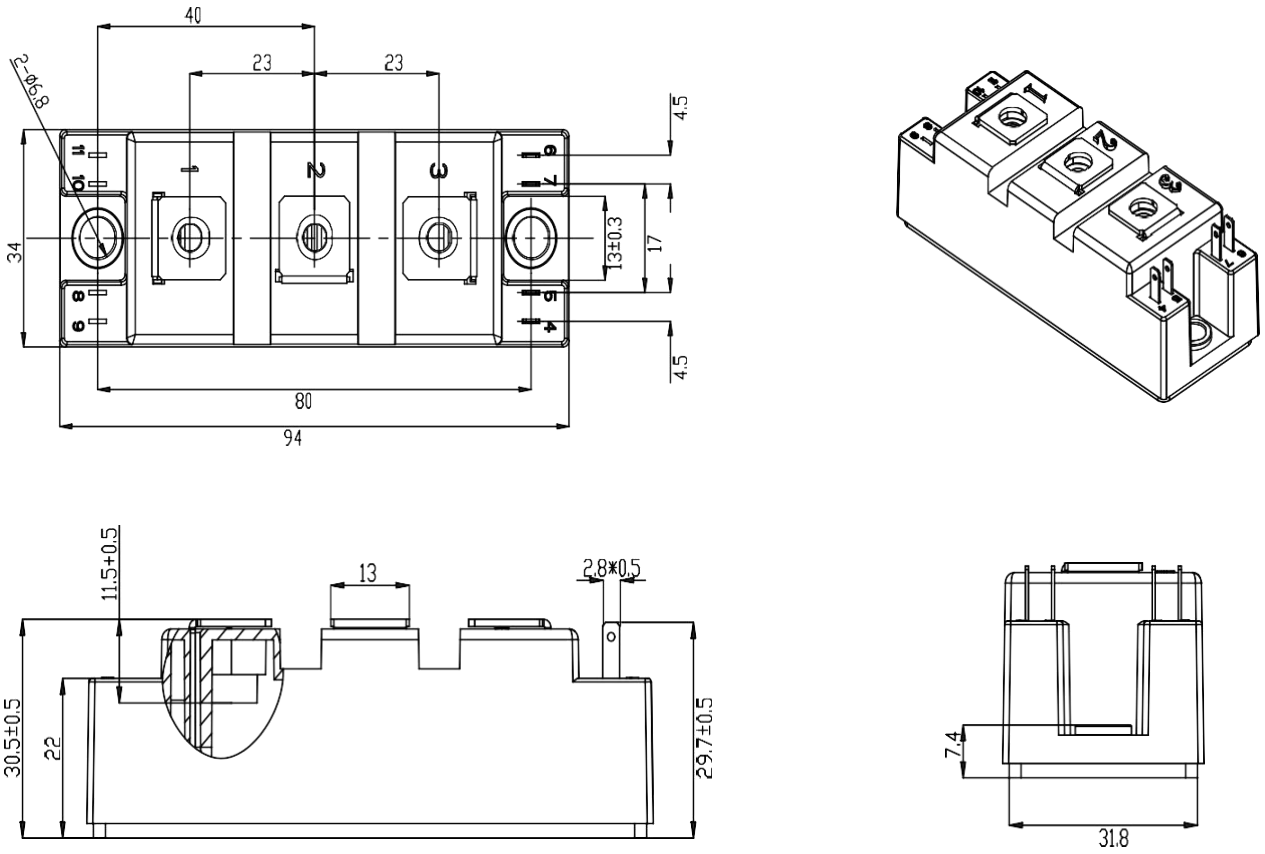


Fig 11. Transient thermal impedance Diode,Inverter
$Z_{thJC}=f(t)$

Circuit Diagram



Package Outlines(Unit: mm)



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