

Key Parameters

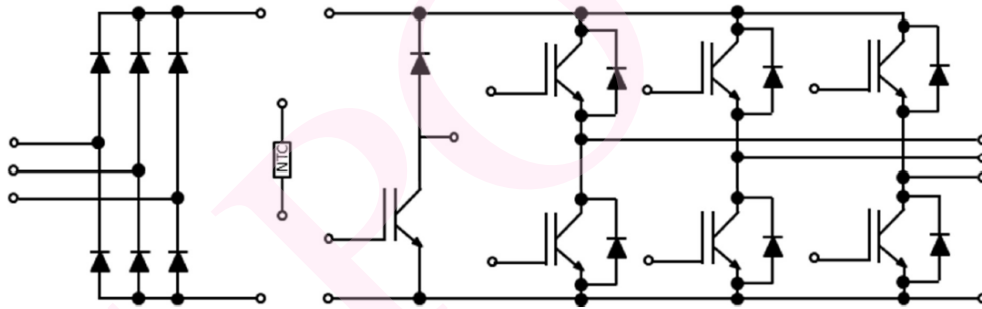
V_{CES} = 1200V
 I_c = 75A

Features

- Low $V_{ce(sat)}$
- Fast switching
- High ruggedness
- High short circuit capability

Applications

- Inverter for motor drive
- Frequency converters
- UPS
- General purpose Inverters



Equivalent Circuit Schematic

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Absolute Maximum Ratings: IGBT, Inverter						
Symbol	Characteristic	Value	Unit			
V _{CES}	Collector-Emitter Voltage	1200	V			
I _{CDC}	Continuous DC Collector Current (T _C =100°C, T _J =175°C)	75	A			
I _{CRM}	Peak Collector Current (tp=1ms)	150	A			
V _{GES}	Gate-Emitter Voltage	±20	V			
IGBT Characteristics						
Symbol	Characteristic	Conditions	Value			Unit
			Min.	Typ.	Max.	
BV _{CES}	Collector-Emitter breakdown Voltage	V _{GE} =0V, I _C =250μA, T _{vj} =25°C	1200			V
I _{CES}	Collector-Emitter leakage Current	V _{CE} =1200V, V _{GE} =0V, T _{vj} =25°C			5.0	mA
I _{GES}	Gate-Emitter leakage Current	V _{CE} =0V, V _{GE} =±20V, T _{vj} =25°C			400	ηA
V _{GE(th)}	Gate-emitter Threshold Voltage	V _{GE} =V _{CE} , I _C =1.5mA, T _{vj} =25°C	5.5	6.5	7.5	V
V _{CE(sat)}	Collector-Emitter Saturation Voltage	I _C =75A, V _{GE} =15V, T _{vj} =25°C		1.65	2.0	V
		I _C =75A, V _{GE} =15V, T _{vj} =125°C		2.05		V
		I _C =75A, V _{GE} =15V, T _{vj} =150°C		2.2		V
Q _G	Gate Charge	V _{CC} =600V, V _{GE} =15V, I _C =75A T _{vj} =25°C		330		ηC
R _{Gint}	Internal gate resistance			4.0		Ω
C _{iss}	Input Capacitance	V _{CE} =25V, V _{GE} =0V, f=1MHz, T _{vj} =25°C		7.32		ηF
C _{oss}	Output Capacitance			0.21		ηF
C _{rss}	Reverse Transfer Capacitance			0.08		ηF
t _{d(on)}	Turn-on Delay Time	I _C =75A V _{CE} = 600 V V _{GE} =0/15V R _G = 1Ω T _{vj} =25°C , L _{load} =0.8mH		115		ηs
t _r	Rise Time			30		ηs
t _{d(off)}	Turn-off Delay Time			235		ηs
t _f	Fall Time			120		ηs
E _{on}	Energy Dissipation During Turn-on Time		Energy loss include tail and diode reverse recovery		3.4	
E _{off}	Energy Dissipation During Turn-off Time			3.75		mJ
I _{C(SC)}	SC Data	t _{sc} ≤10μs, V _{GE} =15V, T _{vj} =25°C, V _{ce} ≤600V,		310		A
Absolute Maximum Ratings: Diode, Inverter						
Symbol	Characteristic	Value	Unit			
V _{RRM}	Repetitive peak reverse voltage	1200	V			
I _F	Continuous DC forward current (T _C =100°C, T _J =150°C)	75	A			
I _{FRM}	Repetitive peak forward current (tp=1ms)	150	A			
Diode Characteristics						
Symbol	Characteristic	Conditions	Value			Unit
			Min.	Typ.	Max.	
V _F	Forward Voltage	I _F =75A, T _{vj} =25°C		1.8	2.25	V
		I _F =75A, T _{vj} =125°C		1.62		V
		I _F =75A, T _{vj} =150°C		1.58		V
Q _{rr}	Recovered Charge	I _F =75A		5.5		μC
I _{rrm}	Peak Reverse Recovery Current	V _R =600V		85		A
E _{rr}	Reverse Recovery Energy	-di _F /dt =2100A/μs T _{vj} =25°C		2.1		mJ
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Absolute Maximum Ratings: IGBT, Break-Chopper						
Symbol	Characteristic	Value	Unit			
V _{CEs}	Collector-Emitter Voltage	1200	V			
I _{CDC}	Continuous DC Collector Current (T _C =100°C, T _j =175°C)	50	A			
I _{CRM}	Peak Collector Current (tp=1ms)	100	A			
V _{GES}	Gate-Emitter Voltage	±20	V			
IGBT Characteristics						
Symbol	Characteristic	Conditions	Value			Unit
			Min.	Typ.	Max.	
BV _{CEs}	Collector-Emitter breakdown Voltage	V _{GE} =0V, I _C =250μA, T _{vj} =25°C	1200			V
I _{CEs}	Collector-Emitter leakage Current	V _{CE} =1200V, V _{GE} =0V, T _{vj} =25°C			5.0	mA
I _{GES}	Gate-Emitter leakage Current	V _{CE} =0V, V _{GE} =±20V, T _{vj} =25°C			100	ηA
V _{GE(th)}	Gate-emitter Threshold Voltage	V _{GE} =V _{CE} , I _C =1.5mA, T _{vj} =25°C	5.5	6.5	7.5	V
V _{CE(sat)}	Collector-Emitter Saturation Voltage	I _C =50A, V _{GE} =15V, T _{vj} =25°C		1.7	2.0	V
		I _C =50A, V _{GE} =15V, T _{vj} =125°C		2.05		V
		I _C =50A, V _{GE} =15V, T _{vj} =150°C		2.15		V
Q _G	Gate Charge	V _{CC} =600V, V _{GE} =15V, I _C =50A T _{vj} =25°C		220		ηC
C _{iss}	Input Capacitance	V _{CE} =25V, V _{GE} =0V, f=1MHz, T _{vj} =25°C		4150		pF
C _{oss}	Output Capacitance			230		pF
C _{rss}	Reverse Transfer Capacitance			54		pF
t _{d(on)}	Turn-on Delay Time		I _C =50A		90	
t _r	Rise Time	V _{CE} = 600 V		49		ηs
t _{d(off)}	Turn-off Delay Time	V _{GE} =0/15V		240		ηs
t _f	Fall Time	R _G = 10Ω		110		ηs
E _{on}	Energy Dissipation During Turn-on Time	T _{vj} =25°C , L _{load} =0.82mH		3.8		mJ
E _{off}	Energy Dissipation During Turn-off Time	Energy loss include tail and diode reverse recovery		2.3		mJ
Absolute Maximum Ratings: Diode, Break-Chopper						
Symbol	Characteristic	Value	Unit			
V _{RRM}	Repetitive peak reverse voltage	1200	V			
I _F	Continuous DC forward current (T _C =100°C, T _j =150°C)	35	A			
I _{FRM}	Repetitive peak forward current (tp=1ms)	70	A			
Diode Characteristics						
Symbol	Characteristic	Conditions	Value			Unit
			Min.	Typ.	Max.	
V _F	Forward Voltage	I _F =35A, T _{vj} =25°C		2.05	2.45	V
		I _F =35A, T _{vj} =125°C		1.75		V
		I _F =35A, T _{vj} =150°C		1.68		V
Q _{rr}	Recovered Charge	I _F =35A		2.4		μC
I _{rrm}	Peak Reverse Recovery Current	V _R =600V		29		A
E _{rr}	Reverse Recovery Energy	-di _F /dt =800A/μs T _{vj} =25°C		0.8		mJ
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Absolute Maximum Ratings: Diode, Rectifier						
Symbol	Characteristic	Value				Unit
V _{RRM}	Repetitive peak reverse voltage	1600				V
I _{F(AV)}	Average output current 50/60Hz, sine wave (T _C =100°C)	76				A
I _{RMSM}	Maximum RMS current at rectifier output (T _C =80°C)	120				A
I _{FSM}	Surge forward current (V _R =0V, t _p =10msec, T _J =45°C)	1100				A
Diode Characteristics						
Symbol	Characteristic	Conditions	Value			Unit
			Min.	Typ.	Max.	
V _F	Forward Voltage	I _F =75A, T _{vj} =150°C		1.2		V
I _R	Diode reverse current	V _R =1600V, T _J =150°C			4.0	mA
Module Characteristics						
Symbol	Characteristic	Conditions	Value			Unit
			Min.	Typ.	Max.	
V _{isol}	Isolation voltage	t=1min, f=50Hz	2500			V
T _{jmax}	Maximum Junction Temperature				175	°C
T _{vj op}	Operating Junction Temperature		-40		150	°C
T _{stg}	Storage Temperature		-40		150	°C
R _{CC'+EE'}	Module lead resistance terminal to chip			4.0		mΩ
R _{AA'+CC'}	Module lead resistance terminal to chip			3.0		mΩ
L _{SCE}	Stray Inductance, Module			40		nH
R _{θjc}	Junction-to Case	per IGBT-inverter		0.30		°C/W
		per Diode-inverter		0.53		°C/W
		per IGBT-Break Chopper		0.45		°C/W
		per Diode- Break Chopper		0.98		°C/W
		per Diode- Rectifier		0.52		°C/W
R _{θcs}	Case to Sink	per IGBT-inverter		0.15		°C/W
		per Diode-inverter		0.27		°C/W
		per IGBT-Break Chopper		0.22		°C/W
		per Diode- Break Chopper		0.46		°C/W
		per Diode- Rectifier		0.28		°C/W
		per Module		0.01		°C/W
M _t	Module to sink torque		3.0		6.0	NM
G	Weight of Module			300		g
NTC thermistors Characteristics						
Symbol	Characteristic	Conditions	Min.	Typ.	Max.	Unit
R ₂₅	Rated resistance			5.0		kΩ
ΔR/R	Deviation of R100	T _C =100°C, R ₁₀₀ =493Ω	-5		5	%
P ₂₅	Power Dissipation				20.0	mW
B _{25/50}	B-value	$R_2=R_{25}\exp[B_{25/50}(1/T_2-1/(298.15K))]$		3375		K
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• Typical Electrical Characteristics

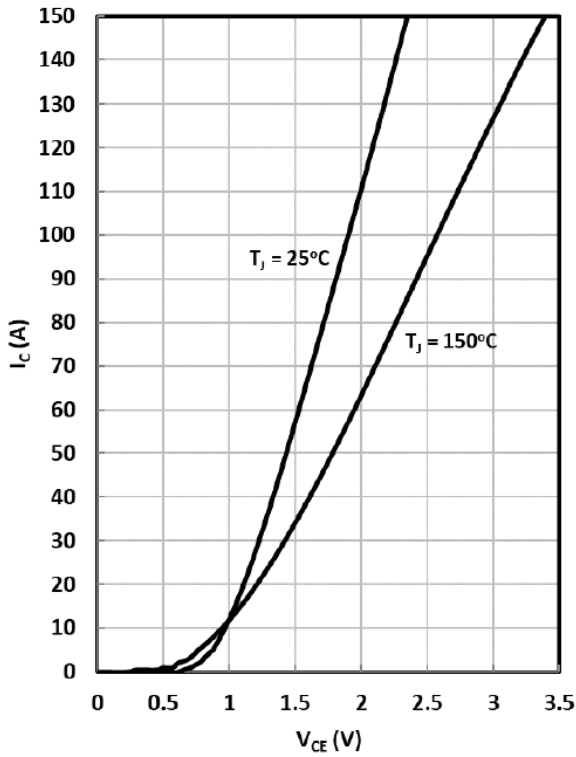


Fig. 1 IGBT (Inverter) Output Characteristics

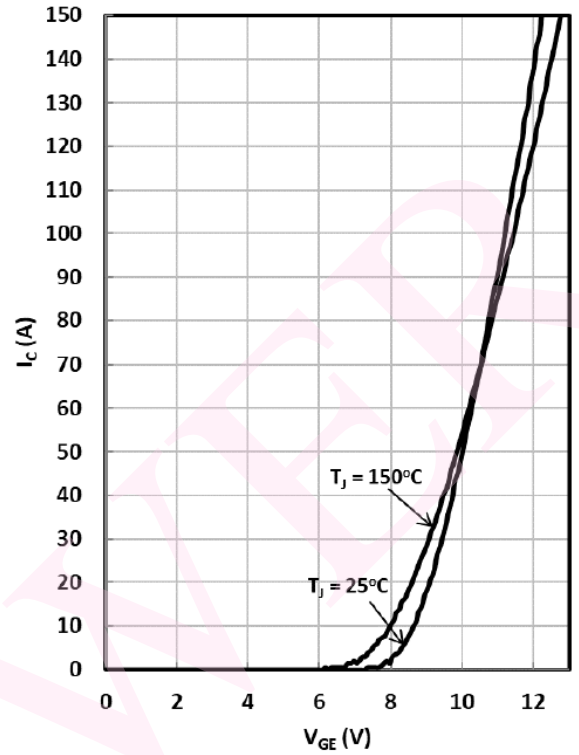


Fig. 2 IGBT (Inverter) Transfer Characteristics

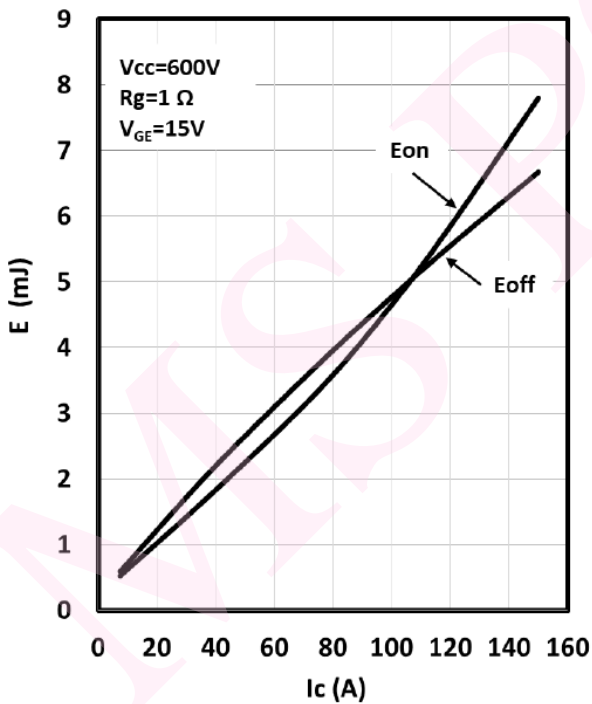


Fig. 3 IGBT (Inverter) Switching Loss vs. I_c

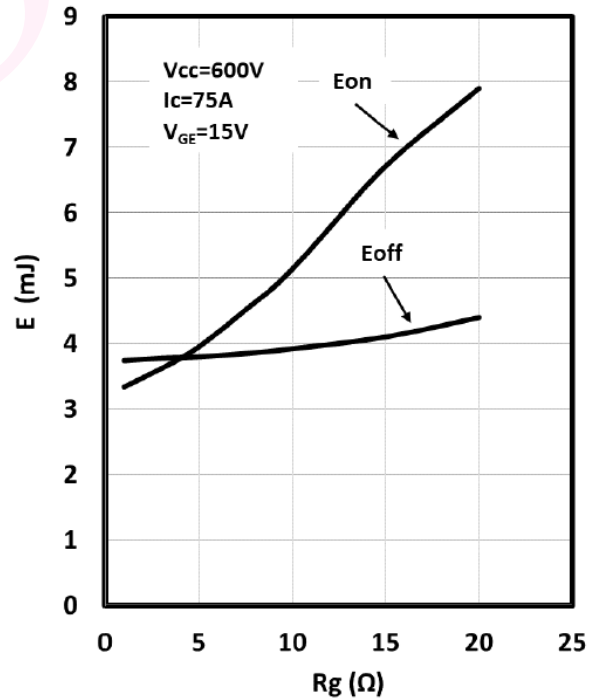


Fig. 4 IGBT (Inverter) Switching Loss vs. R_g

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Fig. 5 RBSOA

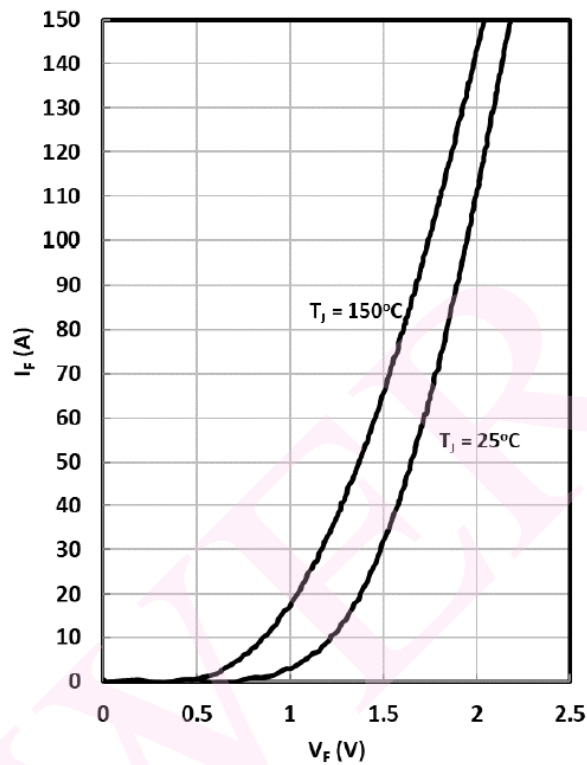


Fig. 6 Diode (Inverter) Forward Characteristics

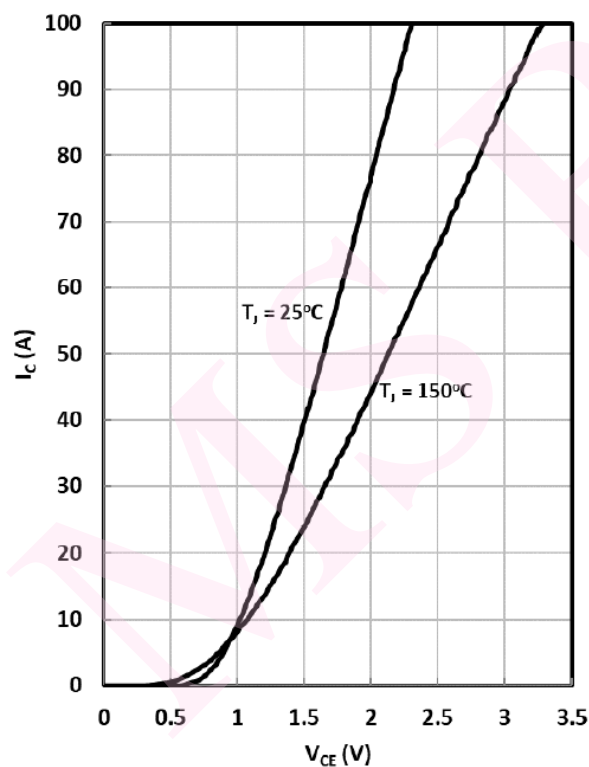


Fig. 7 IGBT (Brake-Chopper) Output Characteristics

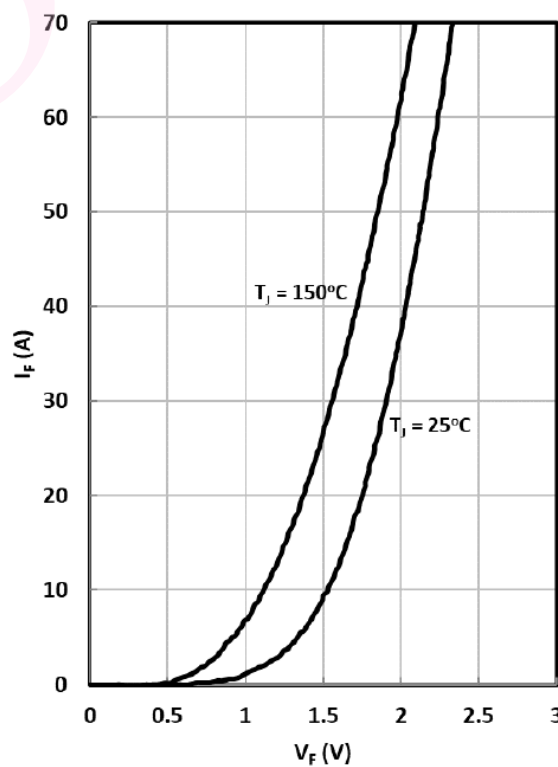


Fig. 8 Diode (Brake-Chopper) Output Characteristics

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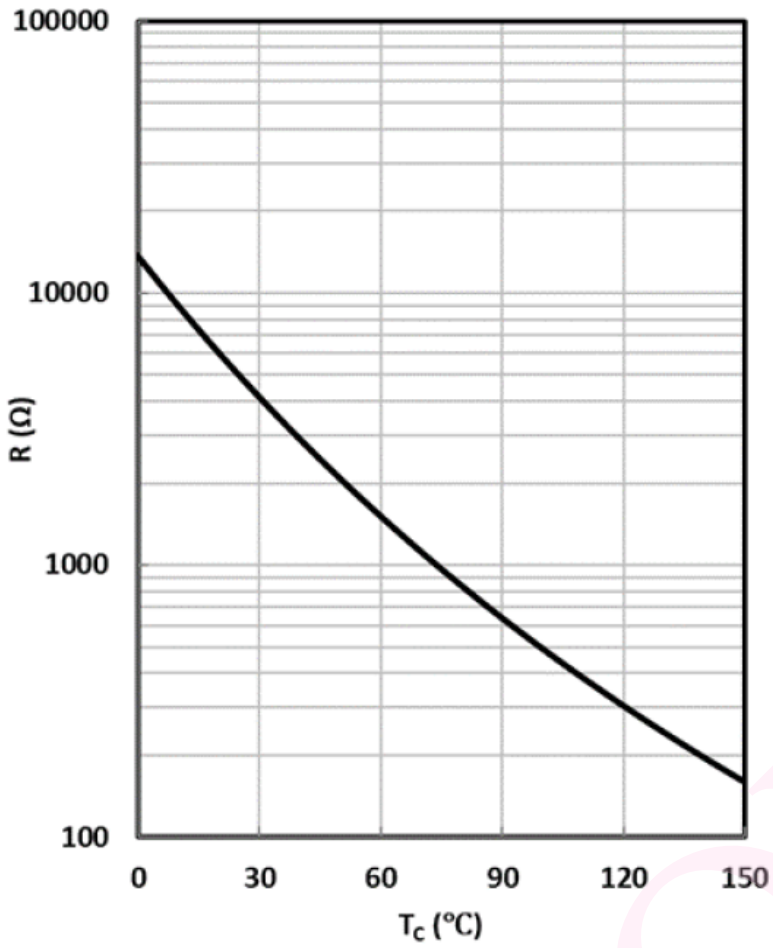
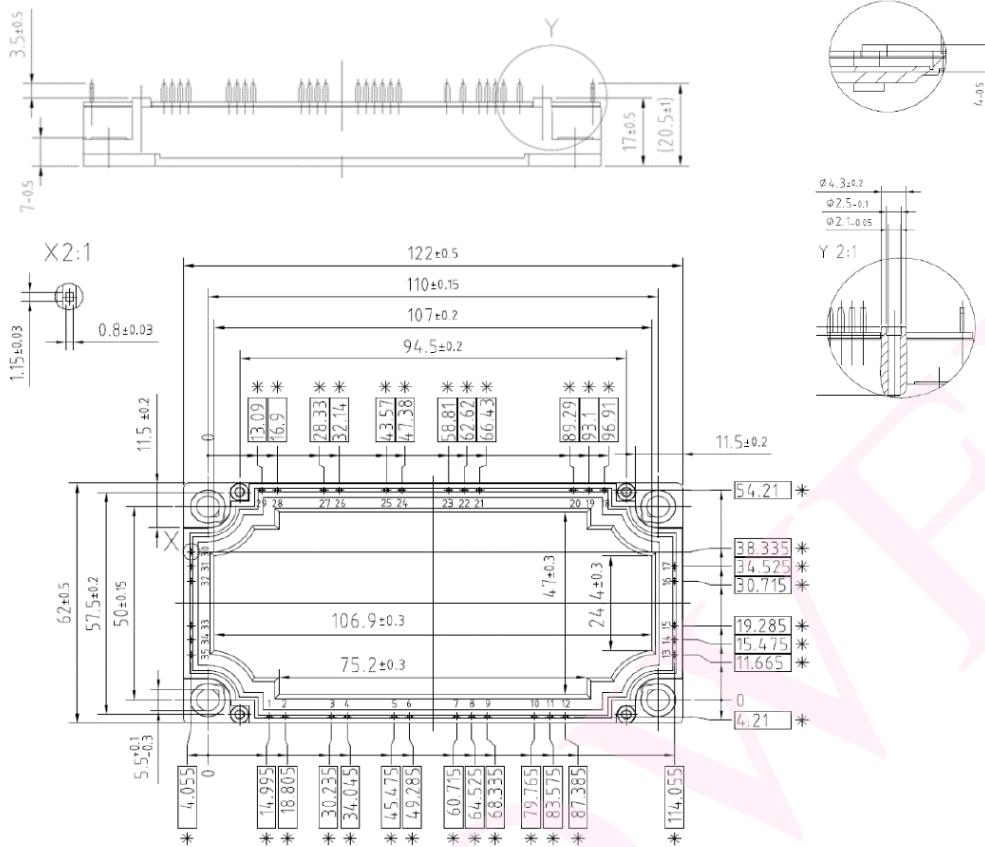


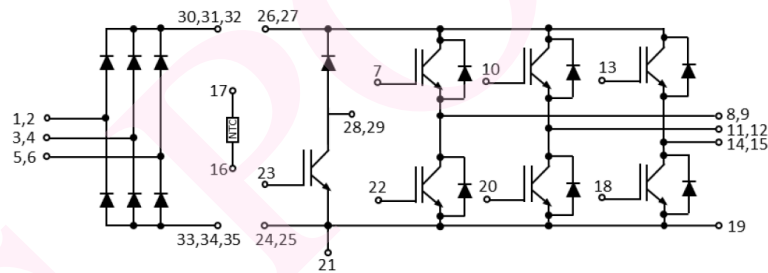
Fig. 9 NTC Temperature Characteristics

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Outline :



* = alle Maße mit einer Toleranz von ± 0.5
 * = all dimensions with tolerance of ± 0.5



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