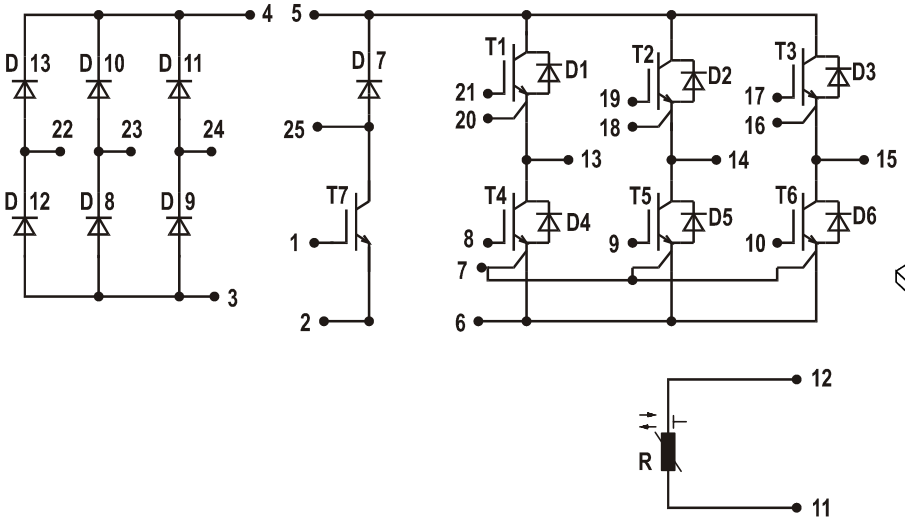
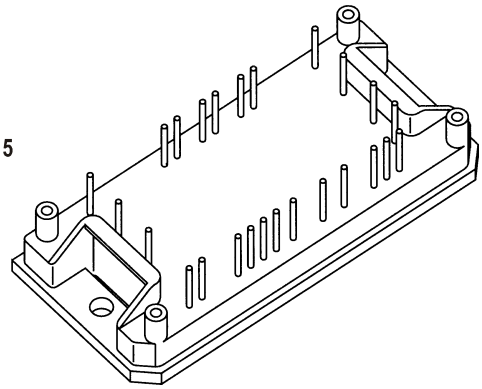
Converter - Brake - Inverter Module (CBI1)





Rectifier	Brake	Inverter
V_{RRM} = 1600V I_{FAVM} = 25 A I_{FSM} = 370 A	V_{CES} = 1200 V I_{C25} = 13 A $V_{CE(sat)}$ = 2.8 V	V_{CES} = 1200 V I_{C25} = 18 A $V_{CE(sat)}$ = 2.8 V

Input Rectifier Bridge D8 - D13

Symbol	Conditions	Maximum Ratings	
V_{RRM}		1600	V
I_F	T_{VJ} = 25°C	55	A
I_{FAVM}	T_{VJ} = 150°C; T_K = 70°C	25	A
I_{FSM}	T_{VJ} = 45°C; t = 10 ms sine 50 Hz	370	A
i^2t	T_{VJ} = 125°C	680	A^2s
T_{VJ}		+150	°C

Symbol	Conditions	Characteristic Values (T_{VJ} = 25°C, unless otherwise specified) min.	typ.	max.	
I_R	V_{RRM} = 1200 V; T_{VJ} = 25°C			20	µA
	T_{VJ} = 125°C			2	mA
V_F	I_F = 55 A		1.2	1.46	V
R_{thJC}	per die		1.05		°C/W

Features

- NPT IGBT technology
  Square RBSOA, no latchup
- Free wheeling diodes with Hiperfast and soft recovery behaviour
- Isolation voltage 2500 V~
- Built in temperature sense
- High level of integration:
  one module for complete drive system
- **D**irect **C**opper **B**onded Al_2O_3 ceramic base plate

Applications

- AC motor control
- AC servo and robot drives

Advantages

- No need of external isolation
- Easy to mount with two screws
- Package designed for wave soldering
- High temperature and power cycling capability

IXYS reserves the right to change limits, test conditions and dimensions.

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Output Inverter T1 - T6, D1 - D6

Symbol	Conditions	Maximum Ratings	
V_{CES}	T_{VJ} = 25°C	1200	V
V_{CGR}	T_{VJ} = 25°C; R_{GE} = 20kΩ	1200	V
V_{GE}	T_{VJ} = 25°C	±20	V
I_C	T_C = 25°C T_C = 90°C	18 11.5	A A
I_{CM}	t_p = 1 ms = 1% duty cycle; T_C = 25°C T_C = 90°C	36 23	A A
t_{SC}	V_{CE} = 600 V; T_{VJ} = 125°C non-repetitive	10	µs
P_{tot}	T_C = 25°C	70	W
T_{VJ} T_{VJ}	Free-Wheeling Diode IGBT	+150 +150	°C °C

Symbol	Conditions	Characteristic Values (T_{VJ} = 25°C, unless otherwise specified) min.	typ.	max.	
I_{CES}	V_{GE} = 0 V; V_{CE} = 1000 V			500	µA
I_{GES}	V_{CE} = 0 V; V_{GE} = 25 V			100	nA
$V_{GE(th)}$	V_{GE} = V_{CE}; I_C = 0.35 mA	4.5	5.5	6.5	V
$V_{(BR)CES}$	V_{GE} = 0 V; I_C = 10 mA; T_{VJ} = -40°C	1200			V
V_{CEsat}	V_{GE} = 15 V; I_C = 10 A; T_{VJ} = 25°C T_{VJ} = 150°C			2.9 3.4	V V
t_f	Inductive load, T_{VJ} = 125°C V_{CC} = 600 V; I_C = 8 A R_G = 100 Ω; V_{GE} = ±15 V		350		ns
t_r			40		ns
$t_{d(on)}$			80		ns
$t_{d(off)}$			420		ns
E_{off}			0.9		mJ
E_{on}			1.3		mJ
C_{iss}	V_{GE} = 0 V V_{CE} = 25 V f = 1 MHz		850		nF
C_{oss}			98		nF
C_{rss}			60		nF
g_{fs}	V_{CE} = 20 V; I_C = 1.5 A	1.7			S
Q_g	V_{CC} = 1000 V; I_C = 8 A pulse; V_{GE} = 15 V		58		nC
V_F	I_F = 4 A; V_{GE} = 0 V; T_{VJ} = 25°C T_{VJ} = 100°C		2.3 2	3	V V
t_{rr}	I_F = 4 A; V_{GE} = 0 V; T_{VJ} = 100°C V_R = -300 V; di_F/dt = -800 A/µs		55		ns
Q_r	I_F = 4 A; V_{GE} = 0 V; V_R = -300 V di_F/dt = -800 A/µs		0.8		µC
I_r				250	µA
R_{thJC}	IGBT (per die) Diode (per die)		1.5 2.25		°C/W °C/W

Brake Chopper T7, D7

Symbol	Conditions	Maximum Ratings	
V_{CES}	T_{VJ} = 25°C	1200	V
V_{CGR}	T_{VJ} = 25°C; R_{GE} = 20kΩ	1200	V
V_{GE}	T_{VJ} = 25°C	±20	V
I_C	T_C = 25°C T_C = 90°C	13 8	A A
I_{CM}	t_p = 1 ms = 1% duty cycle; T_C = 25°C T_C = 90°C	26 16	A A
t_{SC}	V_{CE} = 600 V; T_{VJ} = 125°C non-repetitive	10	µs
P_{tot}	T_C = 25°C	67	W
T_{VJ} T_{VJ}	Free-Wheeling Diode IGBT	+150 +150	°C °C

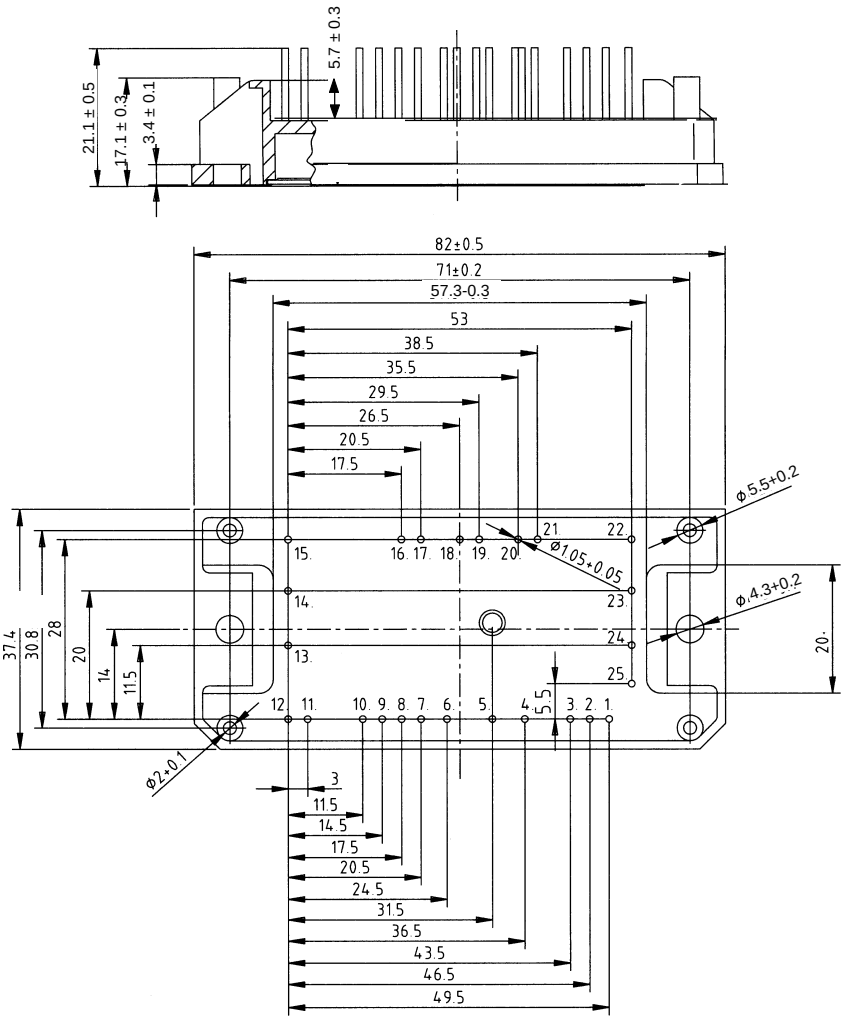
Symbol	Conditions	Characteristic Values (T_{VJ} = 25°C, unless otherwise specified) min.	typ.	max.	
I_{CES}	V_{GE} = 0 V; V_{CE} = 1000 V		1	100	µA
I_{GES}	V_{CE} = 0 V; V_{GE} = 25 V		0.1	100	nA
$V_{GE(th)}$	V_{GE} = V_{CE}; I_C = 0.3 mA	4.5	5.5	6.5	V
$V_{(BR)CES}$	V_{GE} = 0 V; I_C = 10 mA; T_{VJ} = -40°C	1200			V
V_{CEsat}	V_{GE} = 15 V; I_C = 5 A; T_{VJ} = 25°C T_{VJ} = 150°C		2.8 4	3.3 4.5	V V
t_f	Inductive load, T_{VJ} = 125°C V_{CC} = 600 V; I_C = 5 A R_G = 100 Ω; V_{GE} = ±15 V		200		ns
t_r			55		ns
$t_{d(on)}$			65		ns
$t_{d(off)}$			320		ns
E_{off}			0.4		mJ
E_{on}			0.8		mJ
C_{iss}	V_{GE} = 0 V V_{CE} = 25 V f = 1 MHz		650		pF
C_{oss}			50		pF
C_{rss}			20		pF
g_{fs}	V_{CE} = 20 V; I_C = 1.5 A	1.7	2.5		S
Q_g	V_{CC} = 800 V; I_C = 6 A pulse; V_{GE} = 15 V		48		nC
V_F	I_F = 4 A; V_{GE} = 0 V; T_{VJ} = 25°C T_{VJ} = 100°C		2.3 2	3	V V
t_{rr}	I_F = 4 A; V_{GE} = 0 V; T_{VJ} = 100°C V_R = -300 V; di_F/dt = -800 A/µs		55		ns
Q_{rr}	I_F = 4 A; V_R = -300 V; V_{GE} = 0 V di_F/dt = -800 A/µs		0.8		µC
I_r				250	µA
R_{thJC}	IGBT (per die) Diode (per die)		1.55 2.25		°C/W °C/W

Module			
Symbol	**Conditions**	**Maximum Ratings**	
T_{stg}		-40...+125	°C
V_{ISOL}	$I_{ISOL} \leq 1$ mA; 50/60 Hz; t = 1 min	2500	V~
M_d	Mounting torque (M4)	2.0 - 2.2 18 - 20	Nm lb.in.
d_S d_A	Creepage distance on surface Strike distance in air	12.7 12.7	mm mm
Weight	typ.	42	g

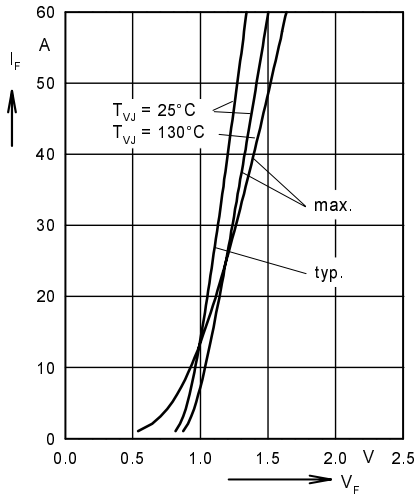
Temperature Sensor R			
Symbol	**Conditions**	**Maximum Ratings**	
R	T_{amb} = 20°C	4.7	kΩ

For additional data see C620/4.7k 5% S+M NTC thermistor catalog

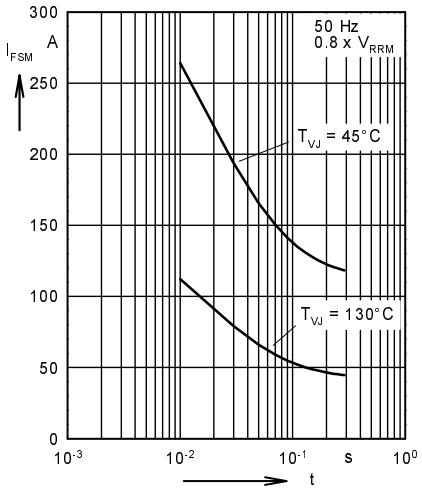
Dimensions in mm (1 mm = 0.0394")



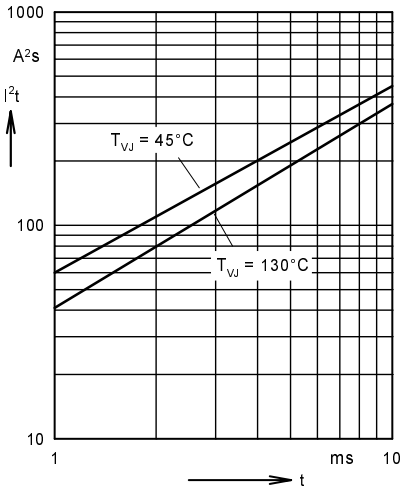
Input Rectifier Bridge D8 - D13



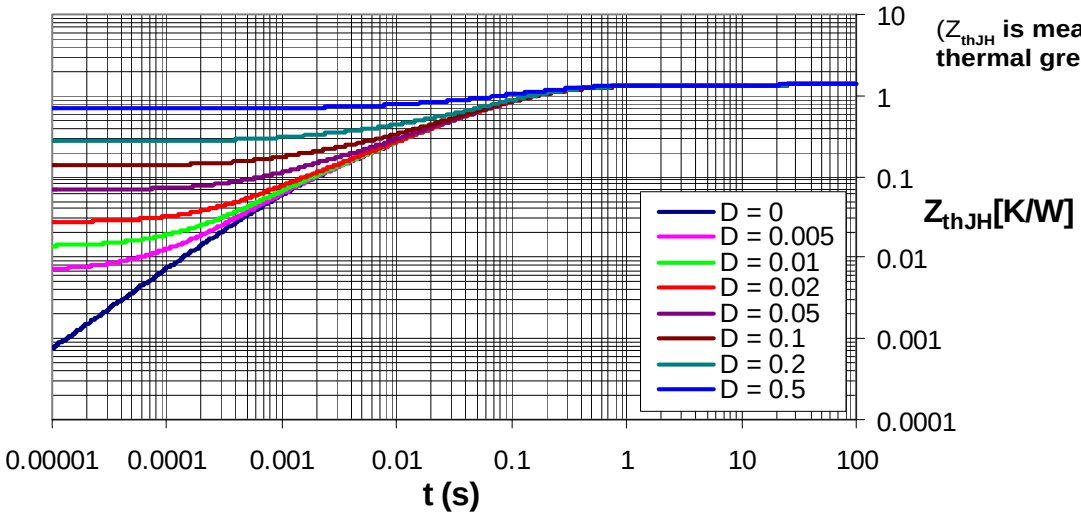
Forward characteristics



Surge overload current
I_{FSM}: crest value, t: duration



I^2t versus time (1-10 ms)

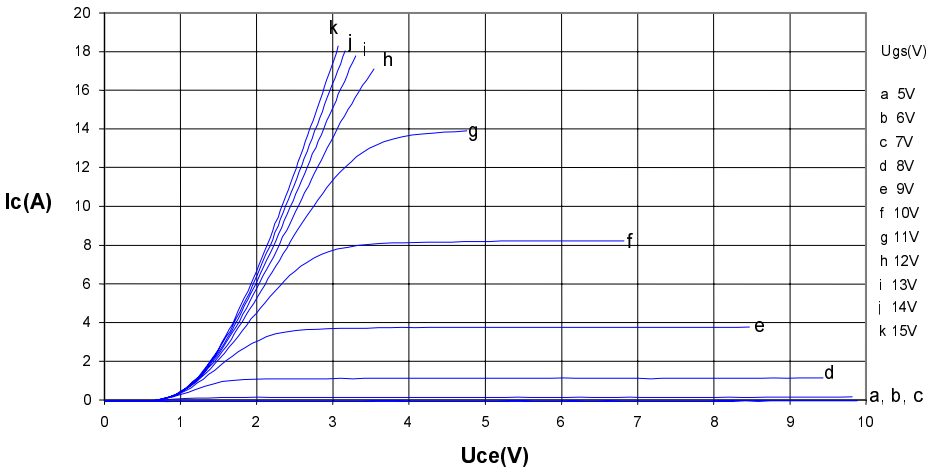


(Z_{thJH} is measured using 50 µm thermal grease)

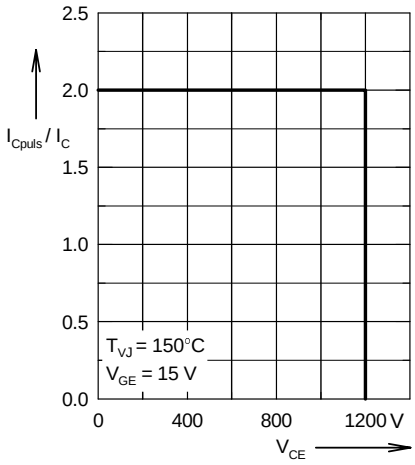
Transient thermal resistance junction to heatsink

Output Inverter T1 - T6

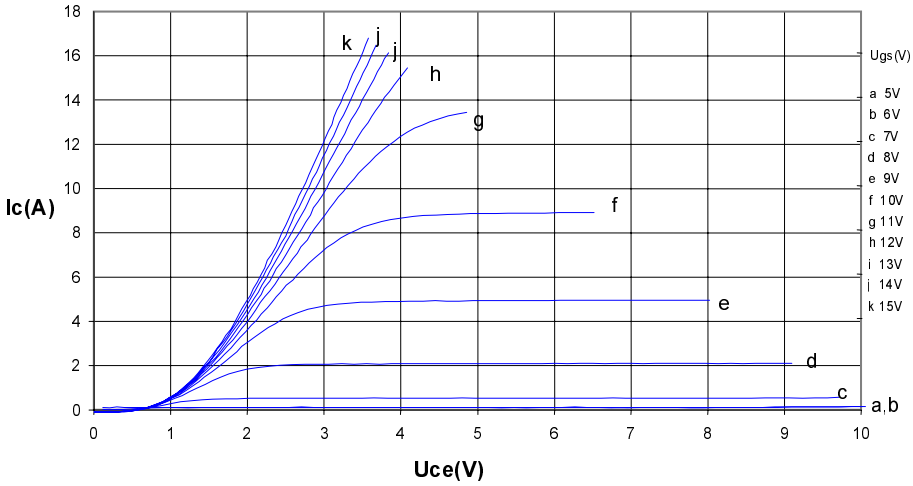
Typ. output characteristics 25°C



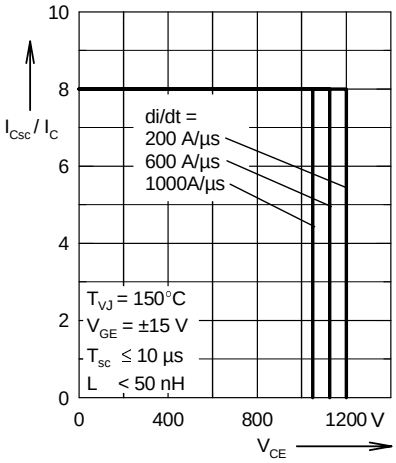
Reverse biased safe operating area



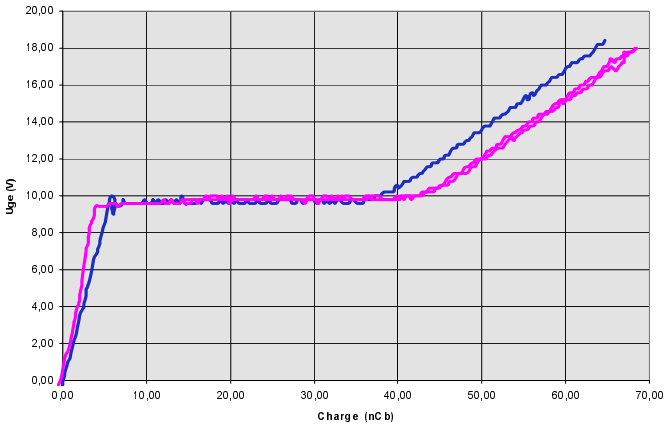
Typ. output characteristics 125°C



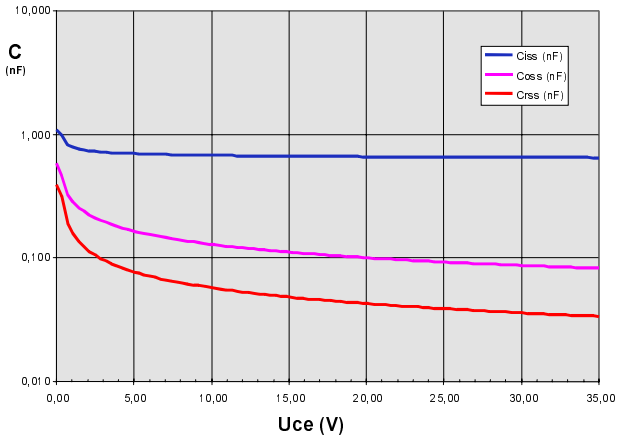
Short circuit safe operating area



Typ. gate charge

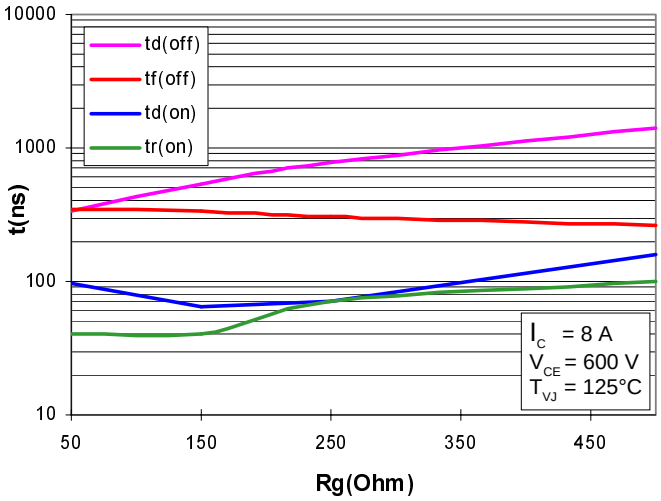


Typ. capacitances

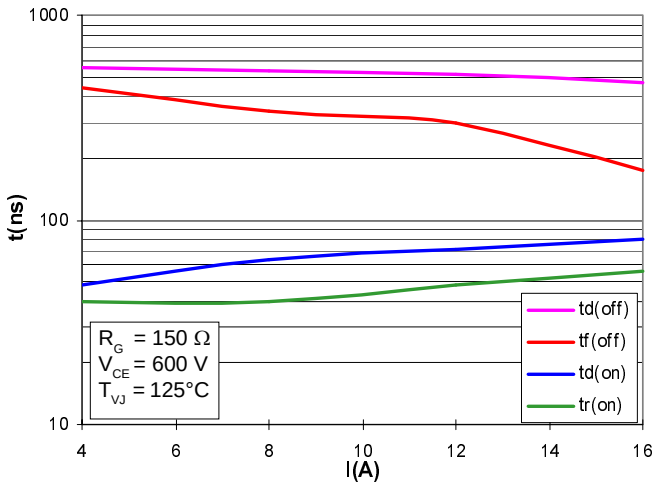


Output Inverter T1 - T6

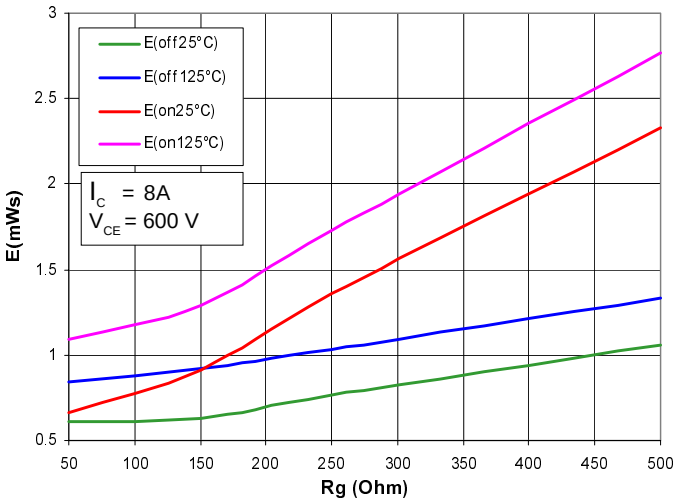
Typ. switching time



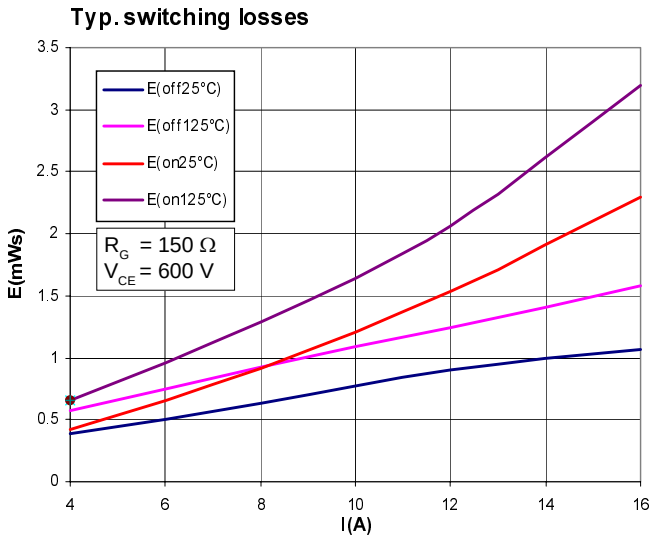
Typ.switching time



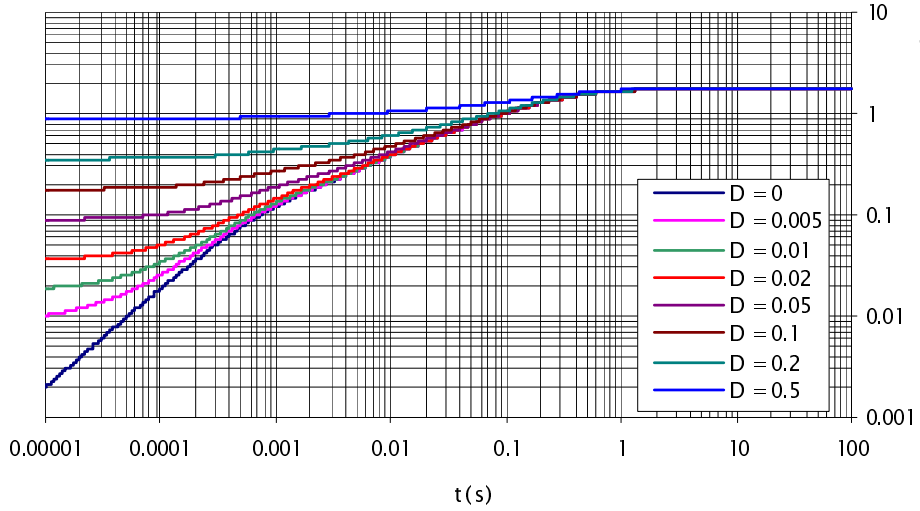
Typ. switching losses



Typ. switching losses



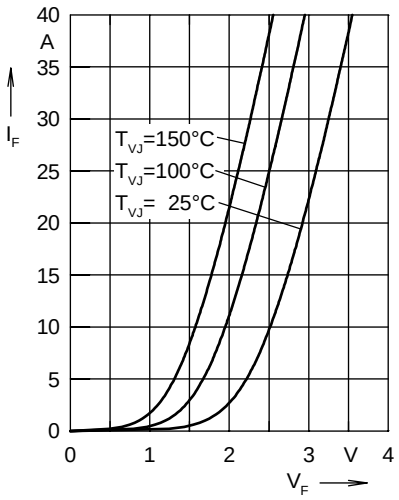
Transient thermal resistance junction to heatsink



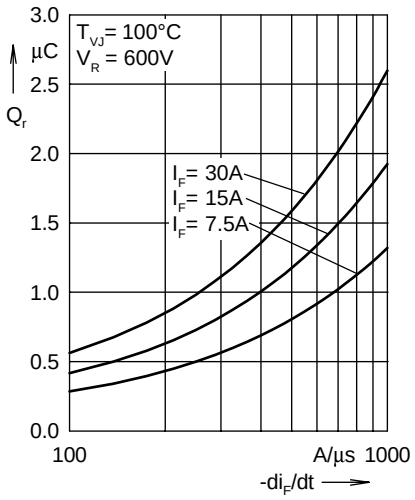
(Z_{thJH} **is measured using 50 µm thermal grease)**

IGBT
ZthJH [K/W]

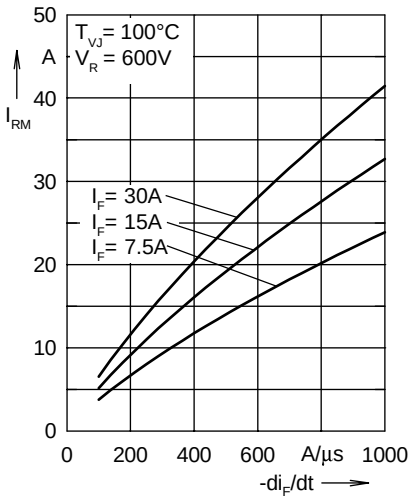
Output Inverter D1 - D6



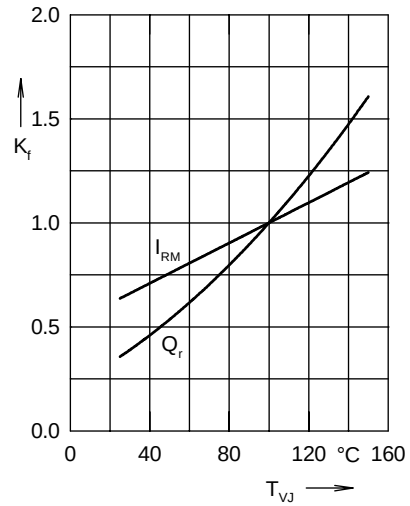
Forward current I_F versus V_F



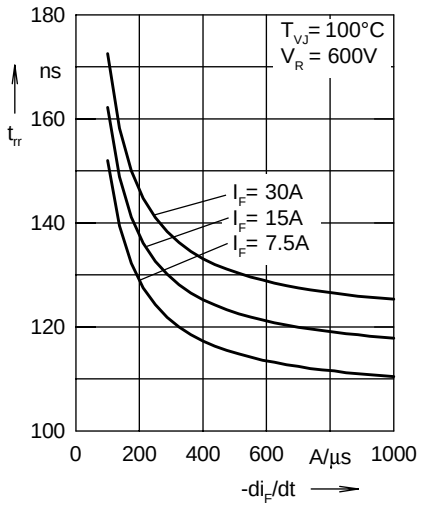
Reverse recovery charge Q_r versus $-di_F/dt$



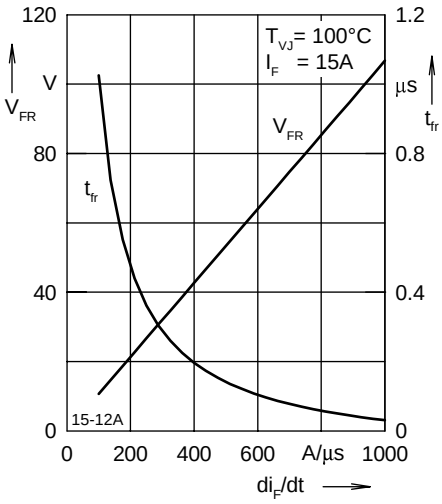
Peak reverse current I_{RM} versus $-di_F/dt$



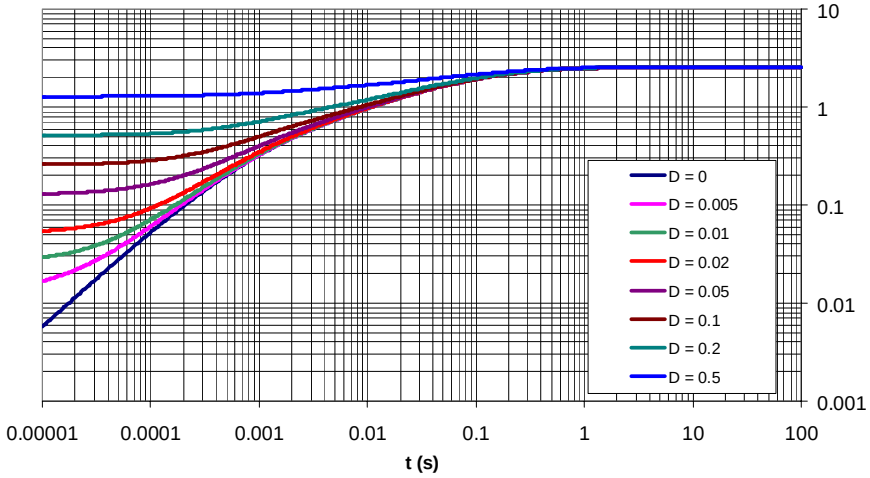
Dynamic parameters Q_r, I_{RM} versus T_{VJ}



Recovery time t_{rr} versus $-di_F/dt$



Peak forward voltage V_{FR} and t_{fr} versus di_F/dt



Transient thermal resistance junction to heatsink

(Z_{thJH} is measured using 50 µm thermal grease)

FRED

Z_{thJH}[K/W]