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IGBT Modules

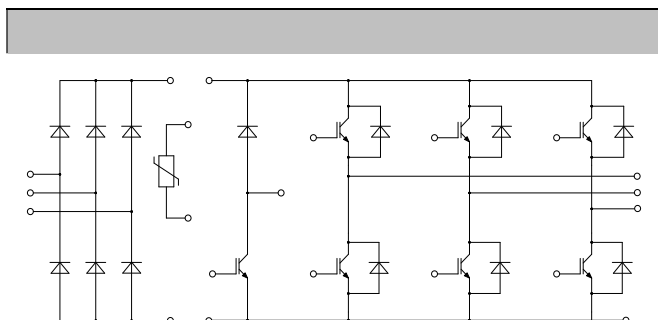
V_{CE(S)} **120V**
 I_C **15A**

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_{rec}	$T_j=25$		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_{rec}	$T_j=125$		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			00		nC	
Input Capacitance	C_{is}	$V_{CE}=25V, V_{GE}=0V$		13		nF	
Reverse Transfer Capacitance	C_{res}	$f=1MHz, T_j=25$		008		nF	
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_{of}		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
Rvalue	R_t	$V_G=0, t_p=10ns, T_J=125$	160	As
		$V_G=0, t_p=10ns, T_J=150$	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	$V_G=60V$ $-d_r/d=50A/\mu s$		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	$V_G=60V$ $-d_r/d=50A/\mu s$		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_{RM}	$T_J=25$	160	V
Average Output Current 50kHz, sine wave	$I_{(A)}$	$T_C=100$	20	A
Minimum RMS Current at Rectifier Output	I_{RMS}	$T_C=100$	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	$I_F=15A, T_J=150$		0.95		V
Reverse Current	I_R	$T_J=150, V_R=160V$			10	mA

NTC-Thermistor

Characteristic values

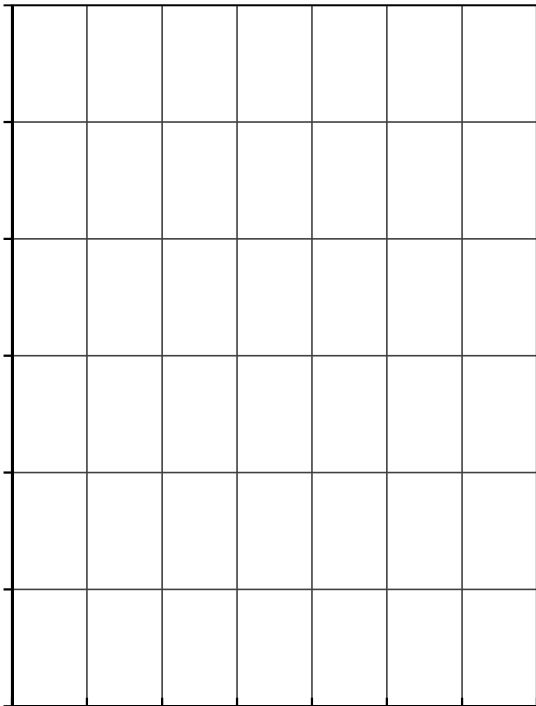
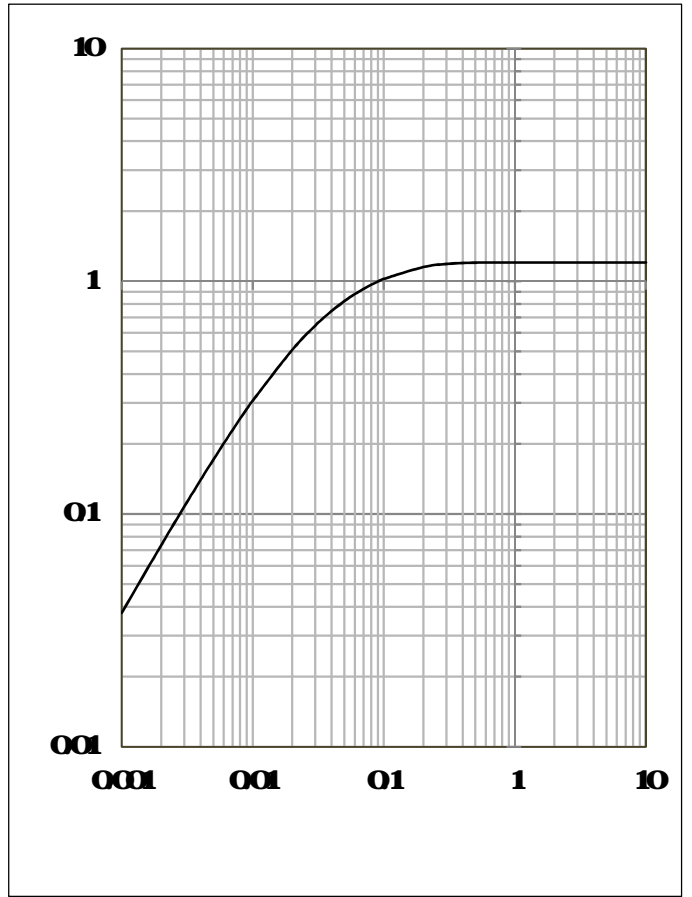
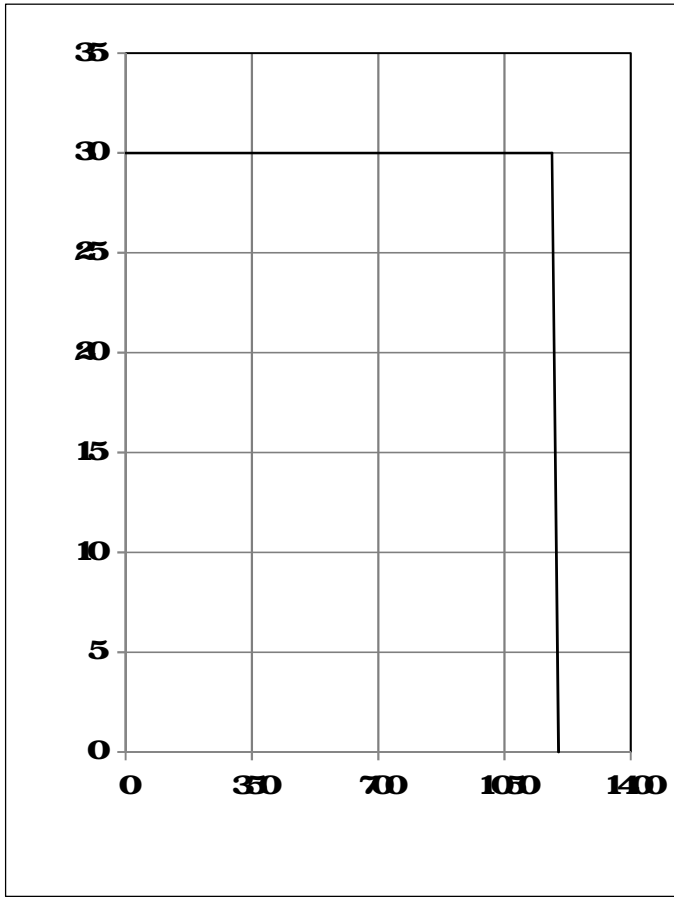
Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Rated Resistance	R_{25}			50		k
Deviation of R100	ΔR	$T_C=100, R_{100}=483$	-5		5	%
Power Dissipation	P_{25}				200	mW
B value	$B_{25/100}$	$R_2=R_{25} \exp[B_{25/100}(1/T_2 - 1/298.15K)]$		335		K

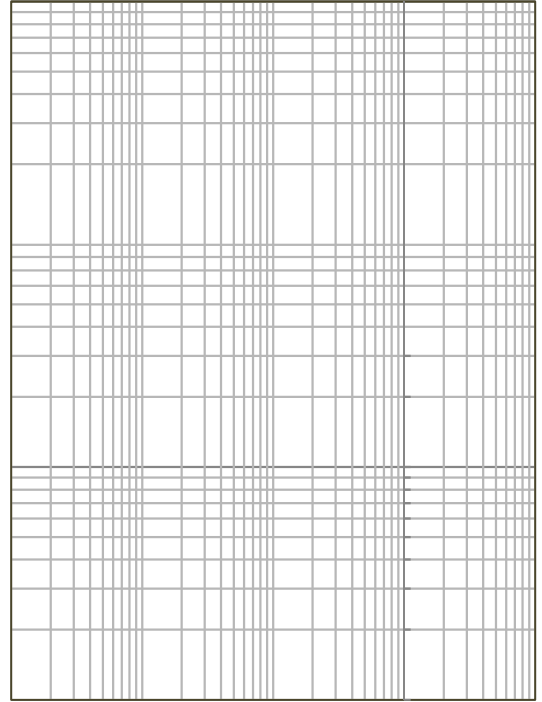
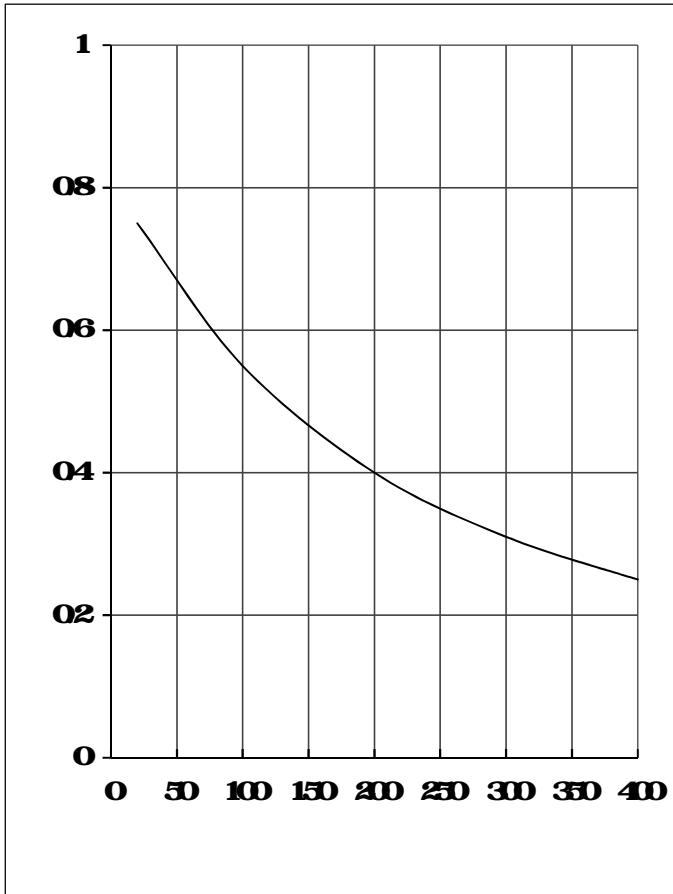


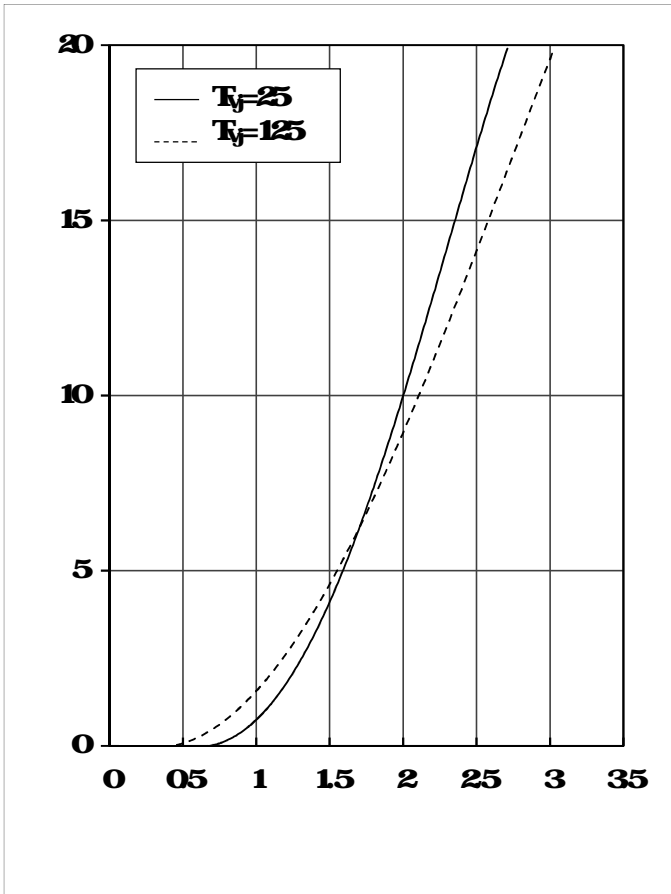
Module Characteristics

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 _{jqp}		-40		150	
Storage Temperature	T _{stg}		-40		125	
Staying inductive current	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 in meter			115	KW
		per Dole in meter			150	
		per GBF base copper			115	
		per Dole copper			230	
		per Dole redifier			113	
Thermal Resistance Case to Sink	R _{CS}	per GBF in meter		041		KW
		per Dole in meter		051		
		per GBF base 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

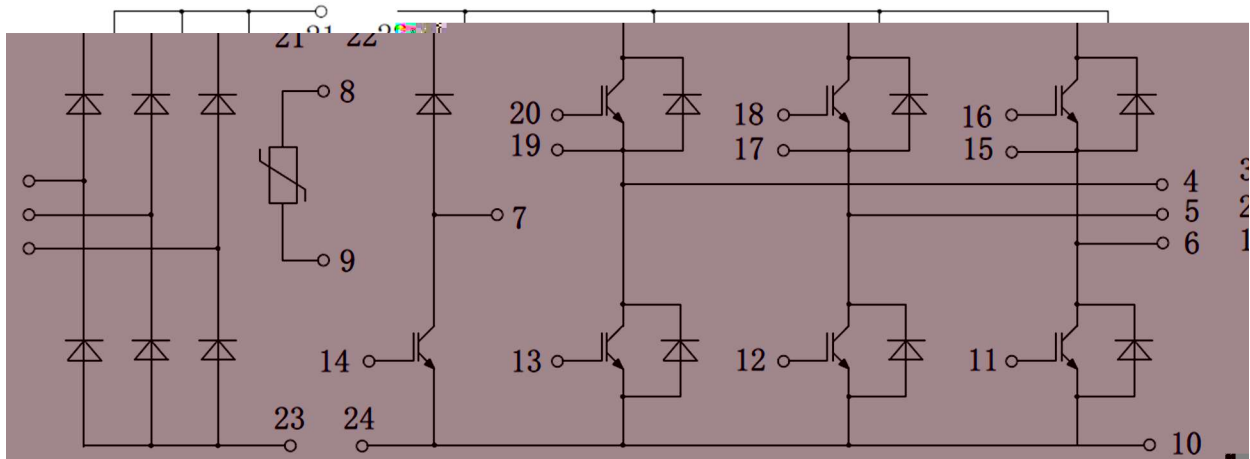








Circuit Diagram



Package Dimensions

