



IGBT Modules

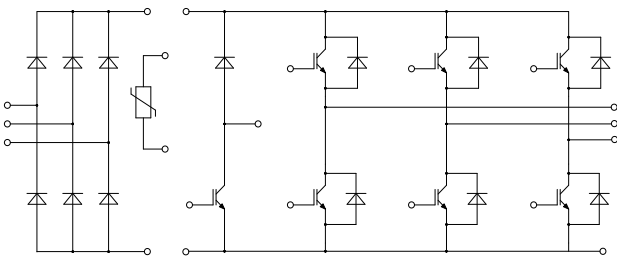
V_{CE(S)} 120V
I_C 15A

Applications

Motor Drives
AC and DC servo drive amplifier
UPS (Uninterruptible Power Supplies)

Features

Low switching losses
Low $V_{CE(sat)}$ with positive temperature coefficient
Including fast & soft recovery anti-parallel FWD
Low inductance case
High short-circuit capability (10s)
Maximum junction temperature 175°C



IGBT- inverter

Absolute Maximum Ratings

Parameter	Symbol	Conditions	Value	Unit
Collector-Emitter Voltage	V_{CE(S)}	V_{GE}=0V, I_C=1mA, T_J=25	120	V
Continuous Collector Current	I_C	T_C=100, T_{Jmax} 175	15	A
Repetitive Peak Collector Current	I_{CM}	tp=1ms	30	A
Gate-Emitter Voltage	V_{GE(S)}	T_J=25	20	V
Total Power Dissipation	P_{tot}	T_C=25 T_{Jmax}=175	142	W



IGBT- inverter

Characteristic values

Parameter	Symbol	Conditions
Saturation Voltage		
Gate Charge		
Input Capacitance		
Reverse Transfer Capacitance		



Diode-inverter

Absolute Maximum Ratings

Parameter	Symbol	Conditions	Value	Unit
Repetitive Peak Reverse Voltage	V_{RRM}	$T_j=25$	120	V
Continuous DC Forward Current	I_F		15	A
Repetitive Peak Forward Current	I_{FRM}	$t_f=1ms$	30	A
Rt value	R_t	$V_F=0, t_f=10ms, T_j=125$	160	μs
		$V_F=0, t_f=10ms, T_j=150$	140	

Characteristic values

Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Forward Voltage	V_F	$I_F=15A, T_j=25$		200	265	V
		$I_F=15A, T_j=125$		210		
		$I_F=15A, T_j=150$		210		
Recovered Charge	Q_r	$I_F=15A$		120		μC
Peak Reverse Recovery Current	I_r	$V_F=60V$ $-d_F/dt=60A/\mu s$		130		A
Reverse Recovery Energy	E_{rrc}	$T_j=25$		037		mJ
Recovered Charge	Q_r	$I_F=15A$		205		μC
Peak Reverse Recovery Current	I_r	$V_F=60V$ $-d_F/dt=60A/\mu s$		120		A
Reverse Recovery Energy	E_{rrc}	$T_j=125$		008		mJ



IGBT-brake-chopper

Absolute Maximum Ratings

Parameter	Symbol	Conditions	Value	Unit
Collector-Emitter Voltage	V_{CES}	$V_{GE}=0V, I_C=1mA, T_j=25$	120	V
Continuous Collector Current	I_C	$T_c=100, \nu_{jmax}=15$	15	A
Repetitive Peak Collector Current	I_{CM}	$t_p=1ms$	30	A
Gate-Emitter Voltage	V_{GES}	$T_j=25$	20	V
Total Power Dissipation	P_{tot}	$T_c=25, T_{jmax}=175$	15	W

Characteristic values

Parameter	Symbol	Conditions	Value			Unit	
			Min.	Typ.	Max.		
Gate-emitter Threshold Voltage	$V_{GE(th)}$	$V_{GE}=V_{CE}, I_C=0.5mA, T_j=25$	52	60	68	V	
Collector-Emitter Cut-off Current	I_{CES}	$V_{CE}=120V, V_{GE}=0V, T_j=25$			10	nA	
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C=15A, V_{GE}=15V, T_j=25$		18	22	V	
		$I_C=15A, V_{GE}=15V, T_j=125$		21			
		$I_C=15A, V_{GE}=15V, T_j=150$		22			
Gate Charge	Q_g			09		µC	
Input Capacitance	C_{is}	$V_{CE}=25V, V_{GE}=0V$		13		rF	
Reverse Transfer Capacitance	C_{res}	$f=1MHz, T_j=25$		08		rF	
Gate-Emitter leakage current	I_{GES}	$V_{CE}=0V, V_{GE}=20V, T_j=25$			40	nA	
Turn-on Delay/line	t_{on}	$I_C=15A$ $V_{CE}=60V$ $V_{GE}=\pm 15V$ $R_g=3\Omega$ $T_j=25$		4		ns	
Rise Time	t_r			4		ns	
Turn-off Delay/line	t_{off}			18		ns	
Fall Time	t_f			16		ns	
Energy Dissipation During Turn-on	E_{on}				09		nJ
Energy Dissipation During Turn-off	E_{off}				05		nJ



TurnOnDelay/line	t_{on}	$I_C=15A$ $V_{CE}=60V$ $V_{GE}=\pm 15V$ $R_G=3\Omega$ $T_J=125$		46		ns
Rise/line	t_r			68		ns
TurnOffDelay/line	t_{off}			28		ns
Fall/line	t_f			20		ns
Energy Dissipation During Turnon/line	E_{on}			137		nJ
Energy Dissipation During Turnoff/line	E_{off}			081		nJ
SCData	I_C	$T_p=10\mu s, V_{GE}=15V, T_J=150$, $V_{CE}=90V, V_{CEM}=120V$		90		A

Diode-Brake-Chopper

Absolute Maximum Ratings

Parameter	Symbol	Conditions	Value	Unit
Repetitive Peak Reverse Voltage	V_{RRM}	$T_J=25$	120	V
Continuous DC Forward Current	I_F		10	A
Repetitive Peak Forward Current	I_{FRM}	$t_p=1ms$	20	A
Reverse	R_t	$V_C=0, t_p=10ns, T_J=125$	160	As
		$V_C=0, t_p=10ns, T_J=150$	140	

Characteristic values

Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Forward Voltage	V_F	$I_F=10A, T_J=25$		200	250	V
		$I_F=10A, T_J=125$		210		
		$I_F=10A, T_J=150$		210		
Recovered Charge	Q_r	$I_F=10A$		090		uC
Peak Reverse Recovery Current	I_r	$V_C=60V$ $-d_r/d=50A/\mu s$		125		A
Reverse Recovery Energy	E_{rr}	$T_J=25$		025		nJ
Recovered Charge	Q_r	$I_F=10A$		170		uC
Peak Reverse Recovery Current	I_r	$V_C=60V$ $-d_r/d=50A/\mu s$		104		A
Reverse Recovery Energy	E_{rr}	$T_J=125$		050		nJ



Diode-Rectifier

Absolute Maximum Ratings

Parameter	Symbol	Conditions	Value	Unit
Repetitive Peak Reverse Voltage	V_{RRM}	$T_J=25$	160	V
Average Output Current 50kHz, sine wave	$I_{(AV)}$	$T_C=100$	20	A
Minimum RMS Current at Rectifier Output	I_{RSM}	$T_C=100$	40	A
Surge Forward Current	I_{SM}	$V_F=0, t_p=10ms, T_J=25$	200	A
Reverse Recovery Time	t_r	$V_F=0, t_p=10ms, T_J=25$	300	ns

Characteristic values

Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Diode Forward Voltage	V_F	$I_F=15A, T_J=150$		0.96		V
Reverse Current	I_R	$T_J=150, V_R=160V$			10	mA

NTC-Thermistor

Characteristic values

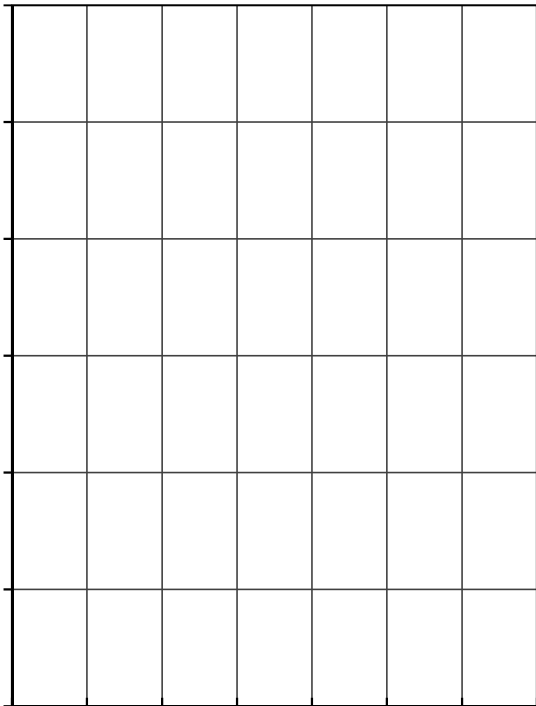
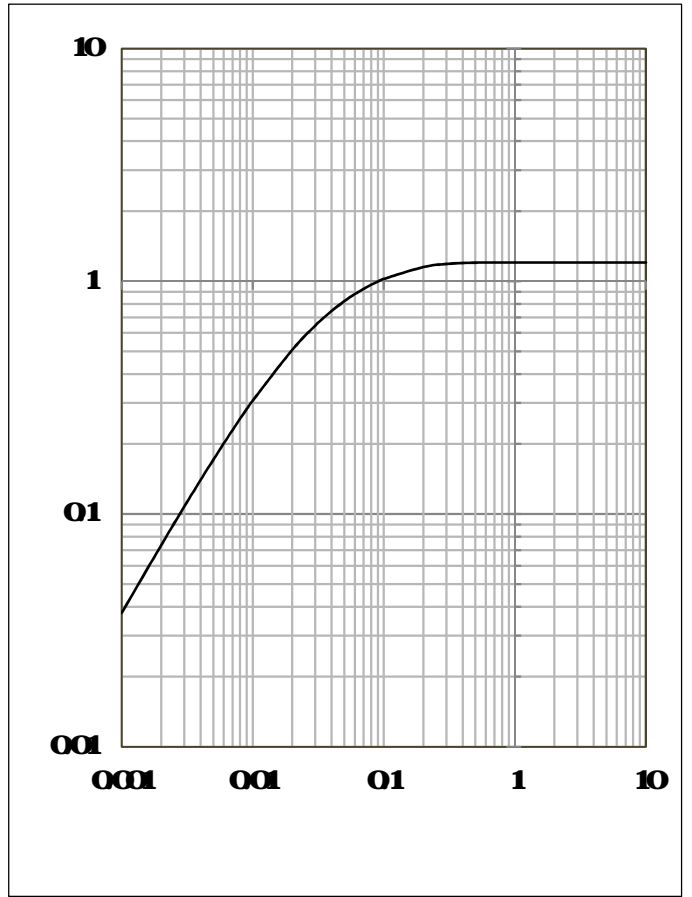
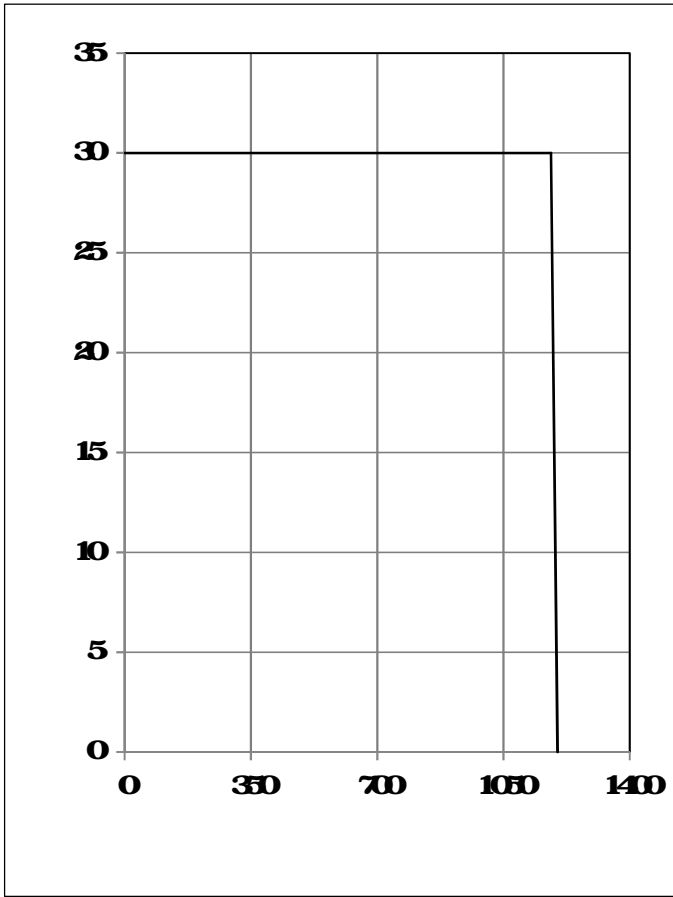
Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Rated Resistance	R_{25}			50		k
Deviation of R100	ΔR	$T_C=100, R_{100}=483$	-5		5	%
Power Dissipation	P_{25}				200	mW
B value	$B_{25/100}$	$R_2=R_{25}, R_{100}=R_{25} \exp\left(\frac{1}{T_2} - \frac{1}{T_{100}}\right) \cdot B$		335		K

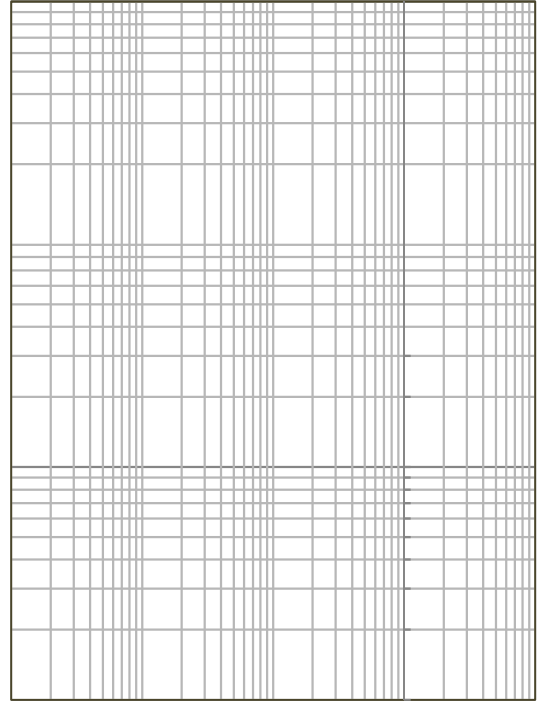
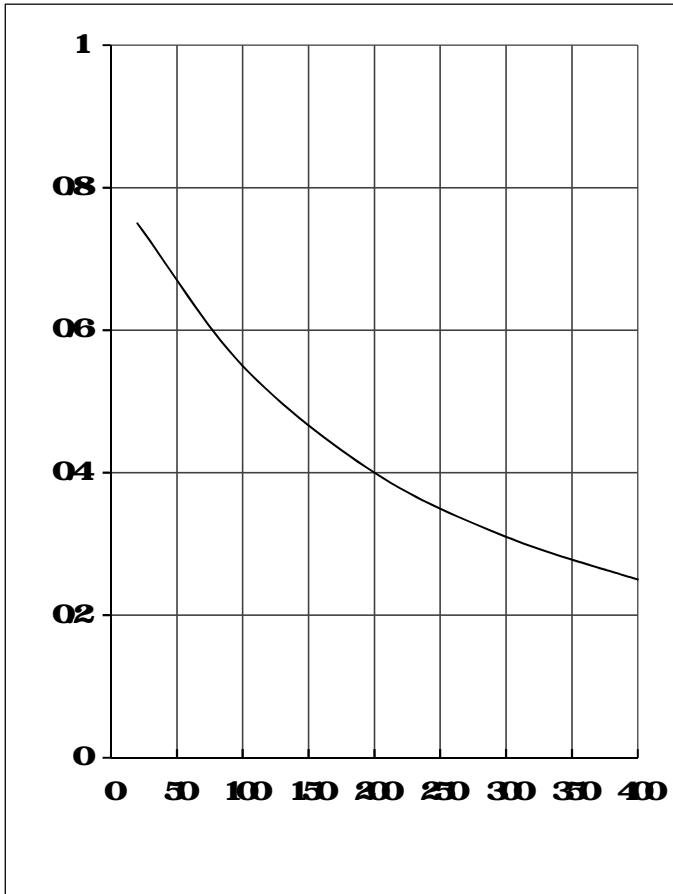


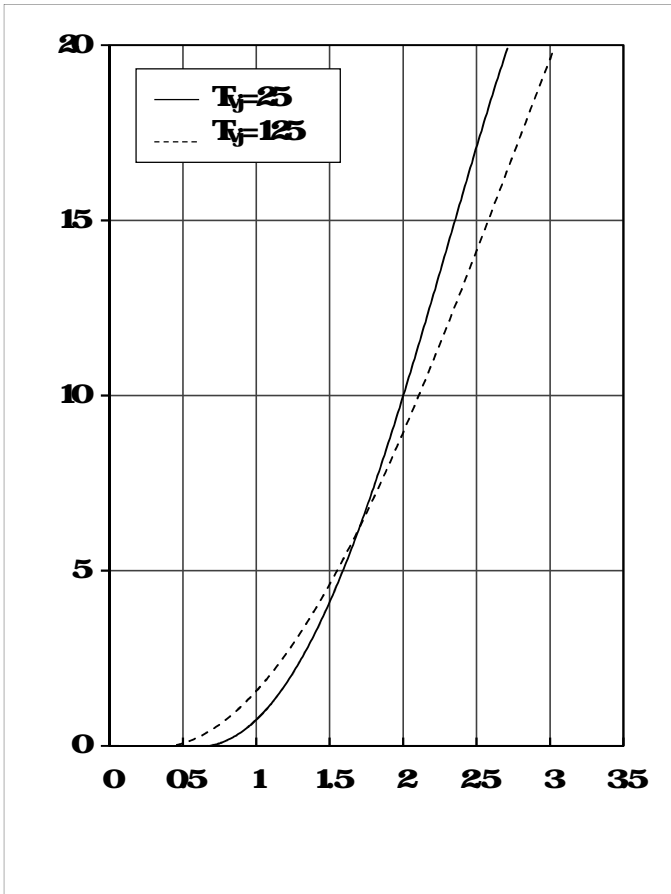
Module Characteristics

T_C=25°C unless otherwise specified

Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Isolation Voltage	V _{sd}	t=1min, f=50Hz	200			V
Minimum Junction Temperature	T _{jmax}				175	
Operating Junction Temperature	T _{jqop}		-40		150	
Storage Temperature	T _{stg}		-40		125	
Staying Inductance Module	I _{sce}			60		
Middle lead resistance terminals dip	R _{C+EE}	T _C =25°C, per switch		40		
	R _{A+CC}			30		
Thermal Resistance Junction to Case	R _{JC}	per GBF meter			115	KW
		per Dole meter			150	
		per GBF bare copper			115	
		per Dole copper			230	
		per Dole redifier			113	
Thermal Resistance Case to Sink	R _{CS}	per GBF meter		041		KW
		per Dole meter		051		
		per GBF bare copper		051		
		per Dole copper		077		
		per Dole redifier		102		
		per Middle		002		
Mating Force Per Clamp	F		30		60	N
Weight of Module	G			180		g

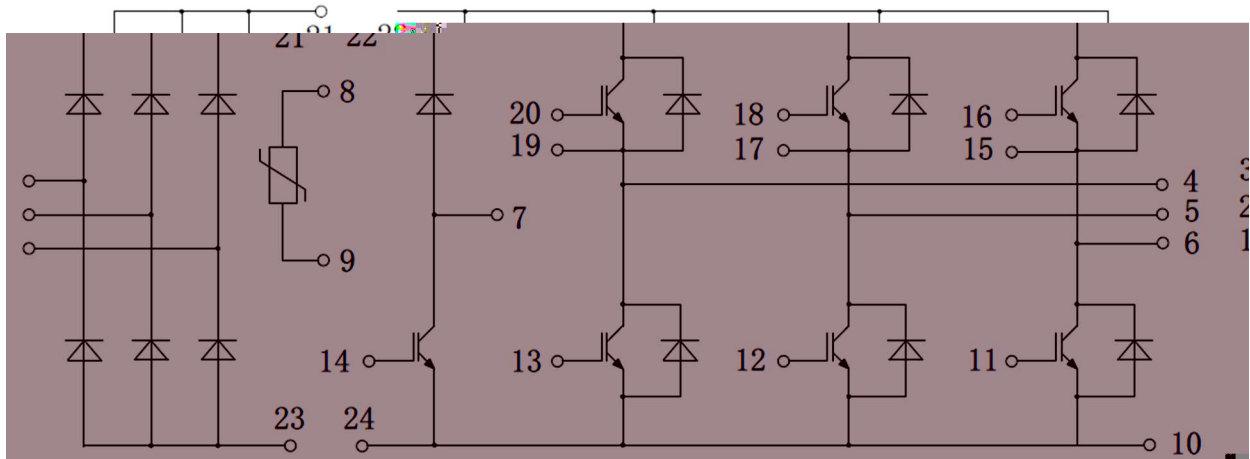








Circuit Diagram



Package Dimensions

