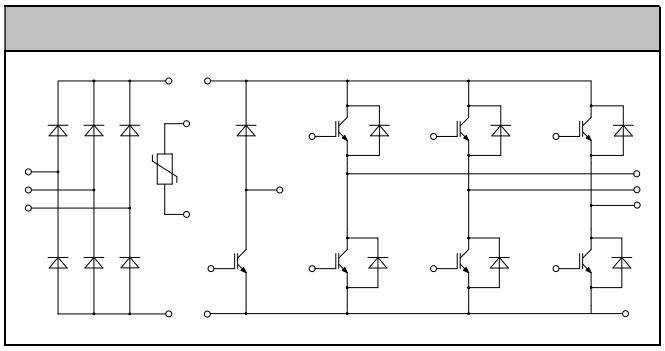
MG40P12E1

1200V
40A

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



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(10us)
Maximum junction temperature 175℃

Collector-Emitter Voltage	V_{CES}	V_{GE}=0V, I_C =1mA, T_{vj}=25	1200	V
Continuous Collector Current	I_C	T_c=100 $_{vjmax}$ 175	40	A
Repetitive Peak Collector Current	I_{CRM}	tp=1ms	80	A
Gate-Emitter Voltage	V_{GES}	T_{vj}=25	20	V
Total Power Dissipation	P_{tot}	T_c=25 T_{vjmax}=175	227	W

Gate-emitter Threshold Voltage	$V_{GE(th)}$	$V_{GE}=V_{CE}$, I_C =1.2mA,T_{vj}=25	5.2	6.0	6.8	V
Collector-Emitter Cut-off Current	I_{CES}	V_{CE}=1200V,V_{GE}=0V, T_{vj}=25℃			1.0	mA
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	Ic=40A,V_{GE}=15V, T_{vj}=25		1.90	2.30	V
		Ic=40A,V_{GE}=15V, T_{vj}=125		2.20		
		Ic=40A,V_{GE}=15V, T_{vj}=150		2.40		
Gate Charge	Q_G			0.35		uC
Input Capacitance	C_{ies}	V_{CE}=25V, V_{GE} =0V, f=1MHz, T_{vj}=25℃		2.25		nF
Reverse Transfer Capacitance	C_{res}			0.10		nF
Gate-Emitter leakage current	I_{GES}	V_{CE}=0 V, V_{GE}=20V,T_{vj} = 25			400	nA
Turn-on Delay Time	$t_{d(on)}$	I_C =40 A V_{CE} = 600 V V_{GE} = ±15V R_G = 13Ω T_{vj}=25		198		ns
Rise Time	t_r			24		ns
Turn-off Delay Time	$t_{d(off)}$			360		ns
Fall Time	t_f			72		ns
Energy Dissipation During Turn-on Time	E_{on}			4.25		mJ
Energy Dissipation During Turn-off Time	E_{off}			2.00		mJ
Turn-on Delay Time	$t_{d(on)}$	I_C =40 A V_{CE} = 600 V V_{GE} = ±15V R_G = 13Ω T_{vj}=125		210		ns
Rise Time	t_r			28		ns
Turn-off Delay Time	$t_{d(off)}$			470		ns
Fall Time	t_f			90		ns
Energy Dissipation During Turn-on Time	E_{on}			6.04		mJ
Energy Dissipation During Turn-off Time	E_{off}			3.05		mJ
SC Data	I_{sc}	T_p≤10us,V_{GE}=15V,T_{vj}=150 , V_{cc}=900V,V_{CEM}≤1200V		200		A

Repetitive Peak Reverse Voltage	V_{RRM}	T_{vj}=25	1200	V
Continuous DC Forward Current	I_F		40	A
Repetitive Peak Forward Current	I_{FRM}	t_p=1ms	80	A
I^2t-value	I^2t	V_R=0,t_p=10ms,T_{vj}=125	240	A^2s
		V_R=0,t_p=10ms,T_{vj}=150	220	

Forward Voltage	V_F	I_F=40A,T_{vj}=25		1.90	2.25	V
		I_F=40A,T_{vj}=125		1.90		
		I_F=40A,T_{vj}=150		1.85		
Recovered Charge	Q_{rr}	I_F =40 A V_R=600V -di$_F$/dt =1600A/us T_{vj}=25		4.15		uC
Peak Reverse Recovery Current	I_{rr}			42		A
Reverse Recovery Energy	E_{rec}			1.30		mJ
Recovered Charge	Q_{rr}	I_F =40 A V_R=600V -di$_F$/dt =1600A/us T_{vj}=125		8.00		uC
Peak Reverse Recovery Current	I_{rr}			46		A
Reverse Recovery Energy	E_{rec}			2.38		mJ

Collector-Emitter Voltage	V_{CES}	V_{GE}=0V, I_C =1mA, T_{vj}=25	1200	V
Continuous Collector Current	I_C	T_c=100 $_{vjmax}$ 175	25	A
Repetitive Peak Collector Current	I_{CRM}	tp=1ms	50	A
Gate-Emitter Voltage	V_{GES}	T_{vj}=25	20	V
Total Power Dissipation	P_{tot}	T_c=25 T_{vjmax}=175	166	W

Gate-emitter Threshold Voltage	$V_{GE(th)}$	V_{GE}=V_{CE}, I_C =1.2mA,T_{vj}=25	5.2	6.0	6.8	V
Collector-Emitter Cut-off Current	I_{CES}	V_{CE}=1200V,V_{GE}=0V, T_{vj}=25℃			1.0	mA
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	Ic=25A,V_{GE}=15V, T_{vj}=25		1.90	2.30	V
		Ic=25A,V_{GE}=15V, T_{vj}=125		2.20		
		Ic=25A,V_{GE}=15V, T_{vj}=150		2.30		
Gate Charge	Q_G			0.24		uC
Input Capacitance	C_{ies}	V_{CE}=25V, V_{GE} =0V, f=1MHz, T_{vj}=25℃		1.60		nF
Reverse Transfer Capacitance	C_{res}			0.07		nF
Gate-Emitter leakage current	I_{GES}	V_{CE}=0 V, V_{GE}=20 V,T_{vj} = 25			100	nA
Turn-on Delay Time	$t_{d(on)}$	I_C =25 A V_{CE} = 600 V V_{GE} = ±15V R_G = 18Ω T_{vj}=25		175		ns
Rise Time	t_r			38		ns
Turn-off Delay Time	$t_{d(off)}$			420		ns
Fall Time	t_f			65		ns
Energy Dissipation During Turn-on Time	E_{on}			1.95		mJ
Energy Dissipation During Turn-off Time	E_{off}			1.20		mJ

Turn-on Delay Time	$t_{d(on)}$		185	u

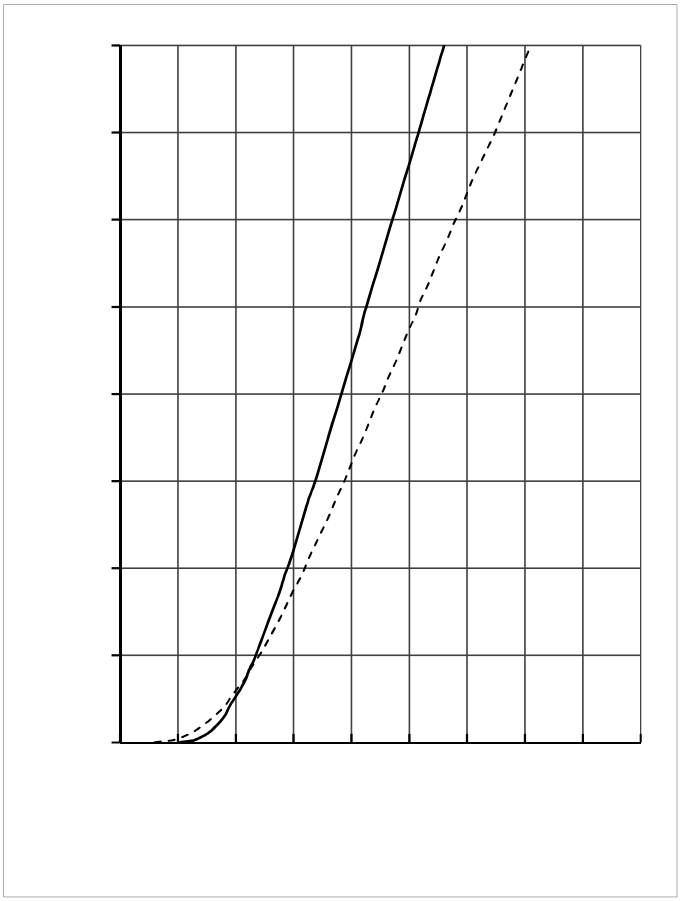
I_C =25 A
V_{CE} = 600 V
V_{GE} = ±15V
R_G = 18Ω
T_{vj}=125

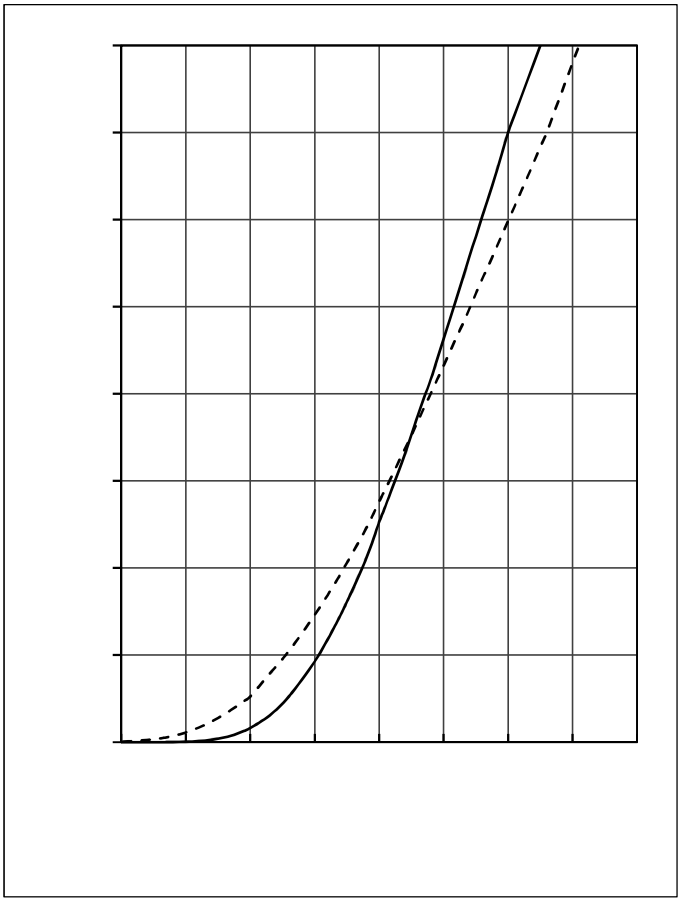
Repetitive Peak Reverse Voltage	V_{RRM}	T_j=25	1600	V
Average output Current 50/60Hz, sine wave	$I_{F(AV)}$	T_c=100	50	A
Maximum RMS Current at Rectifier Output	I_{RMSM}	T_c=100	60	A
Surge Forward Current	I_{FSM}	V_R=0,t_p=10ms,T_j=45	320	A
I^2t-value	I^2t	V_R=0,t_p=10ms,T_j=45	510	A^2s

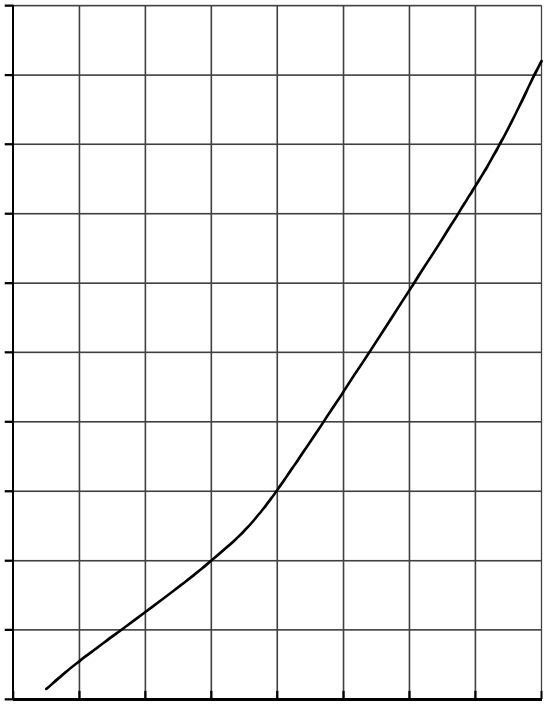
Diode Forward Voltage	V_F	I_F=40A,T_j=125		1.12		V
Reverse Current	I_R	T_j=125 ,V_R=1600V			2.0	mA

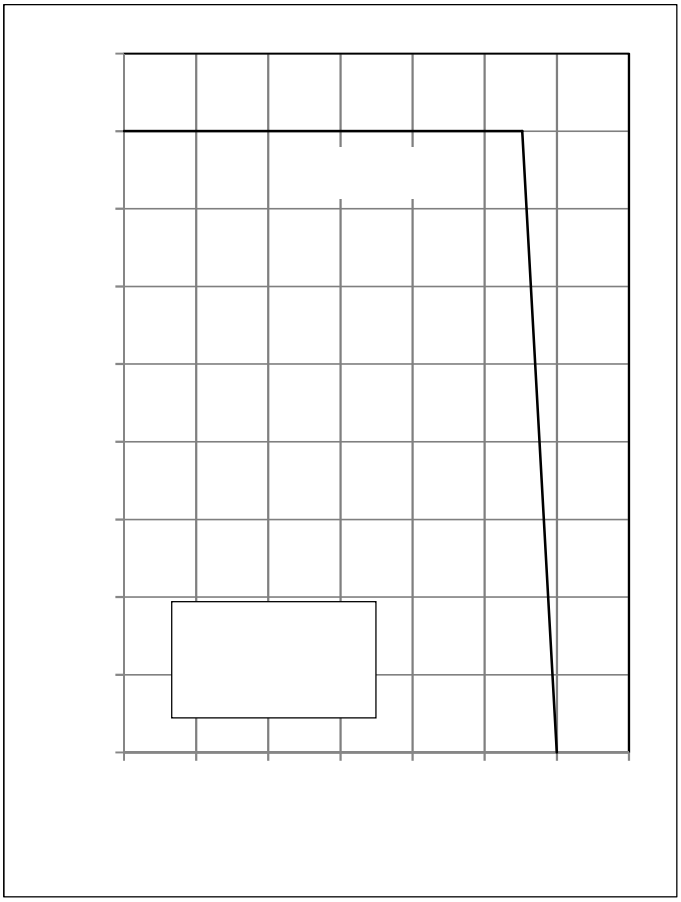
Rated Resistance	R_{25}			5.0		k
Deviation of R100	R/R	T_C=100,R_{100}=493.3	-5		5	%
Power Dissipation	P_{25}				20.0	mW
B-value	$B_{25/50}$	$R_2=R_{25}\exp[B_{25/50}(1/T_2-1/(298.15\ K))]$		3375		K

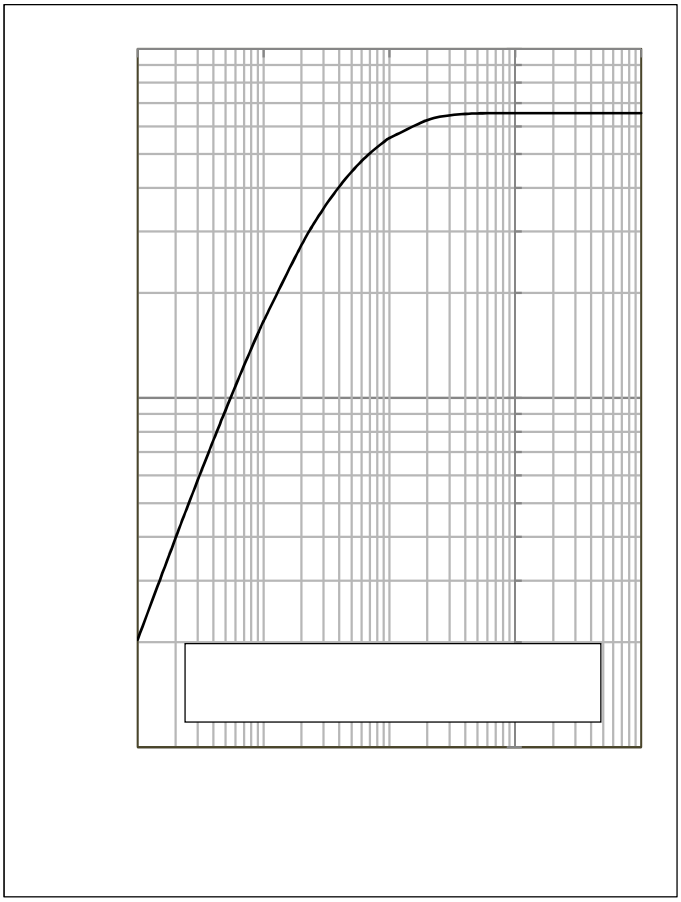
Isolation voltage	V_{isol}	t=1min,f=50Hz	2500			V
Maximum Junction Temperature □	T_{jmax}				175	
Operating Junction Temperature	$T_{vj\ op}$		-40		150	
Storage Temperature	T_{stg}		-40		125	
Stray-inductance-module	L_{SCE}			60		
Module lead resistance, terminals-chip	$R_{cc'+EE'}$	T_C=25 , per switch		4.0		
	$R_{AA'+CC'}$			3.0		
Thermal Resistance Junction-to Case	R_{JC}	per IGBT-inverter			0.66	K/W
		per Diode-inverter			1.00	
		per IGBT-brake-copper			0.90	
		per Diode-chopper			1.50	
		per Diode-rectifier			0.75	
Thermal Resistance Case-to Sink	R_{CS}	per IGBT-inverter		0.31		K/W
		per Diode-inverter		0.48		
		per IGBT-brake-copper		0.33		
		per Diode-chopper		0.70		
		per Diode-rectifier		0.36		
		per Module		0.02		
Mounting Force Per Clamp	F		3.0		6.0	N
Weight of Module	G			180		g

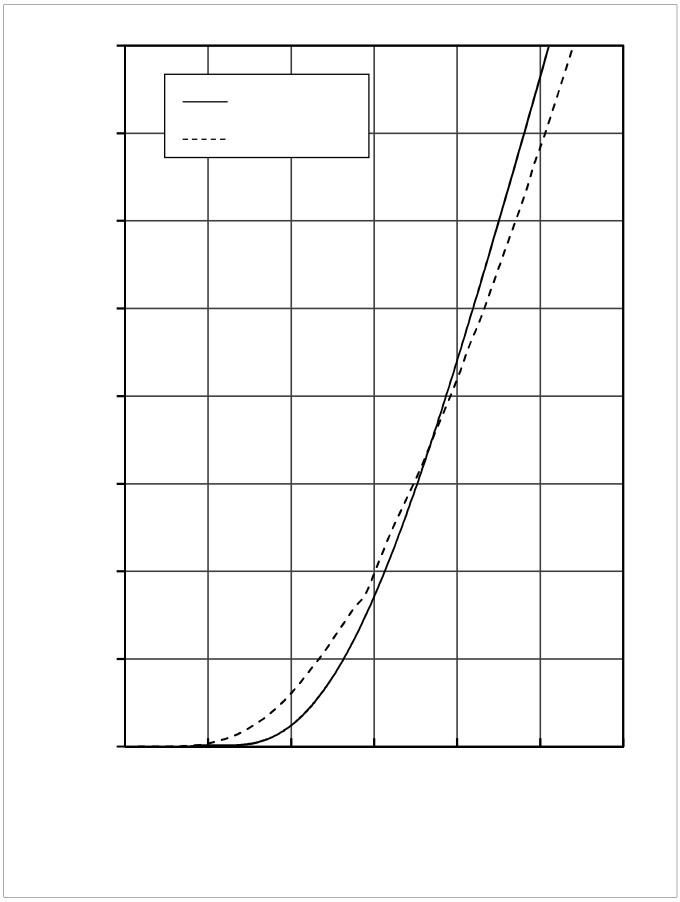


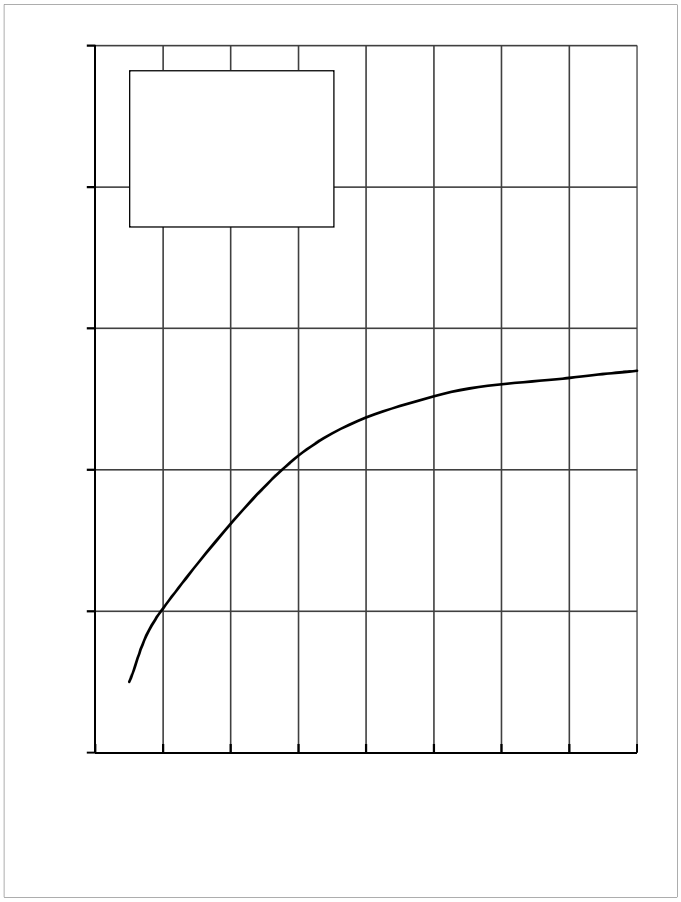


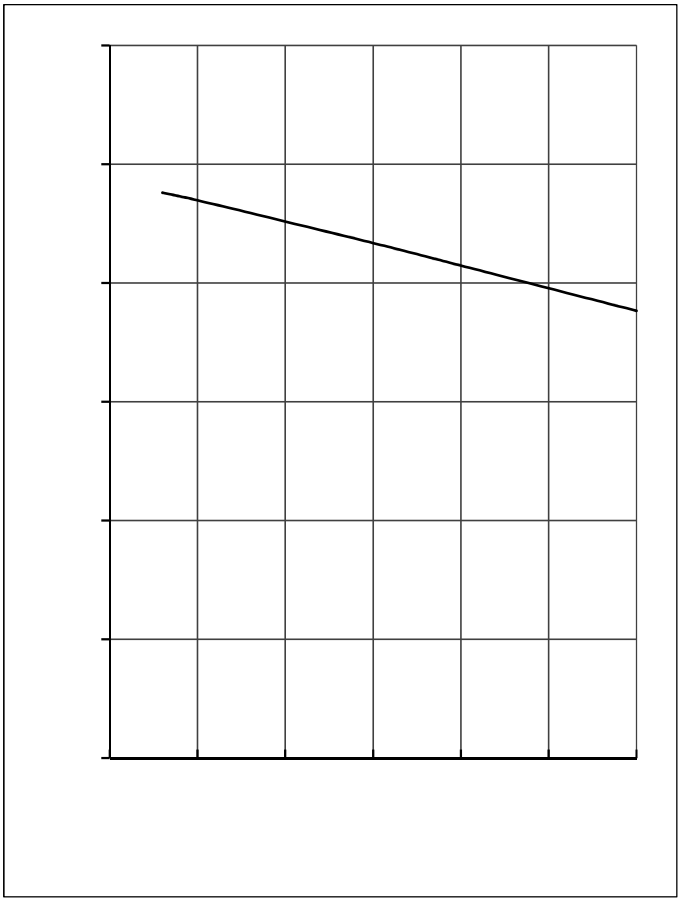


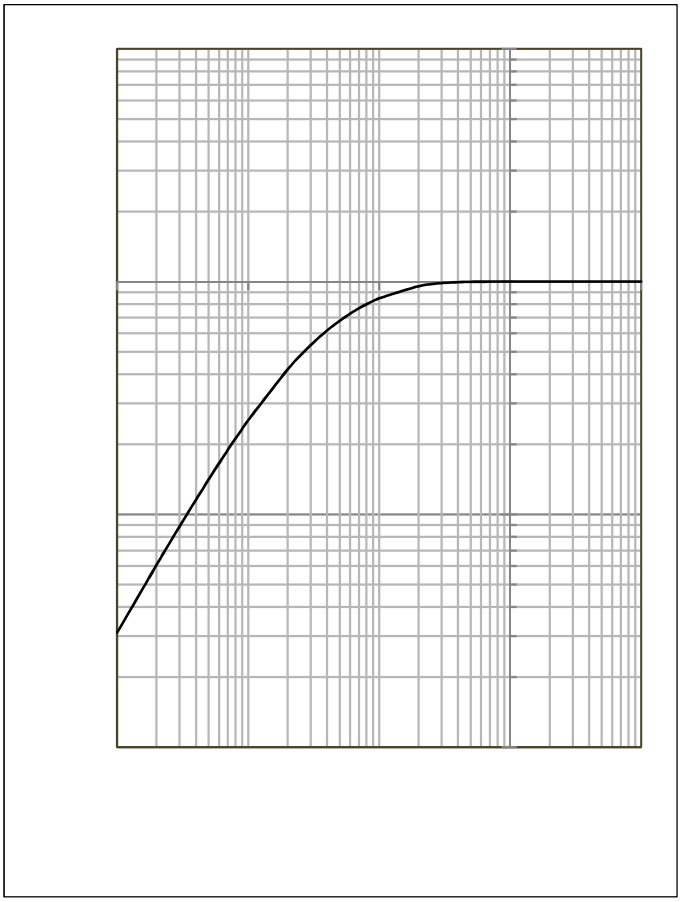


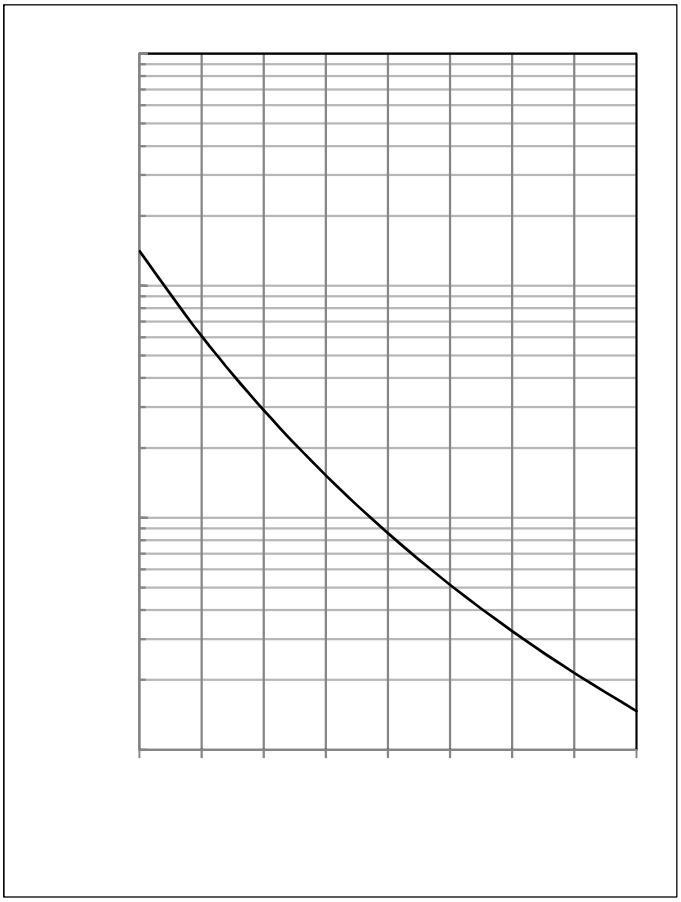


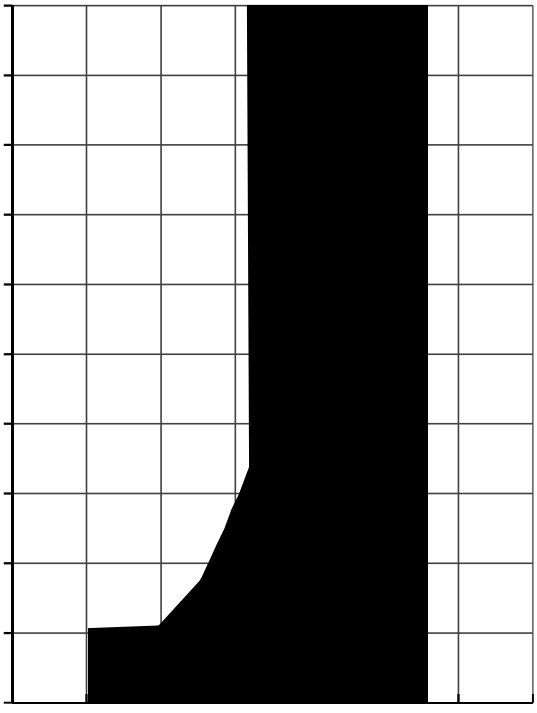


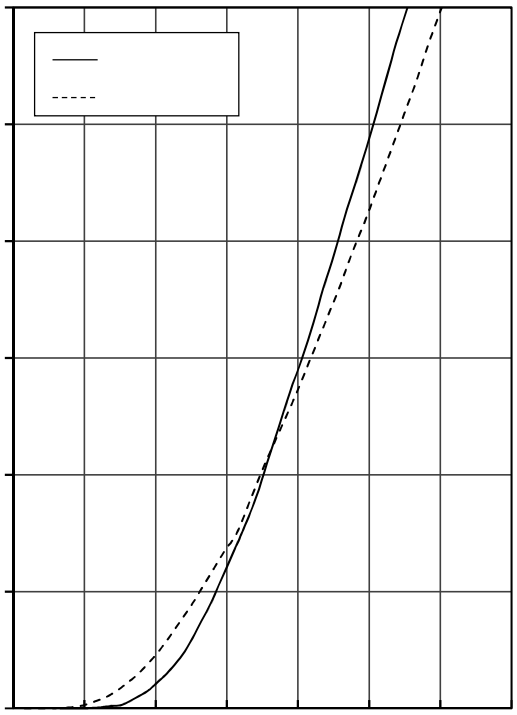


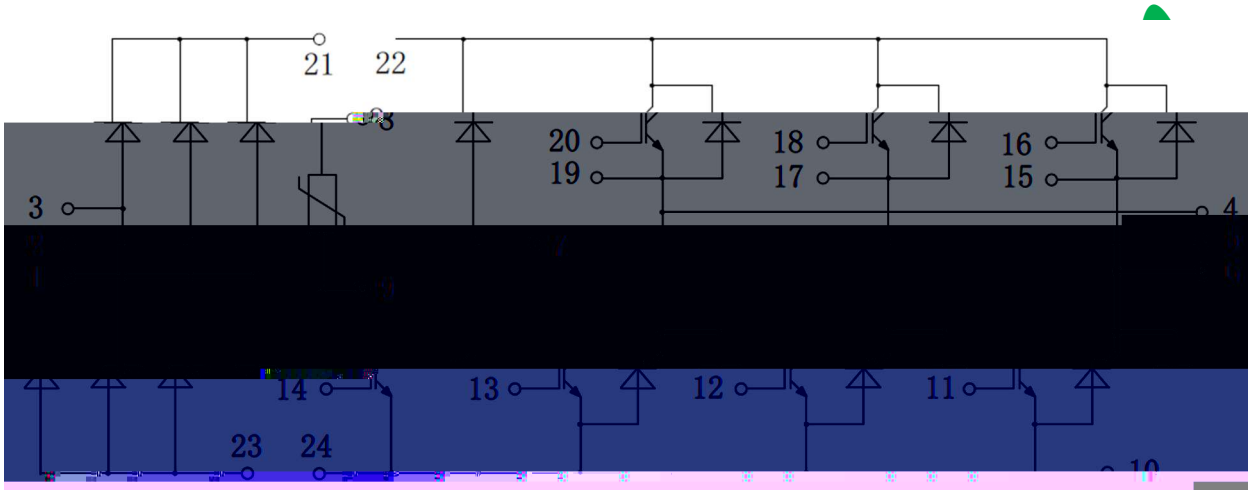












Dimensions in Millimeters