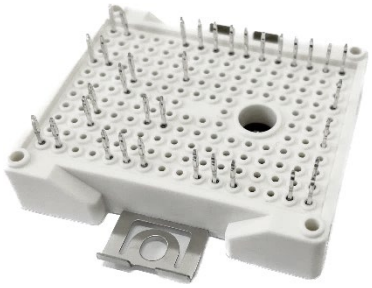
Features

- V_{CES}=1200V
- $I_{C\ nom}$=35A / I_{CRM}=70A
- Low switching losses
- Low inductance
- Fast switching and short tail current
- Integrated NTC temperature sensor
- High power and thermal cycling capability
- Al_2O_3 substrate with low thermal resistance

V_{CES}	1200V
I_C@ T_C=100°C T_{vjmax}=150°C	35A
V_{CEsat} Typ @V_{GE}=15V I_C=35A, T_{vj}=25°C	1.73V
E_{off}@T_{vj}=25℃	2.324mJ

Applications

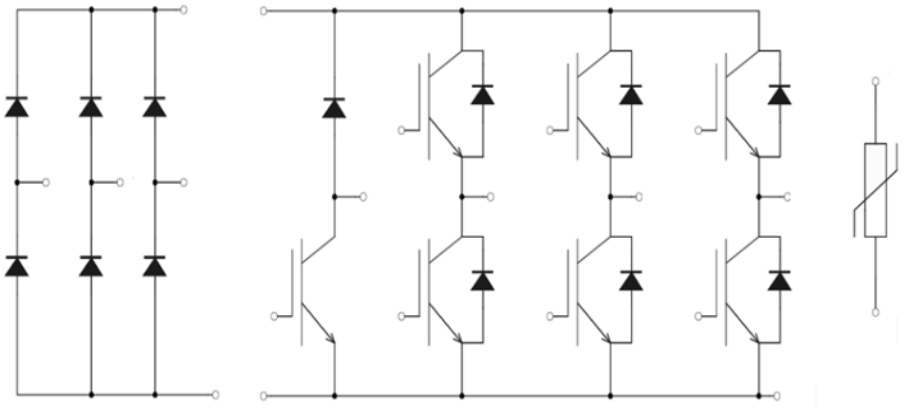
- Inverter for motor drive
- AC and DC servo drive amplifier
- Power supply



Easy PIM2B

Device Type	Device Marking
CIM35T120PEPIM2BA	CIM35T120PEPIM2BA

Description



3 Phase Bridge+Brake

IGBT-Inverter Maximum Ratings

Parameter	Symbol	Note or test condition	Value	Unit
Collector-emitter voltage	V_{CES}	T_{vj}=25℃	1200	V
Gate-emitter peak voltage	V_{GES}	/	±20	V
Continuous DC collector current	$I_{C\ nom}$	T_C=100℃ $T_{vj\ max}$=150℃	35	A
Repetitive peak collector current	I_{CRM}	t_P=1ms	70	A
Total power dissipation	P_{tot}	T_C=25℃ $T_{vj\ max}$=175℃	180	W

Electrical Characteristic Values

Parameter	Symbol	Note or test condition		Value			Unit
				Min	Typ	Max	
Gate threshold voltage	$V_{GE,th}$	I_C=0.25mA V_{CE}=V_{GE} T_{vj}=25℃		5.0	5.8	5.8	V
Collector-emitter saturation voltage	$V_{CE,sat}$	V_{GE}=15V I_C=35A	T_{vj}=25℃	/	1.73	/	V
			T_{vj}=125℃	/	1.95	/	
			T_{vj}=150℃	/	2.00	/	
Internal gate resistor	R_{Gint}	T_{vj}=25℃		/	2.2	/	Ω
Input capacitance	C_{ies}	f=1MHz V_{CE}=25V V_{GE}=0V T_{vj}=25℃		/	6.15	/	nF
Reverse transfer capacitance	C_{res}			/	0.08	/	
Collector-emitter cut-off current	I_{CES}	V_{CE}=1200V V_{GE}=0V T_{vj}=25℃		/	/	1	uA
Gate-emitter leakage current	I_{GES}	V_{CE}=0V V_{GE}= 20V T_{vj}=25℃		/	/	100	nA
Gate charge	Q_G	V_{GE} =-15V ...+15V		/	0.44	/	μC

Continue

Parameter	Symbol	Note or test condition		Value		Unit
				Typ.	Max.	
Turn-on delay time, inductive load	$t_{d,on}$	I_C=35A V_{CE}=600V V_{GE}=±15V $R_{G,on}$=6.8Ω	T_{vj}=25℃	0.027	/	us
			T_{vj}=125℃	0.025	/	
			T_{vj}=150℃	0.026	/	
Rise time, inductive load	t_r		T_{vj}=25℃	0.020	/	us
			T_{vj}=125℃	0.020	/	
			T_{vj}=150℃	0.021	/	
Turn-off delay time, inductive load	$t_{d,off}$	I_C=35A V_{CE}=600V V_{GE}=±15V $R_{G,off}$=6.8Ω	T_{vj}=25℃	0.110	/	us
			T_{vj}=125℃	0.132	/	
			T_{vj}=150℃	0.137	/	
Fall time, inductive load	t_f	I_C=35A V_{CE}=600V V_{GE}=±15V $R_{G,off}$=6.8Ω	T_{vj}=25℃	0.114	/	us
			T_{vj}=125℃	0.200	/	
			T_{vj}=150℃	0.218	/	
Turn-on energy loss per pulse	E_{on}	I_C=35A V_{CE}=600V V_{GE}=±15V $R_{G,on}$=6.8Ω Ls=35nH di/dt=1350A/μs (T_{vj}=150℃)	T_{vj}=25℃	2.373	/	mJ
			T_{vj}=125℃	2.968	/	
			T_{vj}=150℃	3.276	/	
Turn-off energy loss per pulse	E_{off}	I_C=35A V_{CE}=600V V_{GE}=±15V $R_{G,off}$=6.8Ω Ls=35nH dv/dt=5800A/μs (T_{vj}=150℃)	T_{vj}=25℃	2.324	/	mJ
			T_{vj}=125℃	2.982	/	
			T_{vj}=150℃	3.619	/	
SC data	I_{SC}	V_{GE}≤15V, V_{CC}=600 V t_p≤8μs, T_{vj}=150°C , C_{GE}=0.0uF V_{CEmax}=V_{CES} -L_{sCE}·di/dt		210	/	A
Thermal resistance, junction to case	$R_{th,JC}$	Per IGBT		/	0.83	K/W

Diode-Inverter Maximum Ratings

Parameter	Symbol	Note or test condition	Value			Unit
			Min	Typ	Max	
Repetitive peak reverse voltage	V_{RRM}	T_{vj}=25℃	/	/	1200	V
Continuous DC forward current	I_F	/	/	/	35	A
Repetitive peak forward current	I_{FRM}	t_p=1ms	/	/	70	A

Characteristic Values

Parameter	Symbol	Note or test condition		Value			Unit
				Min	Typ	Max	
Forward voltage	V_F	I_F=35A V_{GE}=0V	T_{vj}=25℃	/	2.5	/	V
			T_{vj}=125℃	/	2.6	/	
			T_{vj}=150℃	/	2.6	/	
Peak reverse recovery current	I_{RM}	I_F=35A -di$_F$/dt=2060A/μs (T_{vj}=150℃) V_R=600V V_{GE}=-15V	T_{vj}=25℃	/	42.70	/	A
			T_{vj}=125℃	/	53.20	/	
			T_{vj}=150℃	/	56.00	/	
Recovered charge	Q_r		T_{vj}=25℃	/	2.31	/	μC
			T_{vj}=125℃	/	3.54	/	
			T_{vj}=150℃	/	4.24	/	
Reverse recovery energy	E_{rec}		T_{vj}=25℃	/	0.55	/	mJ
			T_{vj}=125℃	/	1.10	/	
			T_{vj}=150℃	/	1.42	/	
Thermal resistance, junction to case	$R_{th,JC}$	Per diode		/	/	1.057	K/W

Diode-Rectifier Maximum Ratings

Parameter	Symbol	Note or test condition	Value			Unit
			Min	Typ	Max	
Repetitive peak reverse voltage	V_{RRM}	T_{vj}=25℃	/	/	1600	V
Average Rectified Output current	I_F	V_F=1.1, T_{vj}=150℃	/	/	35	A
Surge forward current	I_{FSM}	t_p=10ms, T_{vj}=150℃	/	/	350	A
I^2t - value	I^2t	t_p=10ms, T_{vj}=150℃	/	/	1225	A^2S

Characteristic Values

Parameter	Symbol	Note or test condition	Value			Unit
			Min	Typ	Max	
Forward voltage	V_F	T_{vj}=150℃ I_F=35A	/	1.08	/	V
Reverse current	I_R	V_R=1600V T_{vj}=150℃	/	1	/	mA
Thermal resistance, junction to case	$R_{th,JC}$	Per diode	/	/	0.8	K/W

IGBT, Brake-Chopper Maximum Ratings

Parameter	Symbol	Note or test condition	Value	Unit
Collector-emitter voltage	V_{CES}	T_{vj}=25℃	1200	V
Gate-emitter peak voltage	V_{GES}	/	±20	V
Continuous DC collector current	$I_{C\ nom}$	T_C=100℃ $T_{vj\ max}$=150℃	35	A
Repetitive peak collector current	I_{CRM}	t_P=1ms	70	A

Electrical Characteristic Values

Parameter	Symbol	Note or test condition		Value			Unit
				Min	Typ	Max	
Gate threshold voltage	$V_{GE,th}$	I_C=0.25mA V_{CE}=V_{GE} T_{vj}=25℃		5.0	5.8	6.5	V
Collector-emitter saturation voltage	$V_{CE,sat}$	V_{GE}=15V I_C=35A	T_{vj}=25℃	/	1.73	/	V
			T_{vj}=125℃	/	1.95	/	
			T_{vj}=150℃	/	2.00	/	
Internal gate resistor	R_{Gint}	T_{vj}=25℃		/	0.2	/	Ω
Input capacitance	C_{ies}	f=1MHz V_{CE}=25V V_{GE}=0V T_{vj}=25℃		/	1.50	/	nF
Reverse transfer capacitance	C_{res}			/	0.05	/	
Collector-emitter cut-off current	I_{CES}	V_{CE}=1200V V_{GE}=0V T_{vj}=25℃		/	/	1	uA
Gate-emitter leakage current	I_{GES}	V_{CE}=0V V_{GE}= 20V T_{vj}=25℃		/	/	100	nA
Gate charge	Q_G	V_{GE} =-15V ...+15V		/	0.20	/	μC

Continue

Parameter	Symbol	Note or test condition		Value		Unit
				Typ.	Max.	
Turn-on delay time, inductive load	$t_{d,on}$	I_C=35A V_{CE}=600V V_{GE}=±15V $R_{G,on}$=10Ω	T_{vj}=25℃	0.044	/	us
			T_{vj}=125℃	0.047	/	
			T_{vj}=150℃	0.051	/	
Rise time, inductive load	t_r		T_{vj}=25℃	0.026	/	us
			T_{vj}=125℃	0.029	/	
			T_{vj}=150℃	0.031	/	
Turn-off delay time, inductive load	$t_{d,off}$	I_C=35A V_{CE}=600V V_{GE}=±15V $R_{G,off}$=10Ω	T_{vj}=25℃	0.117	/	us
			T_{vj}=125℃	0.140	/	
			T_{vj}=150℃	0.145	/	
Fall time, inductive load	t_f		T_{vj}=25℃	0.17	/	us
			T_{vj}=125℃	0.22	/	
			T_{vj}=150℃	0.06	/	
Turn-on energy loss per pulse	E_{on}	I_C=35A V_{CE}=600V V_{GE}=±15V $R_{G,on}$=10Ω Ls=30nH di/dt=920A/μs (T_{vj}=150℃)	T_{vj}=25℃	3.17	/	mJ
			T_{vj}=125℃	4.04	/	
			T_{vj}=150℃	4.25	/	
Turn-off energy loss per pulse	E_{off}	I_C=35A V_{CE}=600V V_{GE}=±15V $R_{G,off}$=10Ω Ls=30nH dv/dt=5930A/μs (T_{vj}=150℃)	T_{vj}=25℃	2.17	/	mJ
			T_{vj}=125℃	3.37	/	
			T_{vj}=150℃	3.51	/	
SC data	I_{SC}	V_{GE}≤15V, V_{CC}=600 V t_p≤8μs, T_{vj}=150°C , C_{GE}=0.0uF V_{CEmax}=V_{CES} -L_{sCE}·di/dt		210	/	A
Thermal resistance, junction to case	$R_{th,JC}$	Per IGBT		/	0.90	K/W

Diode, Brake-Chopper Maximum Ratings

Parameter	Symbol	Note or test condition	Value			Unit
			Min	Typ	Max	
Repetitive peak reverse voltage	V_{RRM}	T_{vj}=25℃	/	/	1200	V
Continuous DC forward current	I_F	/	/	/	35	A
Repetitive peak forward current	I_{FRM}	t_p=1ms	/	/	70	A

Characteristic Values

Parameter	Symbol	Note or test condition		Value			Unit
				Min	Typ	Max	
Forward voltage	V_F	I_F=35A V_{GE}=0V	T_{vj}=25℃	/	2.50	/	V
			T_{vj}=125℃	/	2.60	/	
			T_{vj}=150℃	/	2.60	/	
Peak reverse recovery current	I_{RM}	I_F=35A -di$_F$/dt=75A/μs (T_{vj}=150℃) V_R=600V V_{GE}=-15V	T_{vj}=25℃	/	14.48	/	A
			T_{vj}=125℃	/	15.47	/	
			T_{vj}=150℃	/	16.70	/	
Recovered charge	Q_r		T_{vj}=25℃	/	1.78	/	μC
			T_{vj}=125℃	/	3.16	/	
			T_{vj}=150℃	/	3.69	/	
Reverse recovery energy	E_{rec}		T_{vj}=25℃	/	0.45	/	mJ
			T_{vj}=125℃	/	0.99	/	
			T_{vj}=150℃	/	1.17	/	
Thermal resistance, junction to case	$R_{th,JC}$	Per diode		/	/	1.208	K/W

NTC-Thermistor

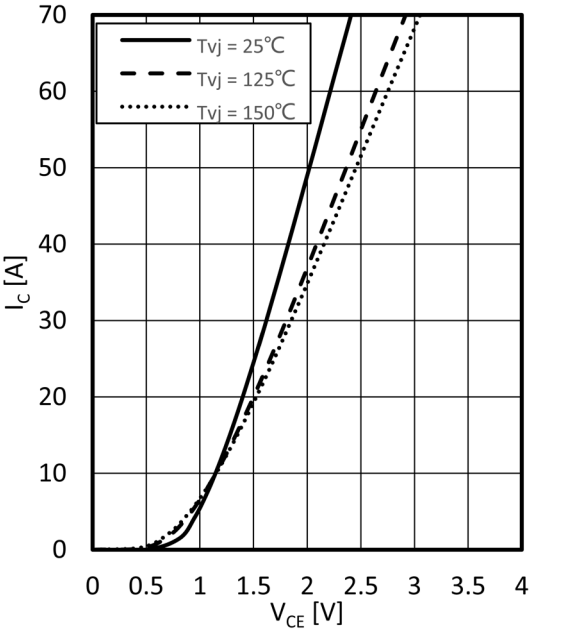
Characteristic Values

Parameter	Symbol	Note or test condition	Value			Unit
			Min	Typ	Max	
Rated resistance	R_{25}	T_C=25℃	/	5.00	/	KΩ
Power dissipation	P_{25}	T_C=25℃	/	/	20	mW
B-value	$B_{25/50}$	$R_2=R_{25}\exp[B_{25/50}(1/T_2-1/(298,15K))]$	/	3400	/	K
	$B_{25/75}$	$R_2=R_{25}\exp[B_{25/75}(1/T_2-1/(298,15K))]$	/	3430	/	
	$B_{25/100}$	$R_2=R_{25}\exp[B_{25/100}(1/T_2-1/(298,15K))]$	/	3445	/	

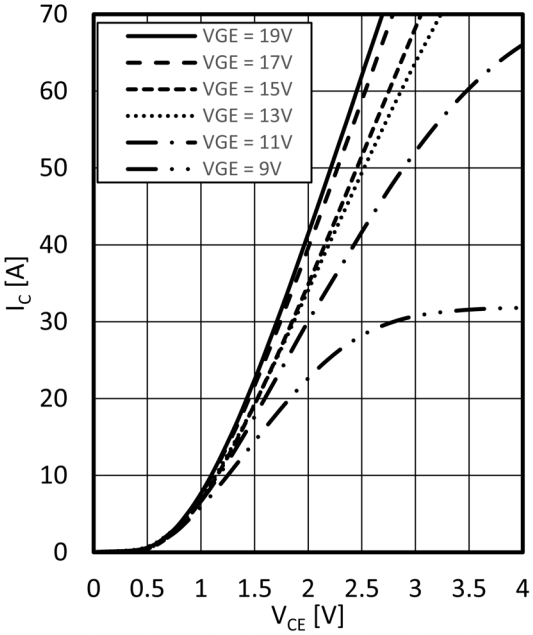
Module

Parameter	Symbol	Note or test condition	Value	Unit
Isolation Voltage	V_{ISOL}	RMS f=50Hz t=1min	2500	V
Stray inductance module	L_{SCE}	/	30	nH
Mounting Torque	M	Screw M4	2.0~2.3	N.m
Weight of Module	G	/	42	g
Operation Junction Temperature	T_{jop}	/	-40~+150	℃
Storage Temperature Range	T_{stg}	/	-40~+125	℃

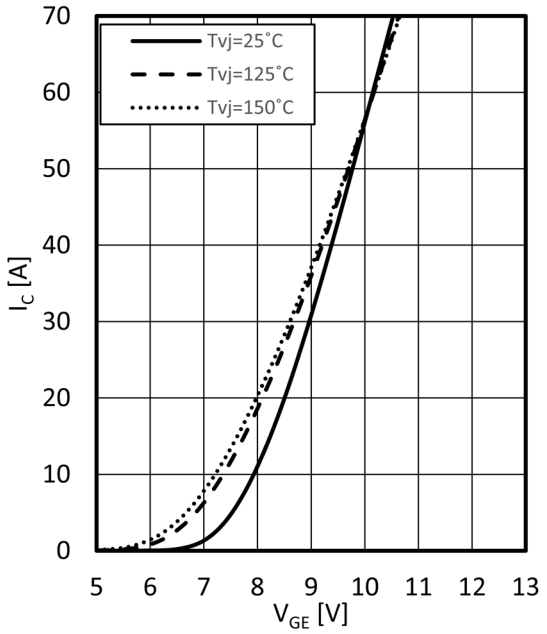
Characteristic diagram



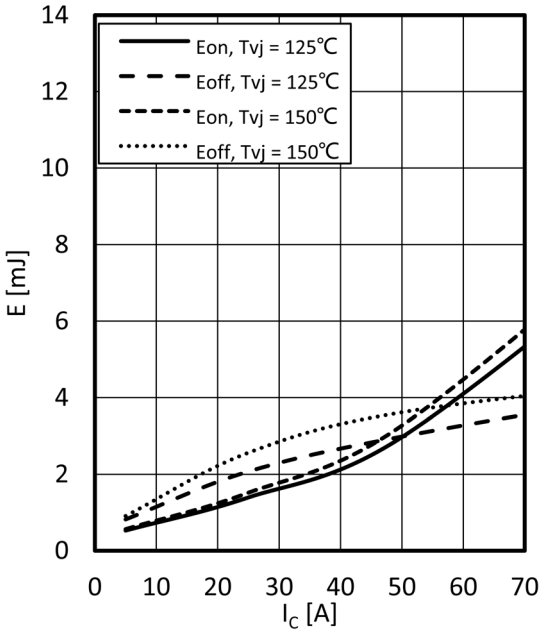
Output characteristic IGBT,inverter (typical)
$I_C = f(V_{CE})$
$V_{GE} = 15V$



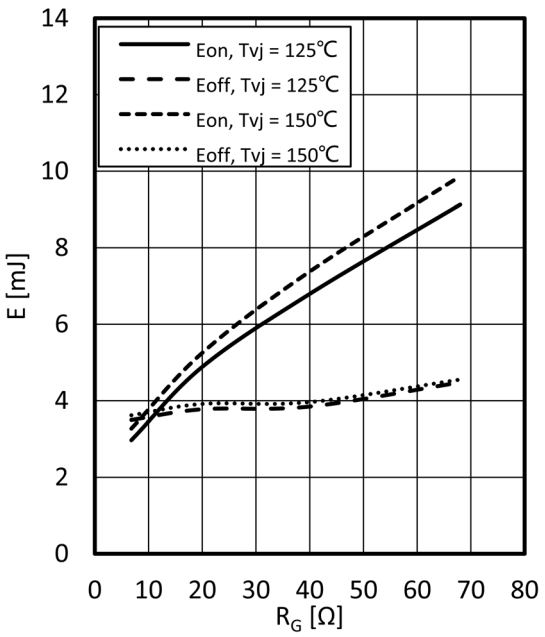
Output characteristic IGBT,inverter (typical)
$I_C = f(V_{CE})$
$T_{vj} = 150°C$



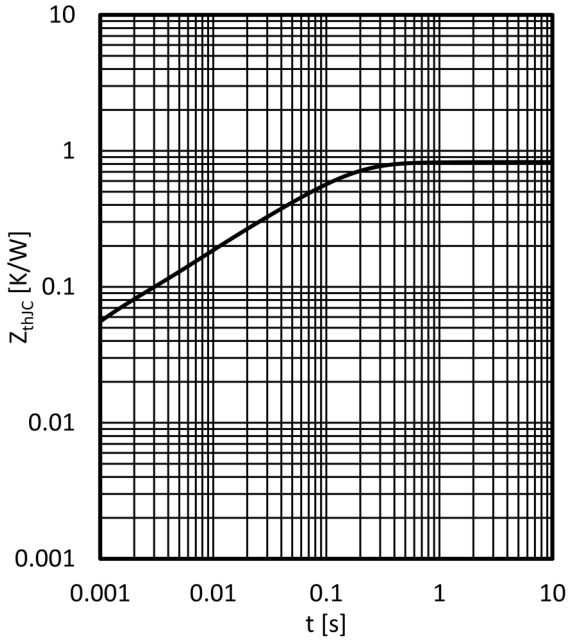
Transfer characteristic IGBT,inverter (typical)
$I_C = f(V_{GE})$
$V_{CE} = 20V$



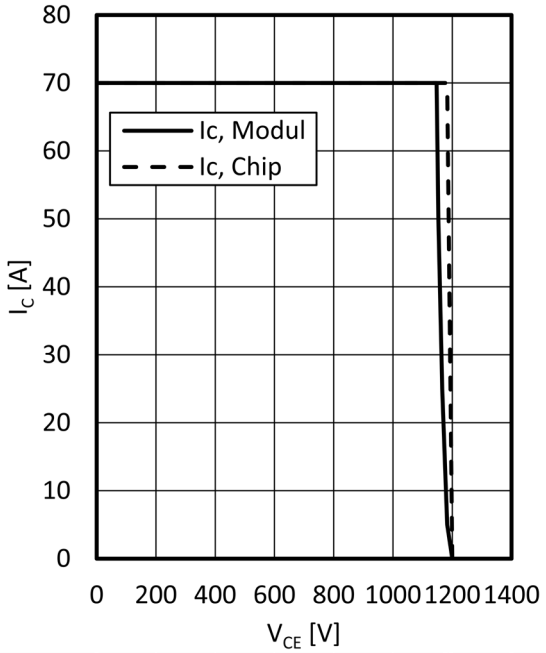
Switching losses IGBT,inverter (typical)
$E_{on} = f(I_C)$ $E_{off} = f(I_C)$
$V_{GE} = \pm 15V$, $R_{Gon} = 6.8\Omega$, $R_{Goff} = 6.8\Omega$, $V_{CE} = 600V$



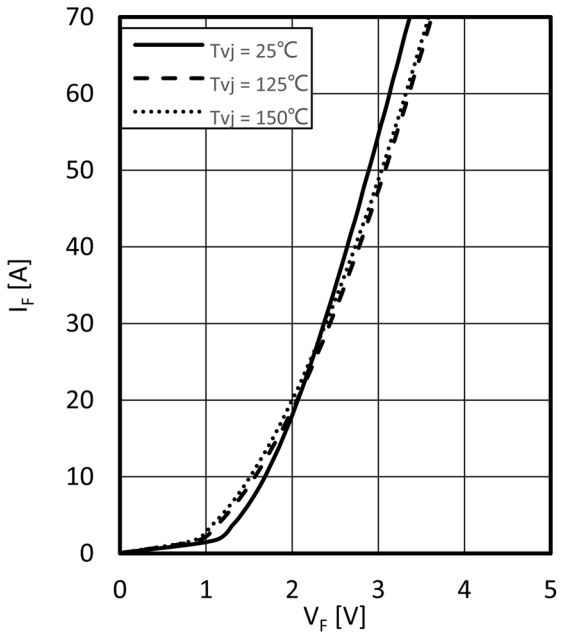
Switching losses IGBT,inverter (typical)
E_{on} = f (R_G) E_{off} = f (R_G)
I_C =35A, V_{CE} = 600V, V_{GE} = ±15V



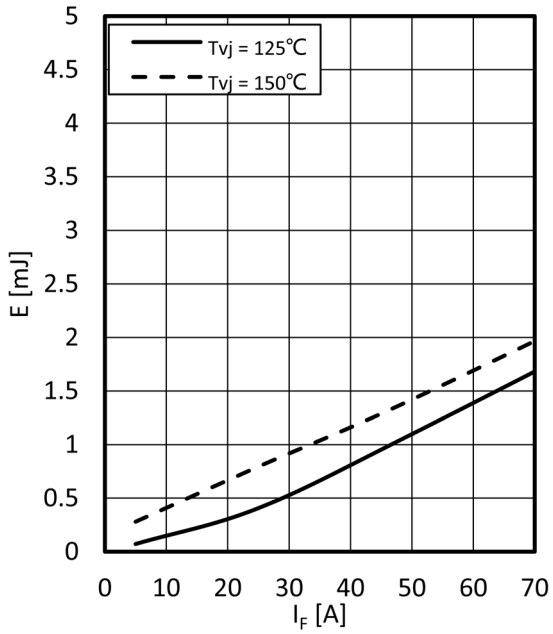
Transient thermal impedance IGBT,inverter
Z_{thJC}= f (t)



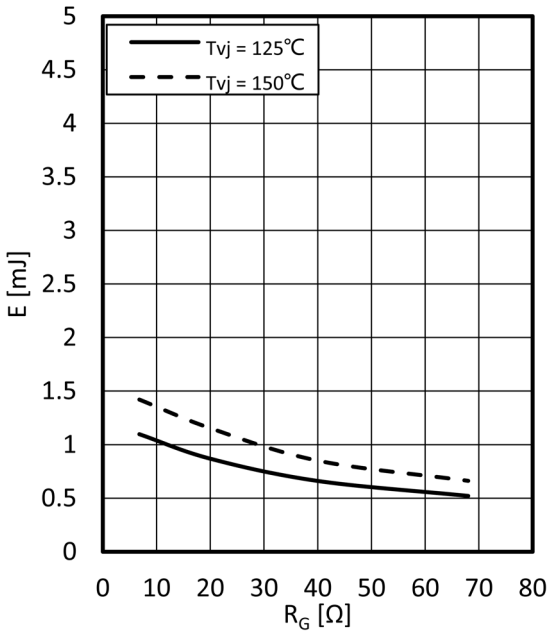
Reverse bias safe operating area IGBT,inverter(RBSOA)
I_C =f (V_{CE})
V_{GE} = 15V, R_{Goff} = 6.8Ω, Tvj = 150°C



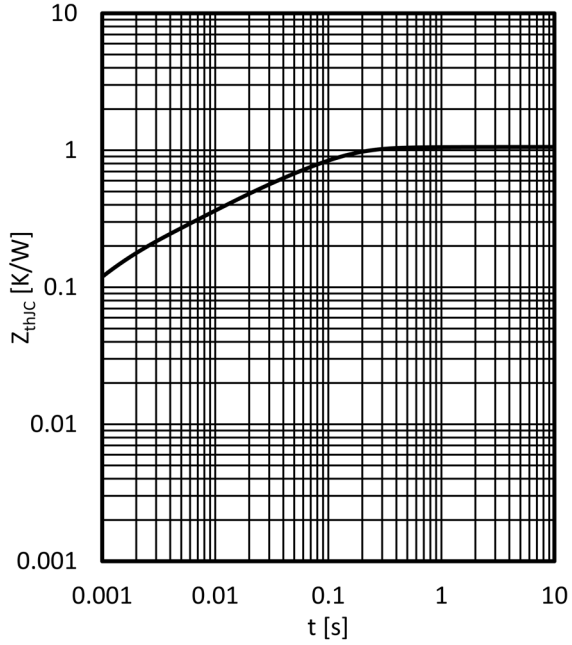
Forward characteristic of Diode,inverter (typical)
I_F =f (V_F)



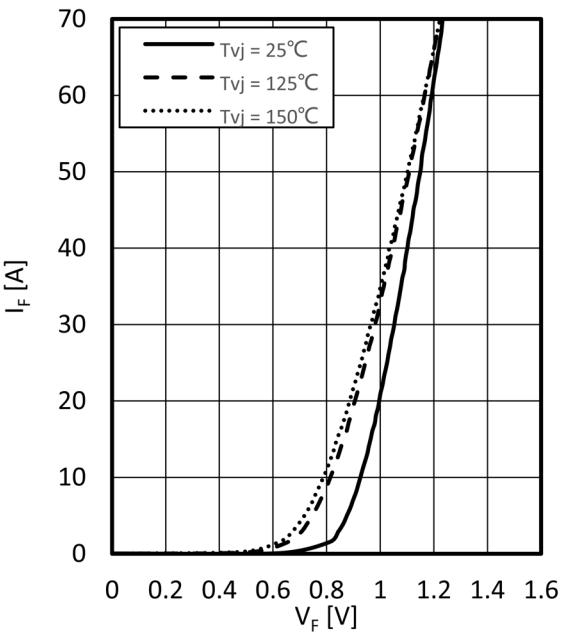
Switching losses Diode,inverter (typical)
E_{rec} =f (I_F)
R_{Gon}=15Ω, V_{CE}= 600V



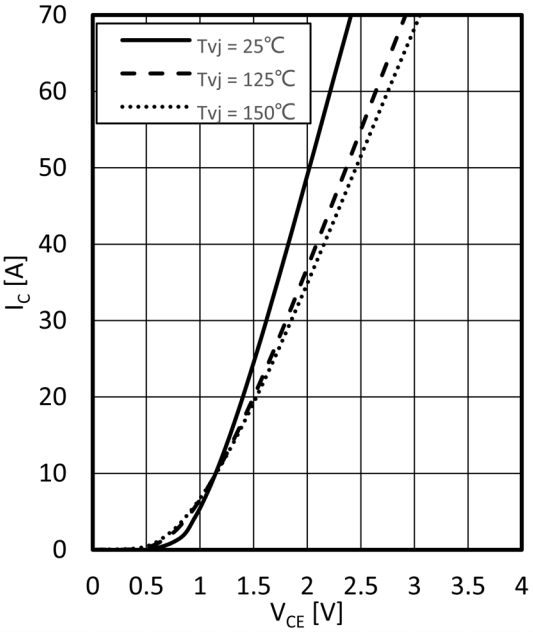
Switching losses Diode,inverter (typical)
E_{rec} =f (R_G)
I_F =35A, V_{CE}= 600V



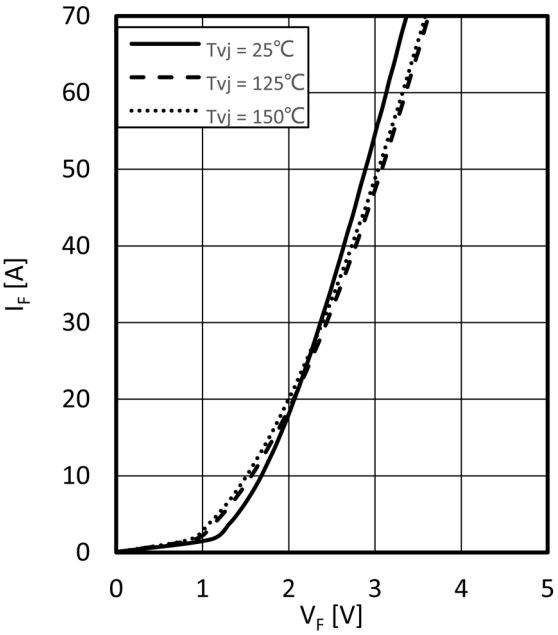
Transient thermal impedance Diode,inverter
Z_{thJC}= f (t)



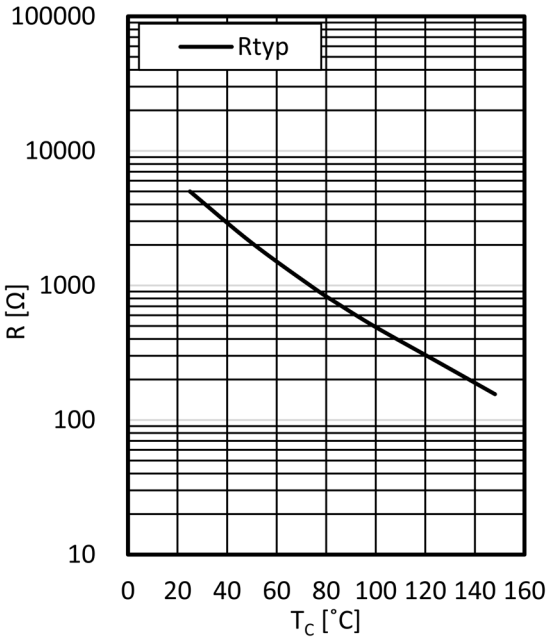
Forward characteristic of Diode,Rectifier(typical)
I_F= f (V_F)



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

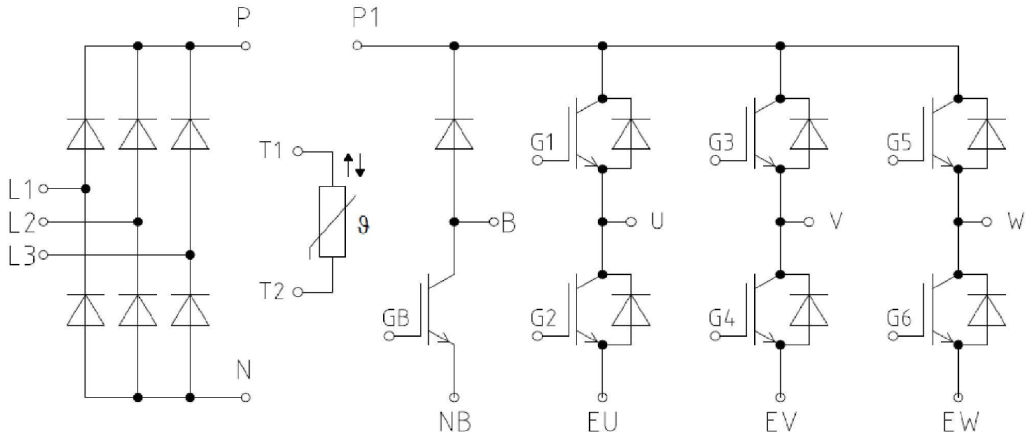


Forward characteristic of Diode, Brake-Chopper(typical)
$I_F = f(V_F)$

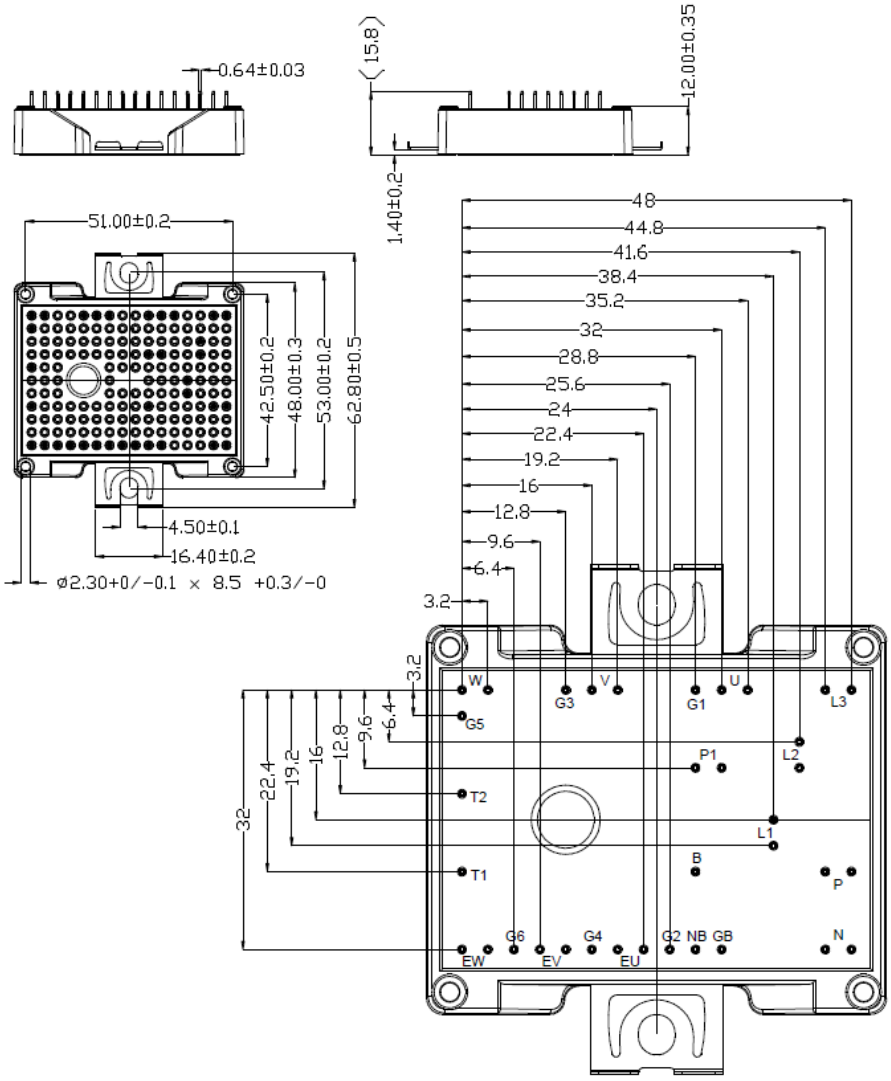


NTC-Thermistor-temperature characteristic (typical)
$R = f(T_{NTC})$

Circuit diagram



Package Outlines



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