2.70 Pdm 4.4

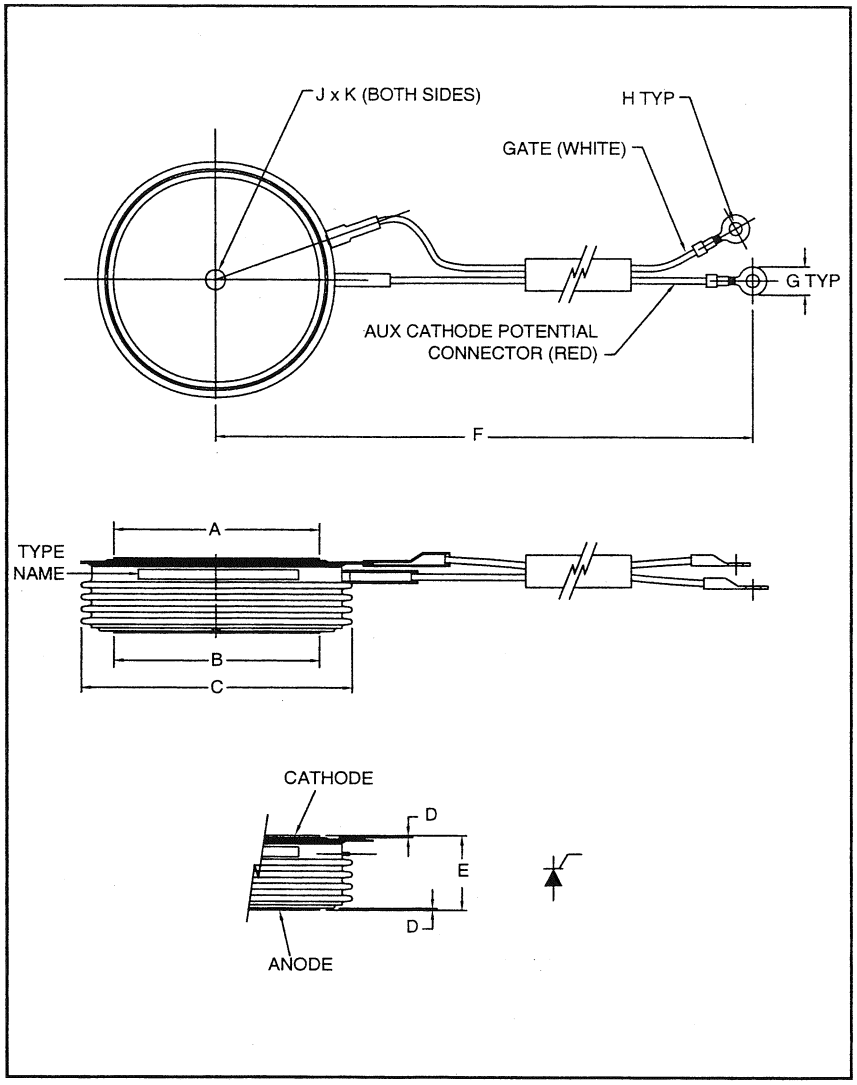
Powerex, Inc., 200 Hillis Street, Youngwood, Pennsylvania 15697-1800 (724) 925-7272

Mitsubishi Thyristor

FT1500AU-240

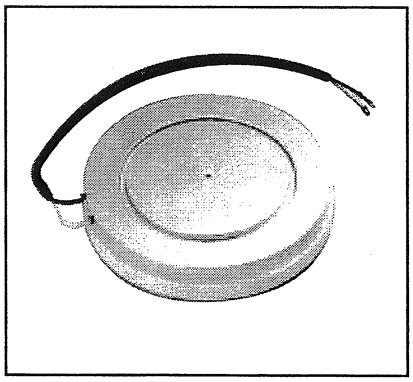
Ultra High Voltage Thyristor

1500 Amperes/12000 Volts



Outline Drawing and Circuit Diagram

Dimensions	Inches	Millimeters
A	4.13 Dia.	105.0 Dia.
B	4.13 Dia.	105.0 Dia.
C	6.5 Dia.	165.0 Dia.
D	0.2	0.40
E	1.38±0.02	35.0±0.5
F	17.99±0.39	457.0±10
G	0.30	7.5
H	0.17 Dia.	4.3 Dia.
J	0.14 Dia.	3.6±0.1 Dia.
K	0.09 Deep	2.2±0.1 Deep



Description:
Powerex Ultra High Voltage Thyristors are used in high voltage AC Switch and Static Var Compensator (SVC) applications.

Features:
- ☐ Average On-state Current ($I_{T(AV)}$ = 1500A)
- ☐ Repetitive Peak Off-state Voltage (V_{DRM} = 12000V)
- ☐ Low On-state Voltage
- ☐ Press Pack Type

Applications:
- ☐ High Voltage AC Switch
- ☐ Static Var Compensator (SVC)

Ordering Information:
Example: Select the complete part module number you desire from the table below.

Device	Current Rating Amperes	Manu. Number	Type	Voltage Rating (x 50)
FT*	1500	A	U**	240

* Press Pack Thyristor
**Ultra High Voltage

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FT1500AU-240
Ultra High Voltage Thyristor
1500 Amperes/12000 Volts

Absolute Maximum Ratings, T_j = 25 °C unless otherwise specified

Ratings	Symbol	FT1500AU-240	Units
Repetitive Peak Reverse Voltage	V_{RRM}	12000	Volts
Non-Repetitive Peak Reverse Voltage	V_{RSM}	12000	Volts
DC Reverse Voltage	$V_{R(DC)}$	9600	Volts
Repetitive Peak Off-state Voltage	V_{DRM}	12000	Volts
Non-Repetitive Peak Off-state Voltage	V_{DSM}	12000	Volts
RMS On-state Current	$I_{T(RMS)}$	2360	Amperes
Average On-state Current, f = 60Hz, Sine Wave θ = 180°C, T_f = 88°C	$I_{T(AV)}$	1500	Amperes
Surge (Non-repetitive) On-state Current, One Half Cycle at 60Hz	I_{TSM}	34	kA
Current-squared, Time Integration, One Cycle at 60Hz	I^2t	4.8×10^6	A^2s
Critical Rate of Rise of On-state Current, V_D = 1/2 V_{DRM}, I_G = 2.0A, T_j = 125°C	di_T/dt	100	A/µs
Peak Forward Gate Power Dissipation	P_{FGM}	30	Watts
Average Forward Gate Power Dissipation	$P_{FG(AV)}$	8.0	Watts
Peak Forward Gate Voltage	V_{FGM}	20	Volts
Peak Reverse Gate Voltage	V_{RGM}	10	Volts
Peak Forward Gate Current	I_{FGM}	6.0	Amperes
Junction Temperature	T_j	-40 to 125	°C
Storage Temperature	T_{stg}	-40 to 150	°C
Mounting Force Required, Recommended Value 118	–	108 ~ 132	kN
Weight, Standard Value	–	4000	Grams
DC Off-state Voltage	$V_{D(DC)}$	9600	Volts

Electrical Characteristics, T_j = 25 °C unless otherwise specified

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Repetitive Peak Reverse Current	I_{RRM}	T_j = 125°C, V_{RRM} Applied	–	–	1200	mA
Repetitive Peak Off-state Current	I_{DRM}	T_j = 125°C, V_{DRM} Applied	–	–	1200	mA
On-state Voltage	V_{TM}	T_j = 125°C, I_{TM} = 3000A, Instantaneous Measurement	–	–	4.0	Volts
Critical Rate of Rise of Off-state Voltage	dv/dt	T_j = 125°C, V_D = 1/2 V_{DRM}	2000	–	–	V/µs
Gate Trigger Voltage	V_{GT}	T_j = 25°C, V_D = 6V, R_L = 2Ω	–	–	2.5	Volts
Gate Non-trigger Voltage	V_{GD}	T_j = 125°C, V_D = 1/2 V_{DRM}	0.2	–	–	Volts
Gate Trigger Current	I_{GT}	T_j = 25°C, V_D = 6V, R_L = 2Ω	–	–	350	mA

Thermal and Mechanical Characteristics, T_j = 25 °C unless otherwise specified

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Thermal Resistance, Junction to Fin	$R_{th(j-f)}$	–	–	–	0.005	°C/W

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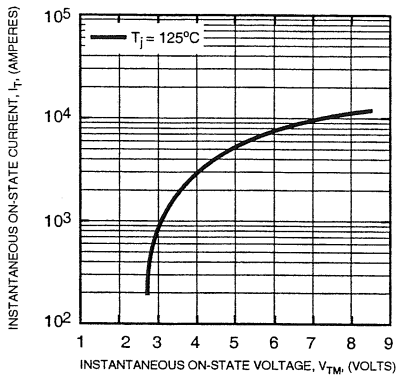
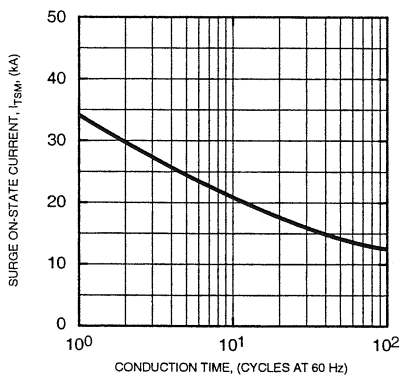
FT1500AU-240
Ultra High Voltage Thyristor
1500 Amperes/12000 Volts

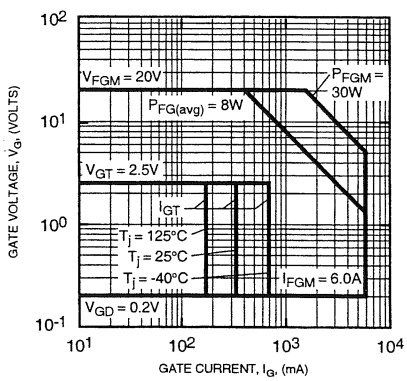
MAXIMUM ON-STATE CHARACTERISTICS



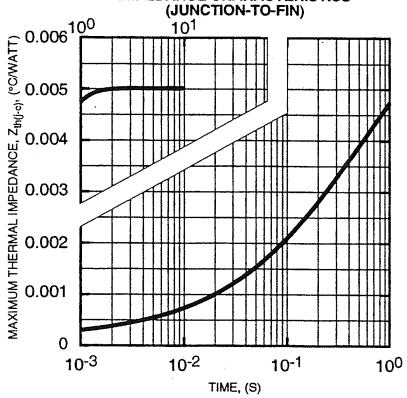
RATED SURGE ON-STATE CURRENT



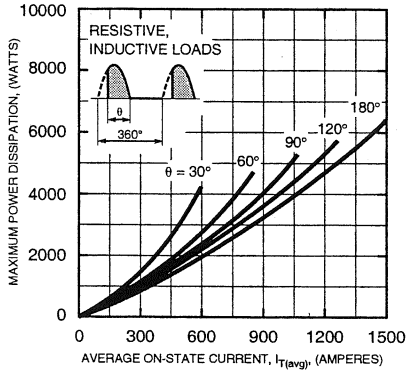
GATE CHARACTERISTICS



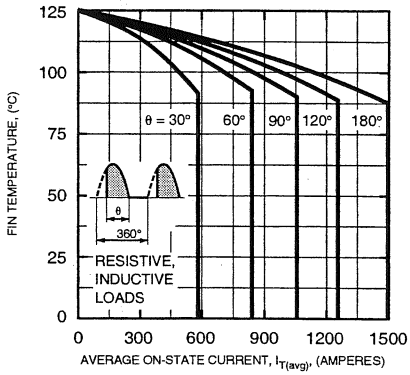
MAXIMUM THERMAL IMPEDANCE CHARACTERISTICS (JUNCTION-TO-FIN)



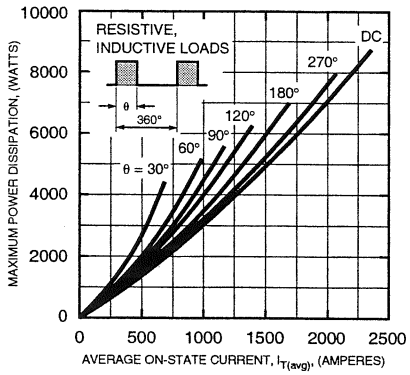
MAXIMUM ON-STATE POWER DISSIPATION (SINGLE-PHASE HALF WAVEFORM)



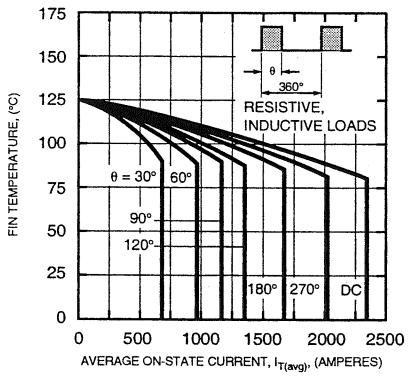
ALLOWABLE FIN TEMPERATURE VS. AVERAGE ON-STATE CURRENT (SINGLE-PHASE HALF WAVEFORM)



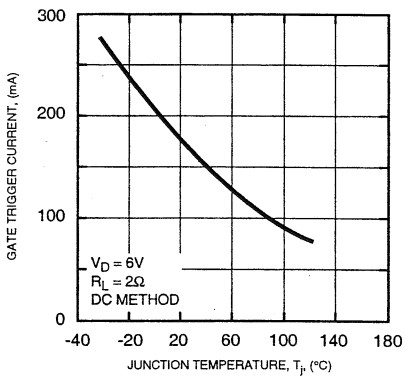
MAXIMUM ON-STATE POWER DISSIPATION (RECTANGULAR WAVE)



ALLOWABLE FIN TEMPERATURE VS. AVERAGE ON-STATE CURRENT (RECTANGULAR WAVE)



GATE TRIGGER CURRENT VS. JUNCTION TEMPERATURE (TYPICAL)



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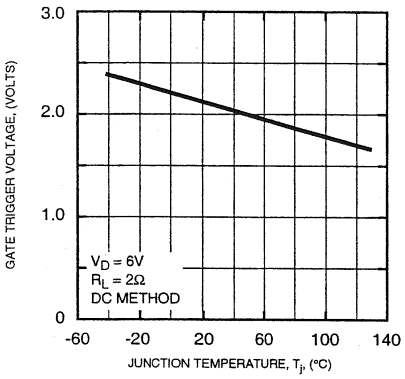
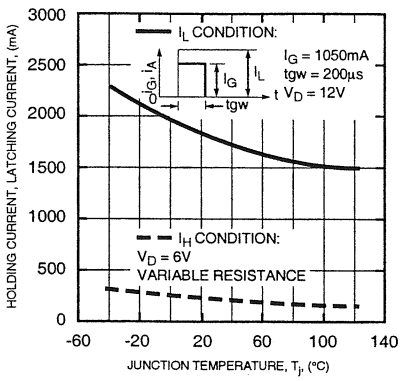
FT1500AU-240
Ultra High Voltage Thyristor
1500 Amperes/12000 Volts

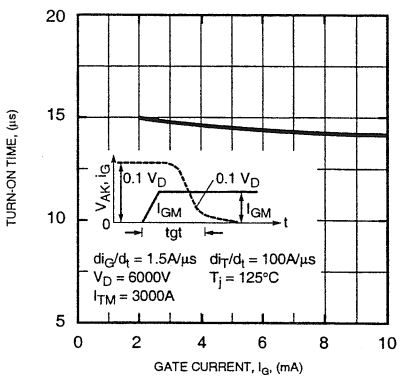
GATE TRIGGER VOLTAGE VS. JUNCTION TEMPERATURE (TYPICAL)



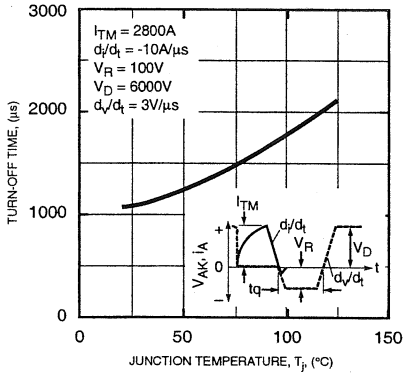
HOLDING CURRENT, LATCHING CURRENT VS. JUNCTION TEMPERATURE (TYPICAL)



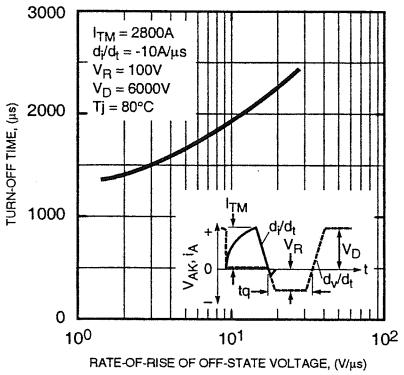
TURN-ON TIME VS. GATE CURRENT (TYPICAL)



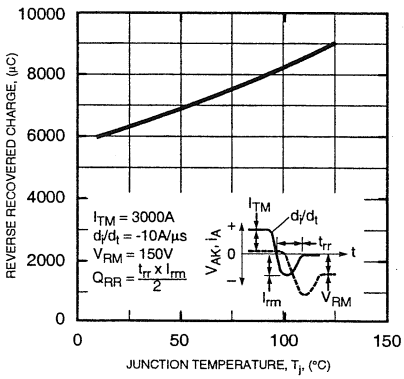
TURN-OFF TIME VS. JUNCTION TEMPERATURE (TYPICAL)



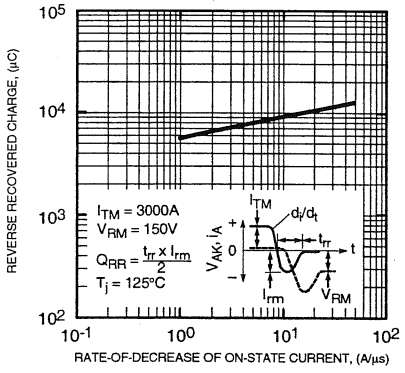
TURN-OFF TIME VS. RATE-OF-RISE OF OFF-STATE VOLTAGE (TYPICAL)



REVERSE RECOVERED CHARGE VS. JUNCTION TEMPERATURE (TYPICAL)



REVERSE RECOVERED CHARGE VS. RATE-OF-DECREASE OF ON-STATE CURRENT (TYPICAL)



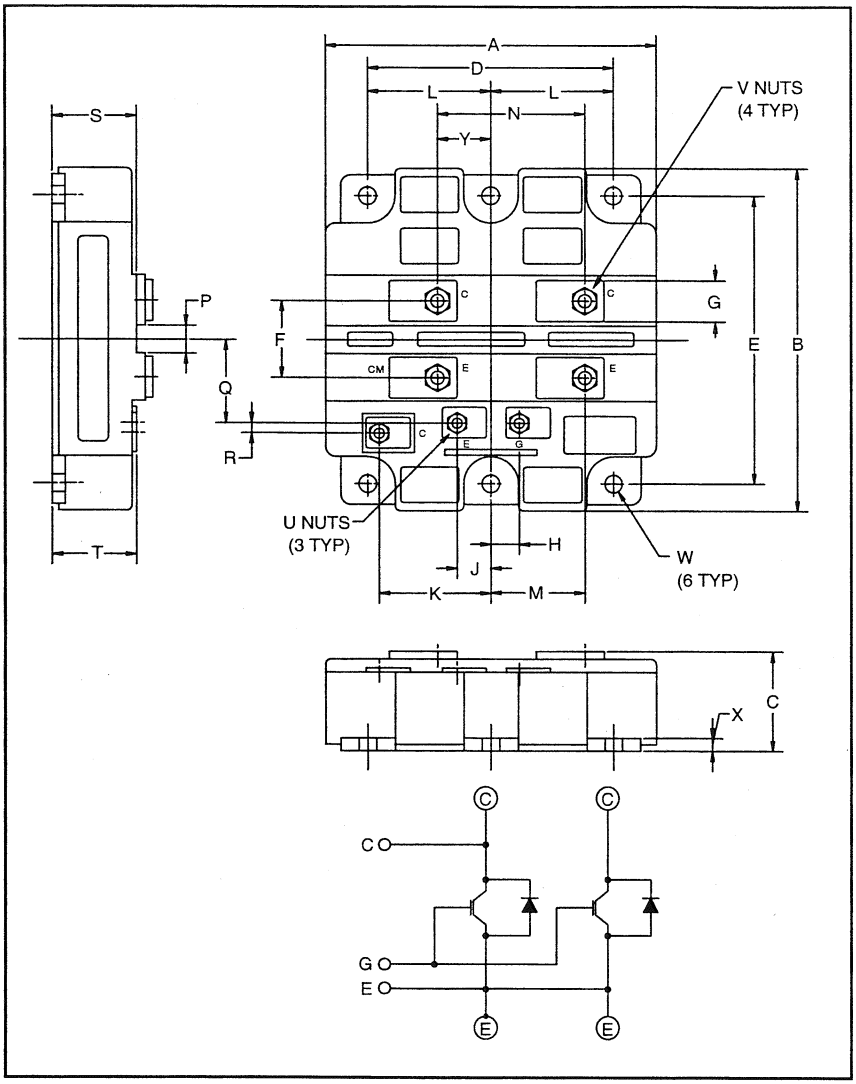
L10 Pbm 4.4

POWEREX

CM400HB-90H

Powerex, Inc., 200 Hillis Street, Youngwood, Pennsylvania 15697-1800 (724) 925-7272

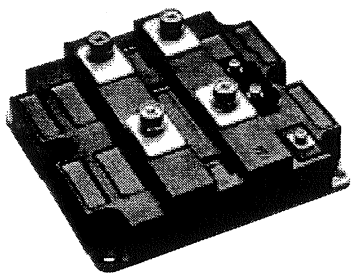
Single IGBTMOD™ HVIGBT
400 Amperes/4500 Volts



Outline Drawing and Circuit Diagram

Dimensions	Inches	Millimeters
A	5.12	130.0
B	5.51	140.0
C	1.50	38.0
D	4.48	114.0
E	4.88±0.01	124.0±0.25
F	1.57	40.0
G	0.79	20.0
H	0.41	10.35
J	0.42	10.65
K	1.92	48.8
L	2.24±0.01	57.0±0.25
M	1.71	43.5

Dimensions	Inches	Millimeters
N	2.42	61.5
P	0.59	15.0
Q	1.57	40.0
R	0.20	5.2
S	1.16	29.5
T	1.10	28.0
U	M4 Metric	M4
V	M8 Metric	M8
W	0.28 Dia.	Dia.7.0
X	0.20	5.0
Y	0.71	18.0



Description:
Powerex IGBTMOD™ Modules are designed for use in switching applications. Each module consists of one IGBT Transistor with a reverse-connected super-fast recovery free-wheel diode. All components and interconnects are isolated from the heat sinking baseplate, offering simplified system assembly and thermal management.

Features:
- ☐ Low Drive Power
- ☐ Low $V_{CE(sat)}$
- ☐ Super-Fast Recovery Free-Wheel Diode
- ☐ Isolated Baseplate for Easy Heat Sinking

Applications:
- ☐ Traction
- ☐ Medium Voltage Drive
- ☐ High Voltage Power Supplies

Ordering Information:
Example: Select the complete part module number you desire from the table below -i.e. CM400HB-90H is a 4500V (V_{CES}), 400 Ampere Single IGBTMOD™ Power Module.

Type	Current Rating Amperes	V_{CES} Volts (x 50)
CM	400	90

Powerex, Inc., 200 Hillis Street, Youngwood, Pennsylvania 15697-1800 (724) 925-7272

CM400HB-90H
Single IGBTMOD™ HVIGBT
400 Amperes/4500 Volts

Absolute Maximum Ratings, T_j = 25 °C unless otherwise specified

Ratings	Symbol	CM400HB-90H	Units
Junction Temperature	T_j	-40 to 150	°C
Storage Temperature	T_{stg}	-40 to 125	°C
Collector-Emitter Voltage (V_{GE} = 0V)	V_{CES}	4500	Volts
Gate-Emitter Voltage (V_{CE} = 0V)	V_{GES}	±20	Volts
Collector Current (T_C = 25°C)	I_C	400	Amperes
Peak Collector Current (Pulse)	I_{CM}	800*	Amperes
Diode Forward Current** (T_C = 25°C)	I_E	400	Amperes
Diode Forward Surge Current** (Pulse)	I_{EM}	800*	Amperes
Maximum Collector Dissipation (T_C = 25°C, IGBT Part, $T_j \leq$ 125°C)	P_C	4300	Watts
Max. Mounting Torque M8 Terminal Screws	–	115	in-lb
Max. Mounting Torque M6 Mounting Screws	–	53	in-lb
Max. Mounting Torque M4 Auxiliary Terminal Screws	–	17	in-lb
Module Weight (Typical)	–	1.5	kg
Isolation Voltage (Charged Part to Baseplate, AC 60Hz 1 min.)	V_{iso}	6000	Volts

* Pulse width and repetition rate should be such that device junction temperature (T_j) does not exceed $T_{j(max)}$ rating.
**Represents characteristics of the anti-parallel, emitter-to-collector free-wheel diode (FWDi).

Static Electrical Characteristics, T_j = 25 °C unless otherwise specified

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Collector-Cutoff Current	I_{CES}	$V_{CE} = V_{CES}$, V_{GE} = 0V	–	–	8.0	mA
Gate Leakage Current	I_{GES}	$V_{GE} = V_{GES}$, V_{CE} = 0V	–	–	0.5	μA
Gate-Emitter Threshold Voltage	$V_{GE(th)}$	I_C = 40mA, V_{CE} = 10V	4.5	6.0	7.5	Volts
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	I_C = 400A, V_{GE} = 15V, T_j = 25°C	–	3.0	3.9*	Volts
		I_C = 400A, V_{GE} = 15V, T_j = 125°C	–	3.3	–	Volts
Total Gate Charge	Q_G	V_{CC} = 2250V, I_C = 400A, V_{GE} = 15V	–	3.6	–	μC
Emitter-Collector Voltage**	V_{EC}	I_E = 400A, V_{GE} = 0V	–	4.0	5.2	Volts

* Pulse width and repetition rate should be such that device junction temperature rise is negligible.
**Represents characteristics of the anti-parallel, emitter-to-collector free-wheel diode (FWDi).

Dynamic Electrical Characteristics, T_j = 25 °C unless otherwise specified

Characteristics		Symbol	Test Conditions	Min.	Typ.	Max.	Units
Input Capacitance		C_{ies}	V_{GE} = 0V, V_{CE} = 10V	–	72	–	nF
Output Capacitance		C_{oes}		–	5.3	–	nF
Reverse Transfer Capacitance		C_{res}		–	1.6	–	nF
Resistive	Turn-on Delay Time	$t_{d(on)}$	V_{CC} = 2250V, I_C = 400A,	–	–	2.4	µs
Load	Rise Time	t_r	V_{GE1} = V_{GE2} = 15V,	–	–	2.4	µs
Switching	Turn-off Delay Time	$t_{d(off)}$	R_G = 22.5Ω	–	–	6.0	µs
Times	Fall Time	t_f	Resistive Load Switching Operation	–	–	1.2	µs
Diode Reverse Recovery Time**		t_{rr}	I_E = 400A, di_E/dt = -800A/µs	–	–	1.8	µs
Diode Reverse Recovery Charge**		Q_{rr}	I_E = 400A, di_E/dt = -800A/µs	–	160*	–	µC

* Pulse width and repetition rate should be such that device junction temperature rise is negligible.
**Represents characteristics of the anti-parallel, emitter-to-collector free-wheel diode (FWDi).

Thermal and Mechanical Characteristics, T_j = 25 °C unless otherwise specified

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Thermal Resistance, Junction to Case	$R_{th(j-c)}$ Q	Per IGBT	–	–	0.023	K/W
Thermal Resistance, Junction to Case	$R_{th(j-c)}$ D	Per FWDi	–	–	0.045	K/W
Contact Thermal Resistance, Case to Fin	$R_{th(c-f)}$	Per Module, Thermal Grease Applied	–	0.015	–	K/W

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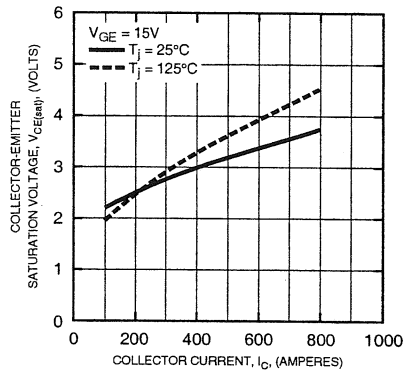
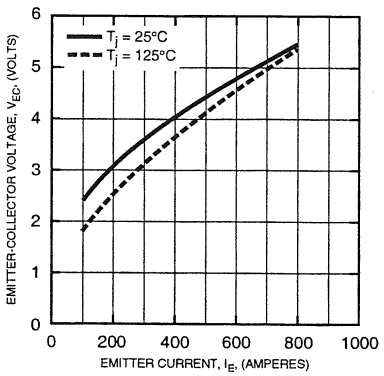
CM400HB-90H
Single IGBTMOD™ HVIGBT
400 Amperes/4500 Volts

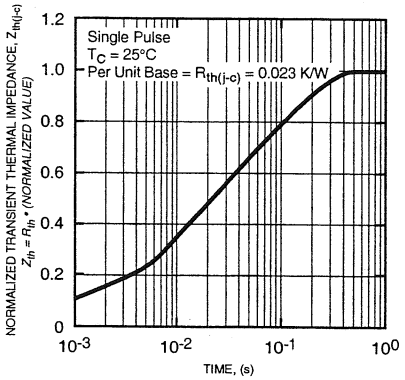
COLLECTOR-EMITTER SATURATION VOLTAGE CHARACTERISTICS (TYPICAL)



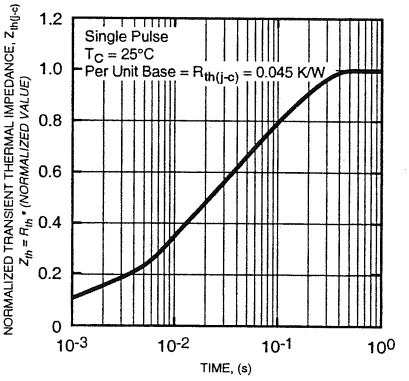
FREE-WHEEL DIODE FORWARD CHARACTERISTICS (TYPICAL)



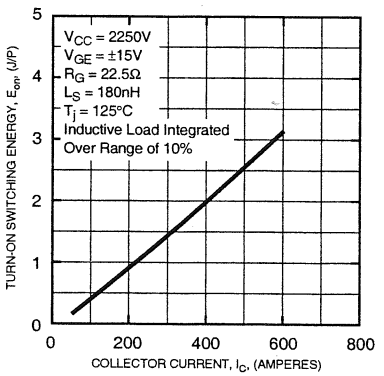
TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (IGBT)



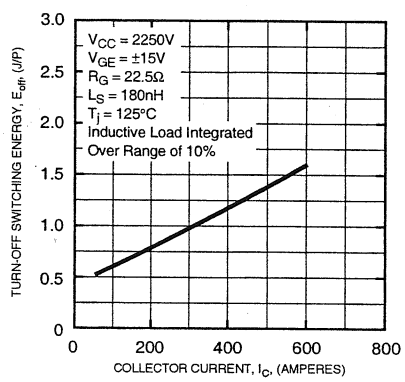
TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (FWDi)



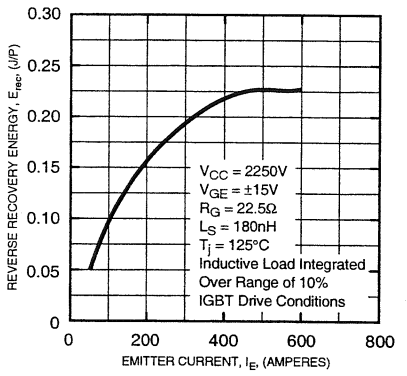
HALF-BRIDGE TURN-ON SWITCHING ENERGY CHARACTERISTICS (TYPICAL)



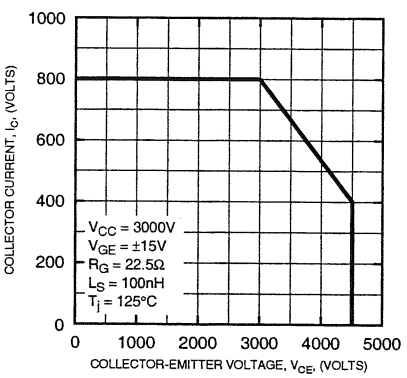
HALF-BRIDGE TURN-OFF SWITCHING ENERGY CHARACTERISTICS (TYPICAL)



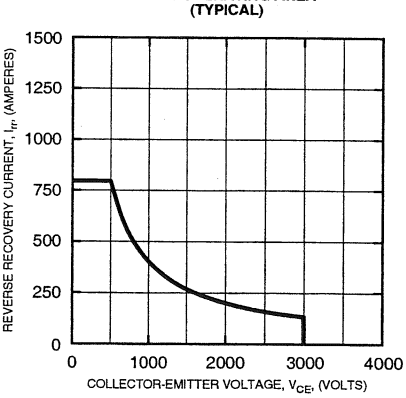
FREE-WHEEL DIODE REVERSE RECOVERY CHARACTERISTICS (TYPICAL)



TURN-ON SWITCHING SAFE OPERATING AREA (RBSOA) (TYPICAL)



DIODE REVERSE RECOVERY SAFE OPERATING AREA (TYPICAL)



PRELIMINARY SPECIFICATIONS

DE-375 301N35

35A, 300V, 0.10Ω
US Patents 4891686, 5640045
Foreign Patents Pending
(04/1999)

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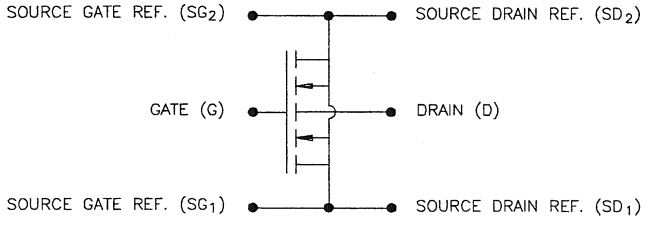
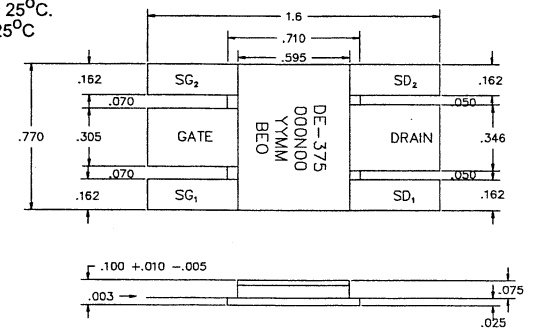
ELECTRICAL CHARACTERISTICS		MIN	TYP	MAX	UNITS	TEST CONDITIONS
V_{DSS}	Drain-Source Voltage	-	-	300	v	
BV_{DSS}	Drain-Source Breakdown Voltage	300	-	-	v	V_{GS} = 0, I_{DS} = 250μA (1)
$V_{GS(th)}$	Gate Threshold Voltage	2	3	4.5	V	V_{DS} = V_{GS}, I_D = 250μA (1)
V_{GS}	Gate-Source Voltage Continuous	-	-	±20	V	
I_{DC}	Drain Current Continuous	-	-	35	A	(1) (5) (6)
I_{DP}	Drain Current Pulsed	-	-	280	A	(2) (4) (5) (6)
g_{fs}	Forward Transconductance	-	29	-	S	V_{DS} = 50V, I_{DS} = .5I_{DC}
$R_{DS(on)}$	Static Drain-Source On-State Resistance	-	.10	-	Ω	V_{GS} = 15V, I_{DS} = .5I_{DC} (1) (5)
C_{iss}	Input Capacitance	-	3800	-	pF	V_{DS} = .8BV_{DS}
C_{oss}	Output Capacitance	-	300	-	pF	f = 1.0MHz
C_{rss}	Reverse Transfer Capacitance	-	90	-	pF	(3)
$t_{d(on)}$	Turn-On Delay Time	-	6	-	ns	V_{DS} = .8BV_{DS}
$t_{(r)}$	Rise Time	-	6	-	ns	I_{DS} = .5I_{DC}
$t_{d(off)}$	Turn-Off Delay Time	-	18	-	ns	Z_{GD} ≤ 1Ω
t_f	Fall Time	-	32	-	ns	(2)
SOURCE-DRAIN DIODE CHARACTERISTICS		**MIN**	**TYP**	**MAX**	**UNITS**	**TEST CONDITIONS**
I_{SC}	Continuous Source Current (Body Diode)	-	-	35	A	(1) (5)
I_{SP}	Pulse Source Current (Body Diode)	-	-	280	A	(2) (4) (5)
V_{SD}	Diode Forward Voltage	-	-	1.5	V	I_{SD} = .5I_{SC}, V_{GS} = 0 (1) (5)
t_{rr}	Reverse Recovery Time	-	800	-	ns	I_{SD} = .5I_{SC}
THERMAL CHARACTERISTICS		**MIN**	**TYP**	**MAX**	**UNITS**	**TEST CONDITIONS**
$R_{\theta JC}$	Junction to Case	-	.290	-	°C/W	(6)
$R_{\theta JHS}$	Junction to Heat Sink	-	.65	-	°C/W	(1) (6)
$R_{\theta JHA}$	Junction to Ambient	-	25	-	°C/W	Free Air Operation (6)
$P_{D\ AMB}$	Power Dissipation Free Air Operation	-	4.5	-	W	Free Air Operation T_J = 150°C (6) (7)
$P_{D\ HS}$	Power Dissipation W (Heat Sink)	-	200	-	W	T_J= 150°C (6) (8)
T_J & T_{sto}	Operating and Storage Temperature	-55	-	+150	°C	
T_L	Max. Lead Temp. for Soldering	-	-	300	°C	

(1) DEI Test Fixture P/N 6040-0023.
(2) DEI Test Fixture P/N 6040-1023.
(3) DEI Test Fixture P/N 6040-2023.
(4) Pulse width and repetition rate limited by junction temperature.
(5) T_C = 25°C.
(6) See mounting instructions.
(7) T_{AMB} = 25°C.
(8) T_{HS} = 25°C





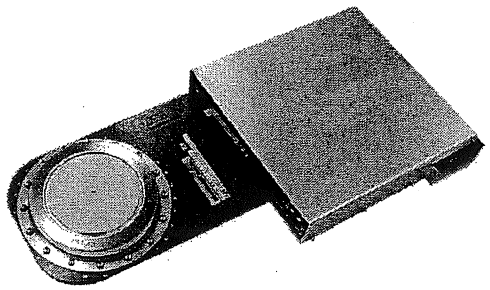
V_{DRM}	=	4500 V
I_{TGQM}	=	4000 A
I_{TSM}	=	32 kA
V_{T0}	=	1.40 V
r_T	=	0.325 mΩ
V_{DClink}	=	2800 V

Asymmetric Integrated Gate-Commutated Thyristor

5SHY 35L4503

Doc. No. 5SYA1228-01 Jan. 01

- **Highest snubberless turn-off rating**
- **Suitable for series connection**
- **Fast response (t_{don} < 3 µs, t_{doff} < 6 µs)**
- **High reliability**
- **Very high EMI immunity**
- **Simple fibre optic control interface and status feedback**
- **Cosmic radiation withstand rating**



Blocking

V_{DRM}	Repetitive peak off-state voltage		4500 V	$V_{GR} \geq 2V$
I_{DRM}	Repetitive peak off-state current	≤	50 mA	$V_D = V_{DRM}$ $V_{GR} \geq 2V$
V_{DClink}	Permanent DC voltage for 100 FIT failure rate		2800 V	Ambient cosmic radiation at sea level in open air.

Mechanical data (see Fig. 8)

F_m	Mounting force	min.	36 kN	
		max.	44 kN	
D_p	Pole-piece diameter		85 mm	±0.1 mm
H	Housing thickness		26 mm	±0.5 mm
m	Weight IGCT		3.30 kg	
D_s	Surface creepage distance	≥	33 mm	Anode to Gate
D_a	Air strike distance	≥	13 mm	Anode to Gate
l	Length IGCT		451 mm	±1.0 mm
h	Height IGCT		40 mm	±1.0 mm
w	Width IGCT		213 mm	±1.0 mm

GCT Data

On-state (see Fig. 2, 3 ,4)

I_{TAVM}	Max. average on-state current	1345 A	Half sine wave, T_C = 85 °C		
I_{TRMS}	Max. RMS on-state current	2110 A			
I_{TSM}	Max. peak non-repetitive surge current	32 kA	t_p =	10 ms	T_j = 125 °C After surge: $V_D = V_R$ = 0V
		47 kA	t_p =	1 ms	
I^2t	Limiting load integral	$5.1 \cdot 10^6$ A^2s	t_p =	10 ms	
		$1.1 \cdot 10^6$ A^2s	t_p =	1 ms	
V_T	On-state voltage	≤ 2.70 V	I_T =	4000 A	T_j = 125 °C
V_{T0}	Threshold voltage	1.40 V	I_T =	1000 - 4000 A	
r_T	Slope resistance	0.325 mΩ			

Turn-on switching

di/dt_{crit}	Max. rate of rise of on-state current	1000 A/µs	f =	500 Hz	T_j =	125 °C
			I_T =	4000 A	V_D =	2500 V
t_{don}	Turn-on delay time	≤ 3 µs	V_D =	2500 V	T_j =	125 °C
t_r	Rise time	≤ 1 µs	I_T =	4000 A		
$t_{on\ (min)}$	Min. on-time	10 µs	R_s =	0.8 Ω	L_i =	2.2 µH
E_{on}	Turn-on energy per pulse	≤ 1.5 J	C_{CL} =	6.0 µF	L_{CL} =	0.3 µH

Turn-off switching (see Fig. 5, 6)

I_{TGQM}	Max. controllable turn-off current	4000 A	V_{DM} ≤	V_{DRM}	T_j =	125 °C
			V_D =	2500 V	L_{CL} =	0.3 µH
t_{doff}	Turn-off delay time	≤ 6.0 µs	V_D =	2500 V	V_{DM} ≤	V_{DRM}
t_f	Fall time	≤ 1.0 µs	T_j =	125 °C	R_s =	0.8 Ω
$t_{off\ (min)}$	Min. off-time	10 µs	I_{TGQ} =	4000 A	L_i =	2.2 µH
E_{off}	Turn-off energy per pulse	≤ 19.5 J	C_{CL} =	6.0 µF	L_{CL} =	0.3 µH

Gate Unit

Power supply (see Fig. 7 to 9)			
V_{GDC}	Gate Unit voltage	20 ±0.5 V_{DC}	Without galvanic isolation to power circuit.
P_{Gin}	Gate Unit power consumption	≤ 52 W	f_S = 500 Hz, $I_{TGQ\,AV}$ = 1000 A, δ = 0.5
X1	Gate Unit power connector	AMP, Type 640389-4, MTA 156, friction lock, right angle Note 1	
Optical control input/output (see Fig. 8 to 10)			
$P_{on\,CS}$	Optical input power	> -21 dBm	Valid for 1mm plastic optical fibre (POF)
$P_{off\,CS}$	Optical noise power	< -40 dBm	
$P_{on\,SF}$	Optical output power	> -19 dBm	
$P_{off\,SF}$	Optical noise power	< -50 dBm	
t_{GLITCH}	Pulse width threshold	≤ 300 ns	Max. pulse width without response
CS	Receiver for command signal	Agilent, Type HFBR-2528 Note 2	
SF	Transmitter for status feedback	Agilent, Type HFBR-1528 Note 2	

Note 1: AMP, www.amp.com
Note 2: Agilent Technologies, www.semiconductor.agilent.com

Thermal

T_j	Operating junction temperature range		0...125	°C	
T_{stg}	Storage temperature range		-40...85	°C	
T_{amb}	Ambient operational temperature range		0...50	°C	
R_{thJC}	Thermal resistance junction to case	≤	12	K/kW	Double side cooled
		≤	20	K/kW	Anode side cooled
		≤	30	K/kW	Cathode side cooled
R_{thCH}	Thermal resistance case to heatsink	≤	6	K/kW	Double side cooled
		≤	3	K/kW	Single side cooled

Analytical function for transient thermal impedance.

$$Z_{thJC}(t) = \sum_{i=1}^{n} R_i(1 - e^{-t/\tau_i})$$

i	1	2	3	4
R_i(K/kW)	5.4	4.5	1.7	0.4
τ_i(s)	1.2	0.17	0.01	0.001
F_M = 36... 44 kN Double side cooled				

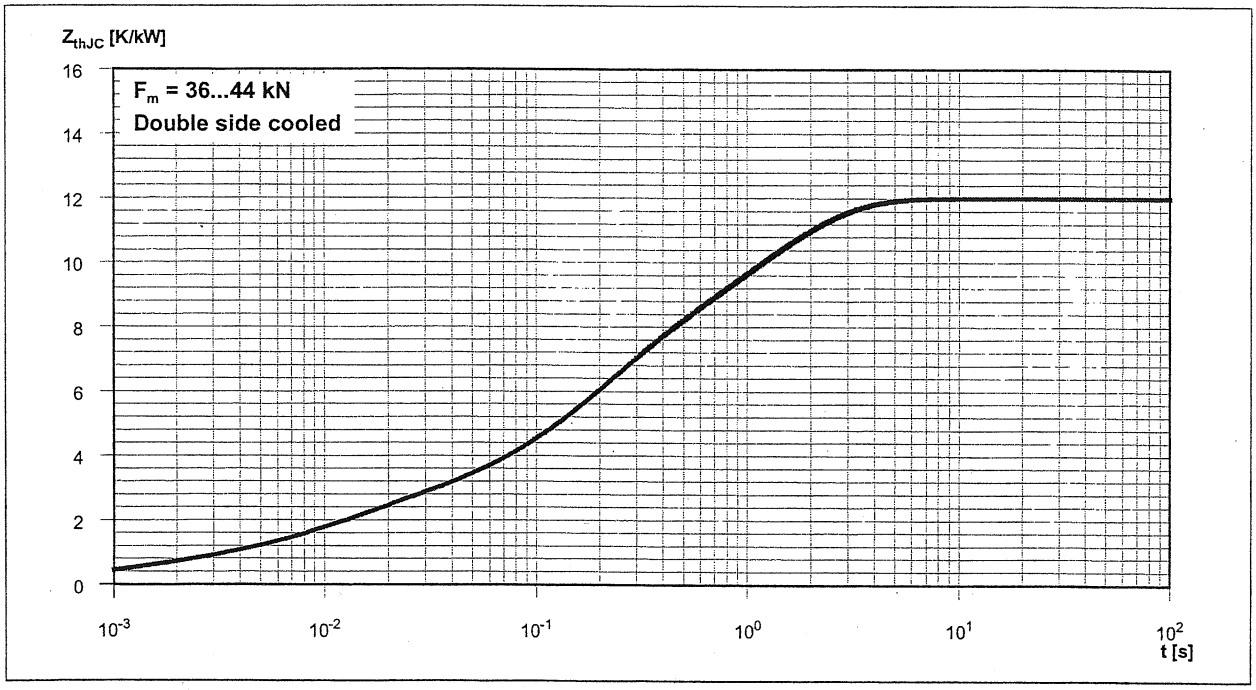


Fig. 1 Transient thermal impedance (junction-to-case) versus time (max. values).

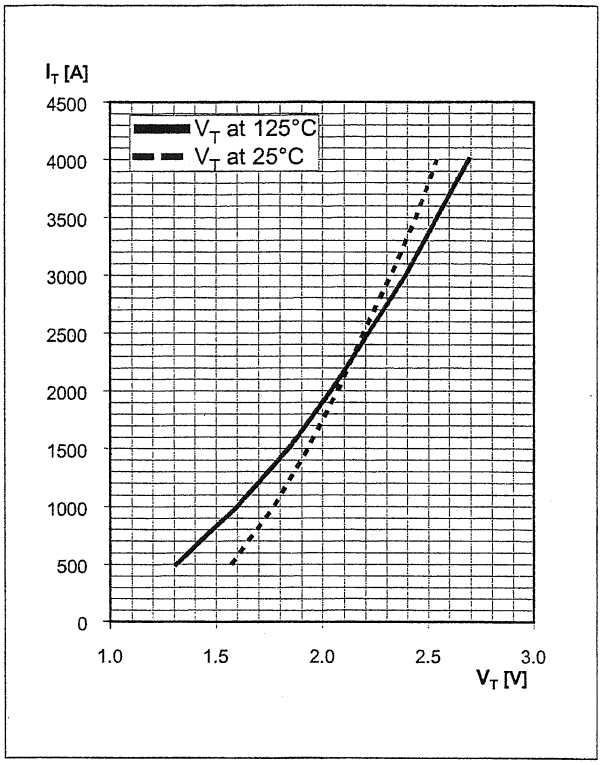


Fig. 2 GCT on-state characteristics.

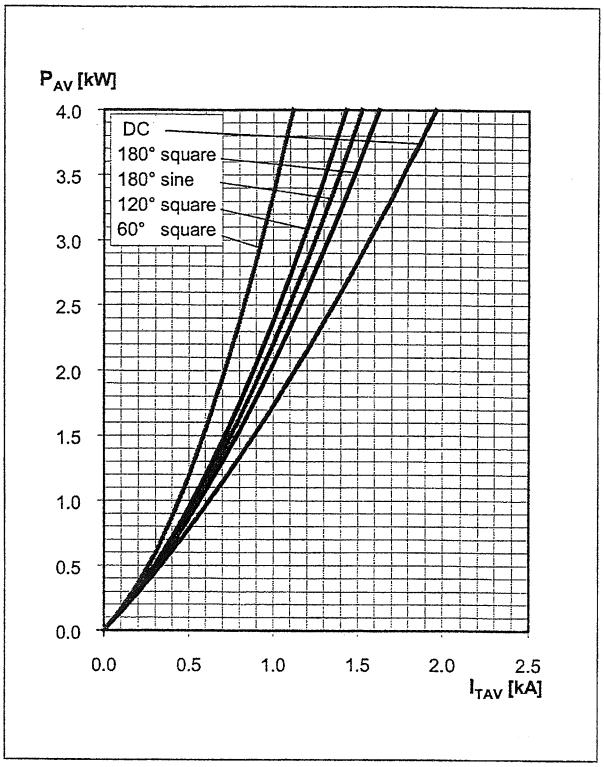


Fig. 3 Average on-state power dissipation versus on-state current.

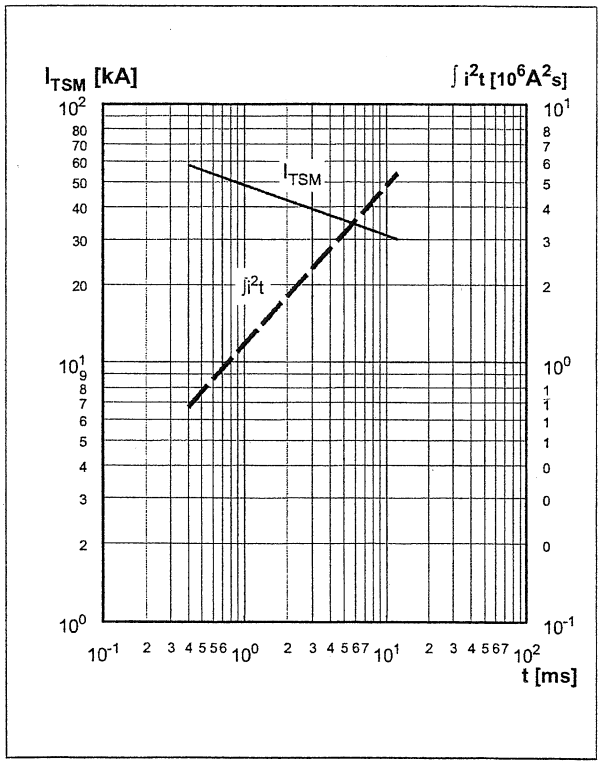


Fig. 4 Surge current and fusing integral versus

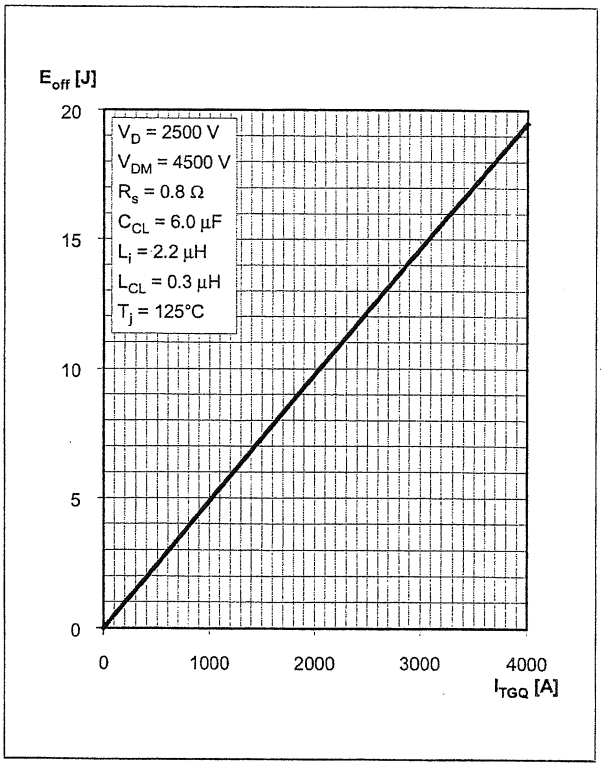


Fig. 5 GCT turn-off energy per pulse versus

pulse width.

turn-off current.

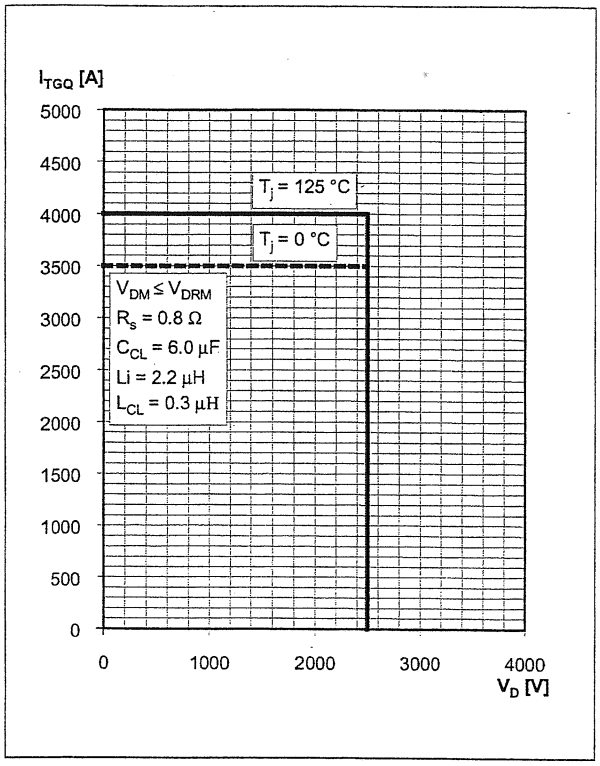


Fig. 6 Max. repetetive turn-off current versus turn-off voltage.

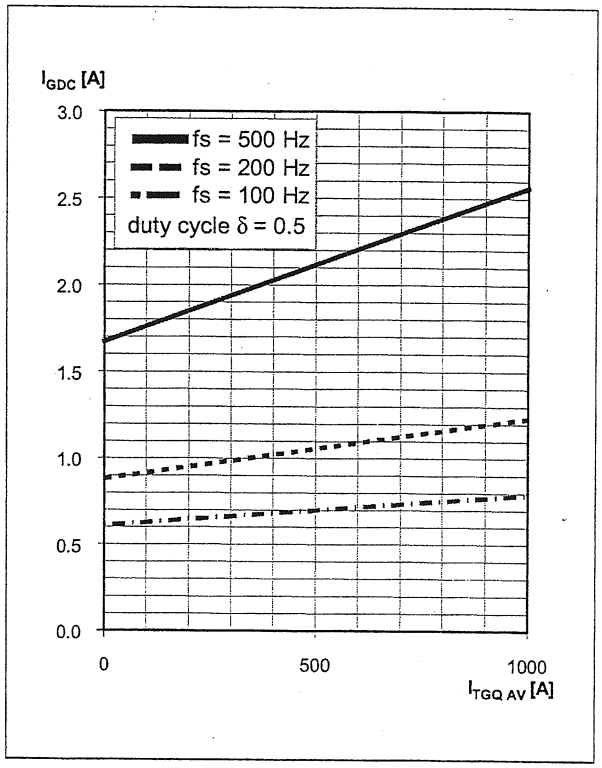


Fig. 7 Gate Unit Supply current.

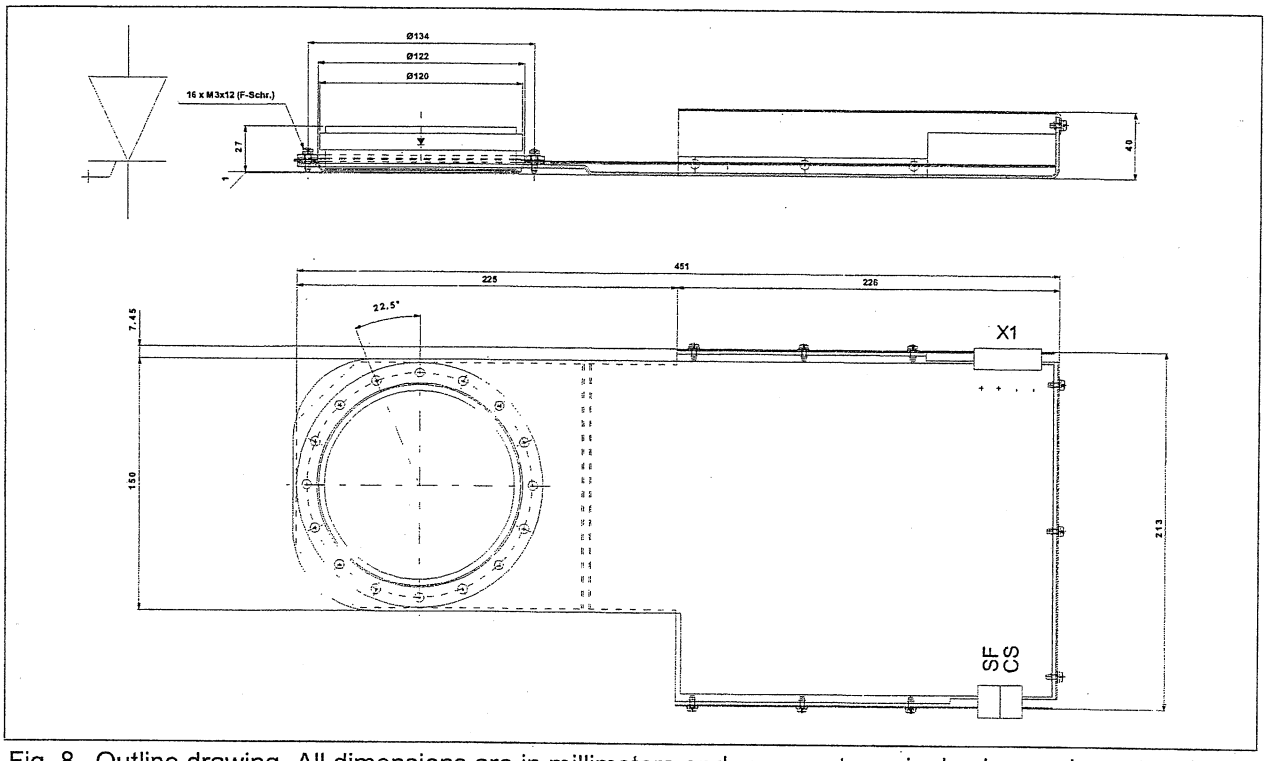


Fig. 8 Outline drawing. All dimensions are in millimeters and represent nominal values unless stated otherwise.

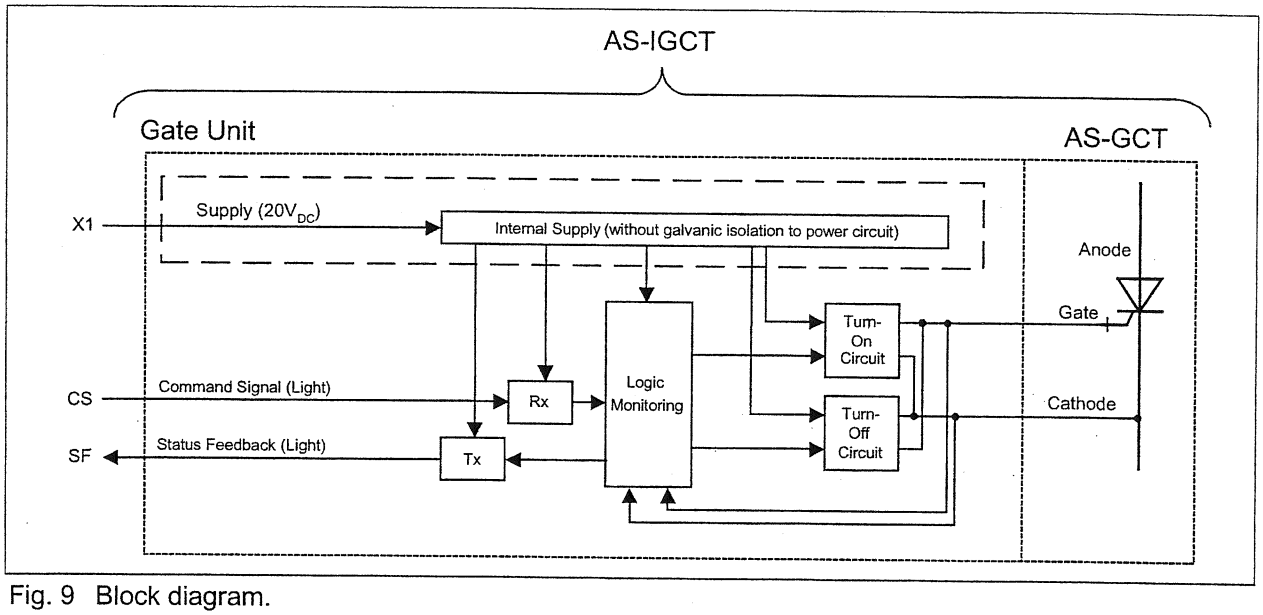


Fig. 9 Block diagram.

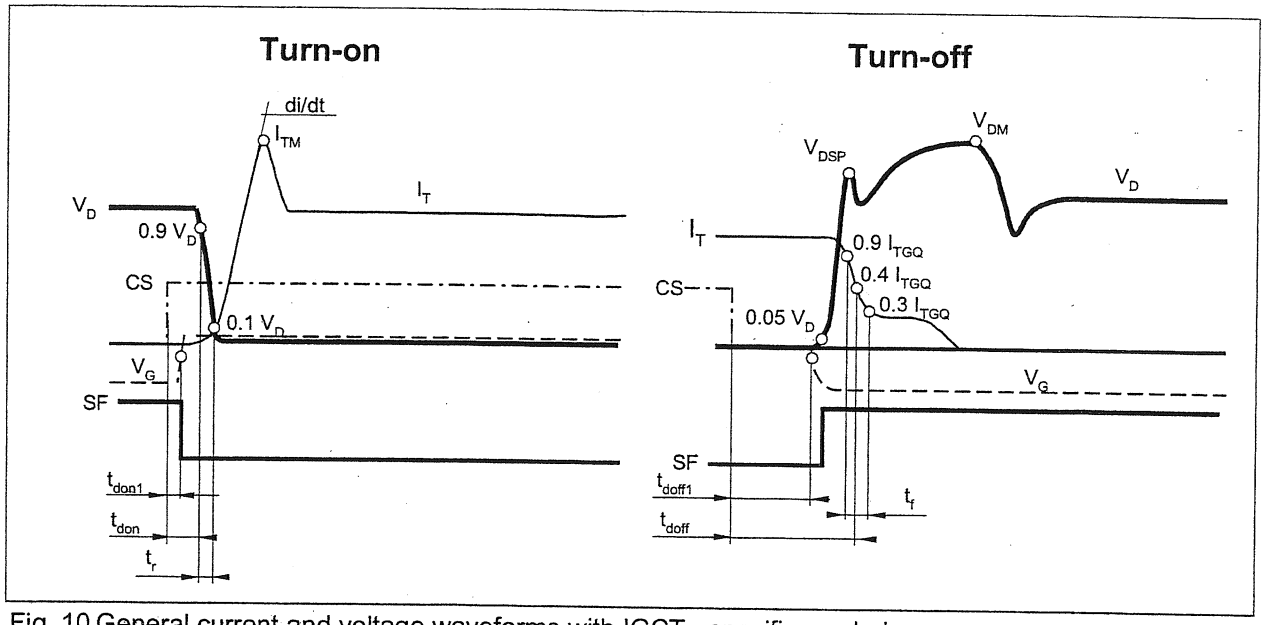


Fig. 10 General current and voltage waveforms with IGCT - specific symbols.

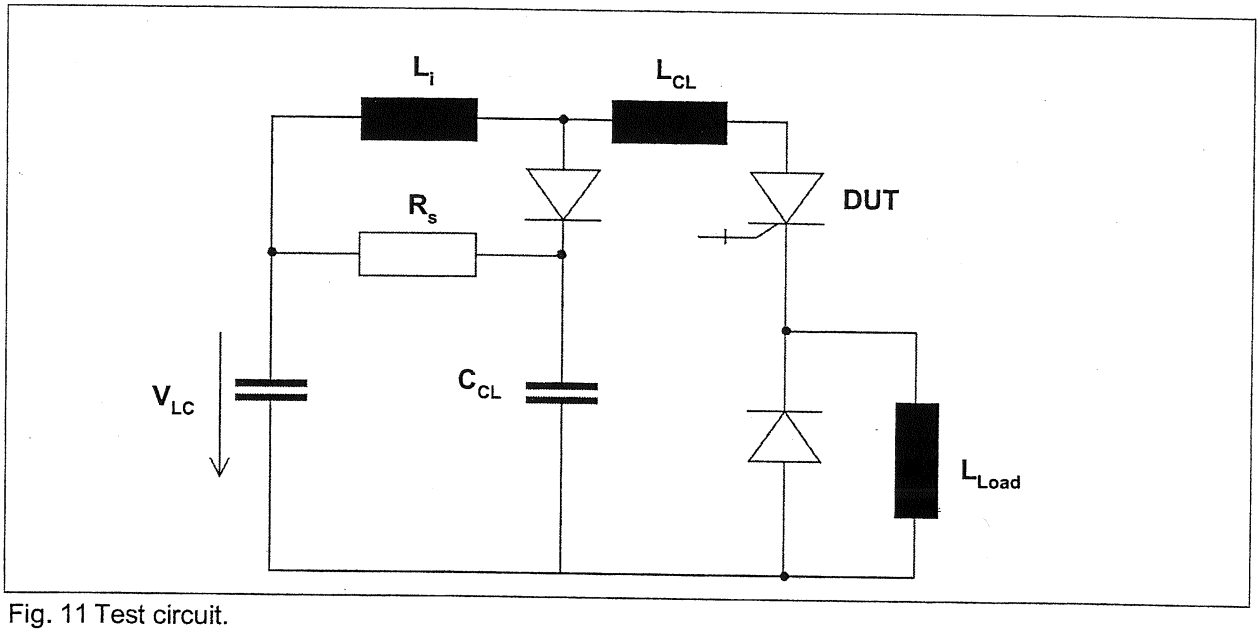


Fig. 11 Test circuit.

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