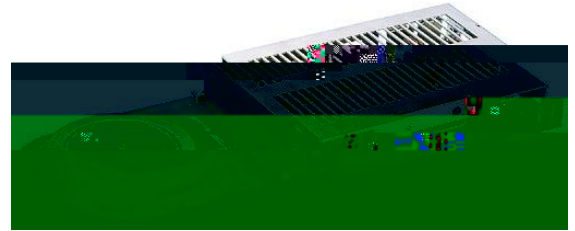


V_{DRM}	=	4500 V
I_{TGQM}	=	2200 A
I_{TSM}	=	17×10^3 A
$V_{(T0)}$	=	1.8 V
r_T	=	0.533 mW
$V_{DC-link}$	=	2800 V

Reverse Conducting Integrated Gate-Commutated Thyristor 5SHX 26L4510

Doc. No. 5SYA1230-03 Aug 07

- High snubberless turn-off rating
- Optimized for medium frequency (<1 kHz) and low turn-off losses
- High reliability
- High electromagnetic immunity
- Simple control interface with status feedback
- AC or DC supply voltage
- Contact factory for series connection



Blocking

Maximum rated values ^{Note 1}

Parameter	Symbol	Conditions	min	typ	max
-----------	--------	------------	-----	-----	-----



GCT Data

On-state (see Fig. 3 to 6, 23)

Maximum rated values Note 1

Parameter	Symbol	Conditions	min	typ	max	Unit
Max. average on-state current	$I_{T(AV)M}$	Half sine wave, $T_C = 85\text{ °C}$, Double side cooled			1010	A
Max. RMS on-state current	$I_{T(RMS)}$				1590	A
Max. peak non-repetitive surge on-state current	I_{TSM}	$t_p = 10\text{ ms}$, $T_j = 125\text{ °C}$, sine wave after surge: $V_D = V_R = 0\text{ V}$			17×10^3	A
Limiting load integral	$I^2 t$				1.45×10^6	$A^2 s$
Max. peak non-repetitive surge on-state current	I_{TSM}	$t_p = 3\text{ ms}$, $T_j = 125\text{ °C}$, sine wave after surge: $V_D = V_R = 0\text{ V}$			25×10^3	A
Limiting load integral	$I^2 t$				938×10^3	$A^2 s$
Critical rate of rise of on-state current	di_T/dt_{cr}	For higher di_T/dt and current lower than 100 A an external retrigger pulse is required.			100	$A/\mu s$

Characteristic values

Parameter	Symbol	Conditions	min	typ	max	Unit
On-state voltage	V_T	$I_T = 2200\text{ A}$, $T_j = 125\text{ °C}$	2.3	2.6	2.95	V
Threshold voltage	$V_{(T0)}$				1.8	V
Slope resistance	$r =$					

Diode Data

On-state (see Fig. 9 to 12, 24, 25)

Maximum rated values Note 1

Parameter	Symbol	Conditions	min	typ	max	Unit
Max. average on-state current	$I_{F(AV)M}$	Half sine wave, $T_C = 85\text{ °C}$			390	A
Max. RMS on-state current	$I_{F(RMS)}$				620	A
Max. peak non-repetitive surge current	I_{FSM}	$t_p = 10\text{ ms}$, $T_{vj} = 125\text{ °C}$, $V_R = 0\text{ V}$			10.6×10^3	A
Limiting load integral	I^2t				561.8×10^3	A^2s
Max. peak non-repetitive surge current	I_{FSM}	$t_p = 3\text{ ms}$, $T_{vj} = 125\text{ °C}$, $V_R = 0\text{ V}$			14.3×10^3	A
Limiting load integral	I^2t				306.7×10^3	A^2s

Characteristic values

Parameter	Symbol	Conditions	min	typ	max	Unit
On-state voltage	V_F	$I_F = 2200$				

Gate Unit Data

Power supply (see Fig. 18, 19)

Maximum rated values ^{Note 1}

Parameter	Symbol	Conditions	min	typ	max	Unit
Gate Unit voltage (Connector X1)	$V_{GIN,RMS}$	AC square wave amplitude (15 kHz - 100kHz) or DC voltage. No galvanic isolation to power circuit.	28		40	V
Min. current needed to power up the Gate Unit	$I_{GIN Min}$	Rectified average current see application note 5SYA 2031	2.1			A
Gate Unit power consumption	$P_{GIN Max}$				100	W

Characteristic values

Parameter	Symbol	Conditions	min	typ	max	Unit
Internal current limitation	$I_{GIN Max}$	Rectified average current limited by the Gate Unit			8	A

Optical control input/output ²⁾ (see Fig. 23)

Maximum rated values ^{Note 1}

Parameter	Symbol	Conditions	min	typ	max	Unit
Min. on-time	t_{on}		40			μs
Min. off-time	t_{off}		40			μs

Characteristic values

Parameter	Symbol	Conditions	min	typ	max	Unit
Optical input power	$P_{on CS}$	CS: Command signal SF: Status feedback Valid for 1mm plastic optical fiber (POF)	-15		-1	dBm
Optical noise power	$P_{off CS}$				-45	dBm
Optical output power	$P_{on SF}$				-1	dBm
Optical noise power	$P_{off SF}$				-50	dBm
Pulse width threshold	t_{GLITCH}	Max. pulse width without response			400	ns
External retrigger pulse width	t_{retrig}		600		1100	ns

2) Do not disconnect or connect fiber optic cables while light is on.

Connectors ²⁾ (see Fig. 20 to 22)

Parameter	Symbol	Description
Gate Unit power connector	X1	AMP: MTA-156, Part Number 641210-5 ³⁾
LWL receiver for command signal	CS	Avago, Type HFBR-2528 ⁴⁾
LWL transmitter for status feedback	SF	Avago, Type HFBR-1528 ⁴⁾

2) Do not disconnect or connect fiber optic cables while light is on.

3) AMP, www.amp.com

4) Avago Technologies, www.avagotech.com

Visual feedback (see Fig. 22)

Parameter	Symbol	Description	Color
Gate OFF	LED1	"Light" when GCT is off	(green)
Gate ON	LED2	"Light" when gate-current is flowing	(yellow)
Fault	LED3	"Light" when not ready / Failure	(red)
Power supply voltage OK	LED4	"Light" when power supply is within specified range	(green)

Thermal**Maximum rated values** Note 1

Parameter	Symbol	Conditions	min	typ	max	Unit
Junction operating temperature	T_{vj}		0		125	°C
Storage temperature range	T_{stg}		-40		60	°C
Ambient operational temperature	T_a		0		50	°C

ange l atu

GCT Part

Max. on-state characteristic model:

$$V_{T25} = A_{T25} + B_{T25} \cdot I_T + C_{T25} \cdot \ln(I_T + 1) + D_{T25} \cdot \sqrt{I_T}$$

Valid for $I_T = 300 - 15000$ A

A ₂₅	B ₂₅	C ₂₅	D ₂₅
-79.1×10^{-3}	272.3×10^{-6}	296.9×10^{-3}	0.0

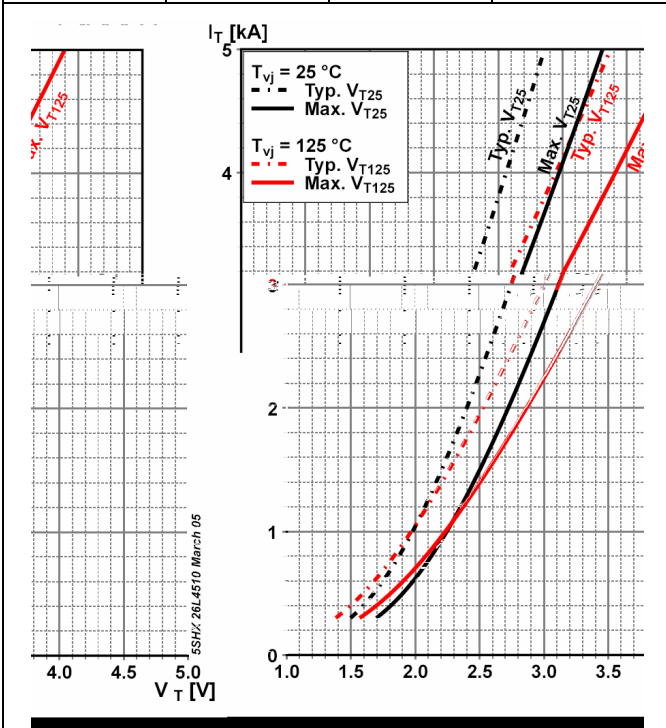


Fig. 3 GCT on-state voltage characteristics

Max. on-state characteristic model:

$$V_{T125} = A_{T125} + B_{T125} \cdot I_T + C_{T125} \cdot \ln(I_T + 1) + D_{T125} \cdot \sqrt{I_T}$$

Valid for $I_T = 300 - 15000$ A

A ₁₂₅	B ₁₂₅	C ₁₂₅	D ₁₂₅
-342.7×10^{-3}	414.9×10^{-6}	312.7×10^{-3}	0.0

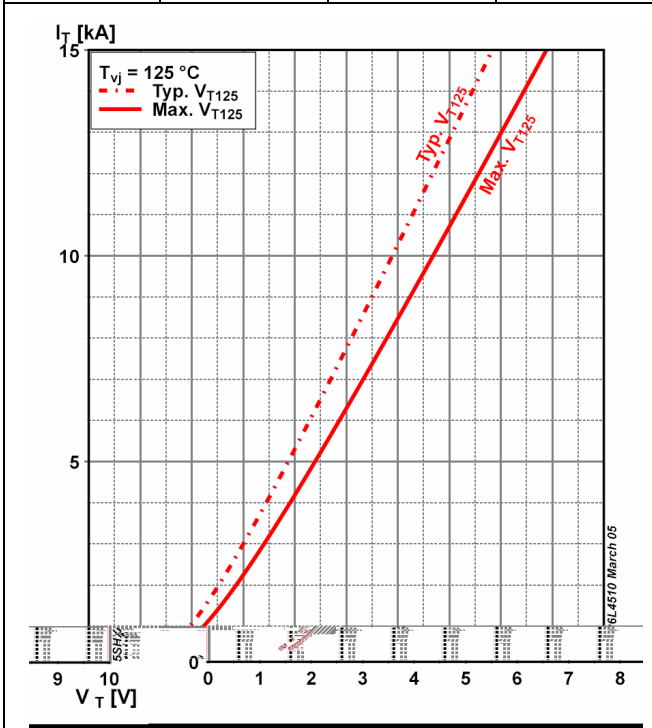


Fig. 4 GCT on-state voltage characteristics

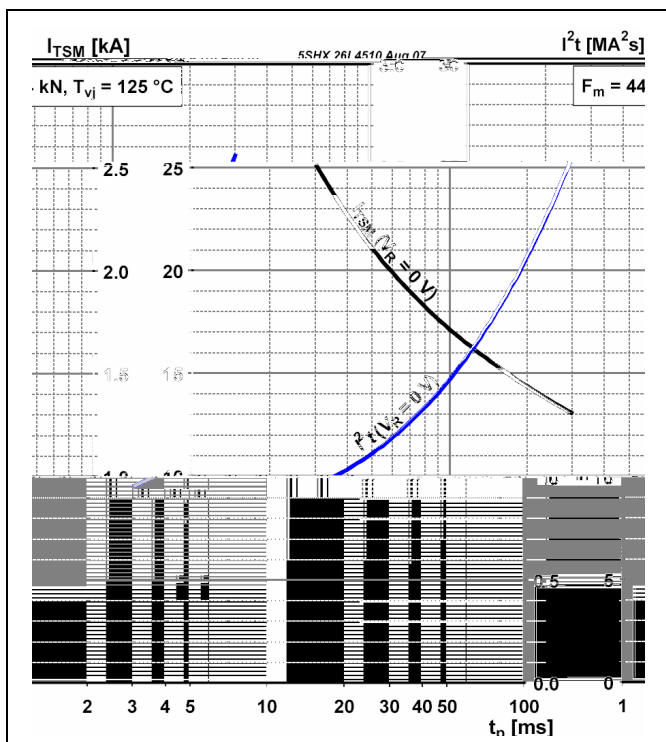


Fig. 5 GCT surge on-state current vs. pulse length, half-sine wave

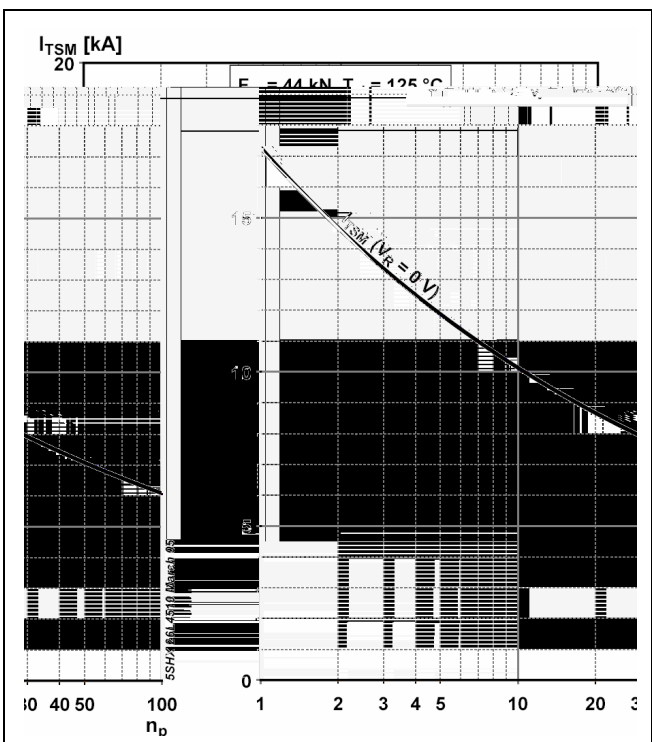


Fig. 6 GCT surge on-state current vs. number of pulses, half-sine wave, 10 ms, 50Hz

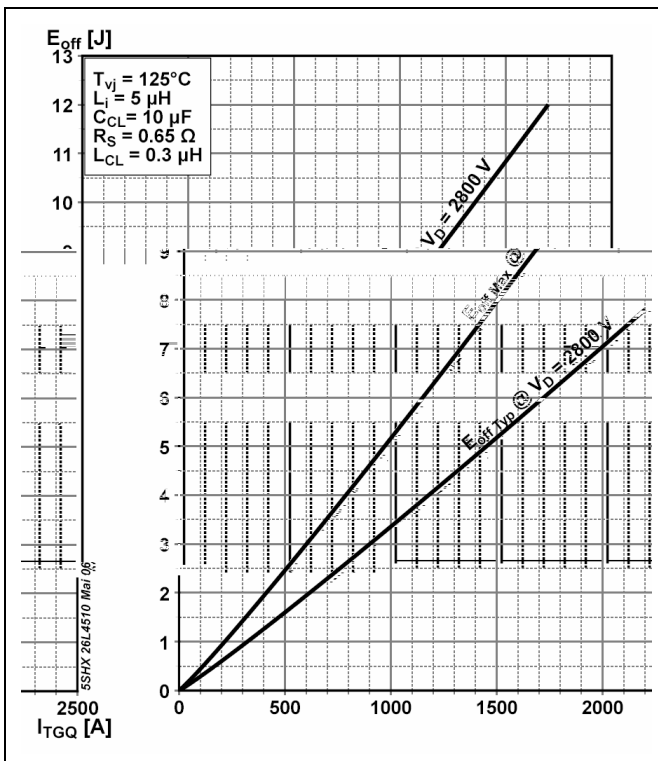


Fig. 7 GCT turn-off energy per pulse vs. turn-off current

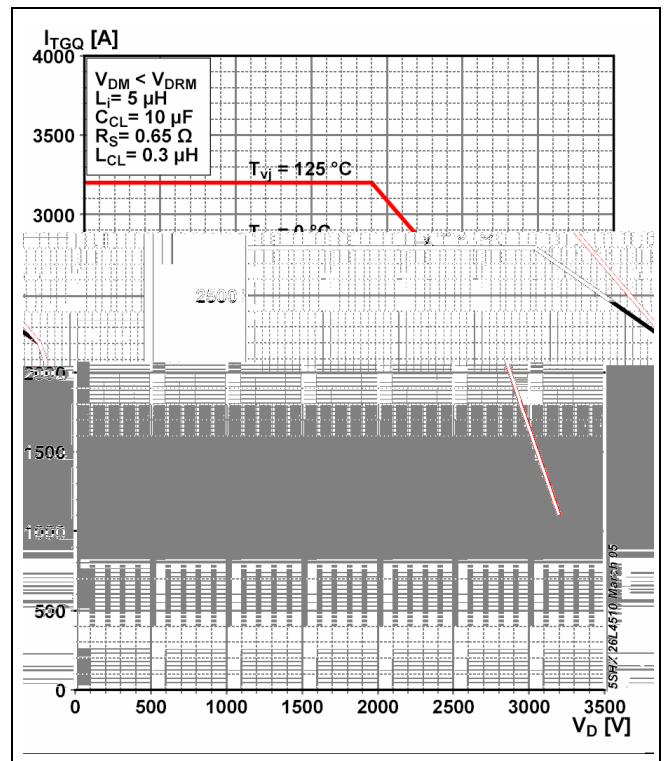


Fig. 8 GCT Safe Operating Area

Diode Part

Max. on-state characteristic model:

$$V_{F25} = A_{Tvj} + B_{Tvj} \cdot I_T + C_{Tvj} \cdot \ln(I_T + 1) + D_{Tvj} \cdot \sqrt{I_T}$$

Valid for $I_F = 300 - 15000$ A

A₂₅

Max. on-state characteristic model:

$$V_{F125} = A_{Tvj} + B_{Tvj} \cdot I_T + C_{Tvj} \cdot \ln(I_T + 1) + D_{Tvj} \cdot \sqrt{I_T}$$

Valid for $I_T = 300 - 15000$ A

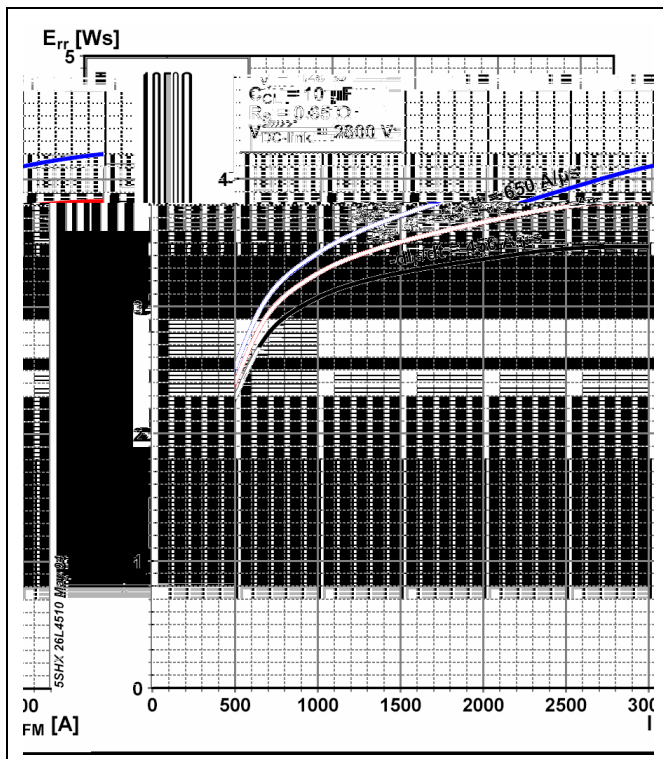


Fig. 13 Upper scatter range of diode turn-off energy per pulse vs. turn-off current

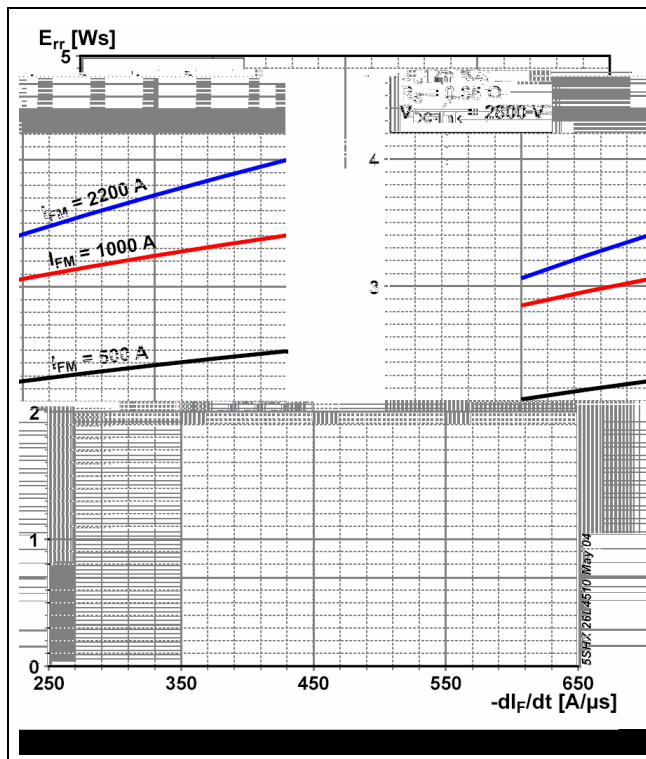


Fig. 14 Upper scatter range of diode turn-off energy per pulse vs decay rate of on-state current

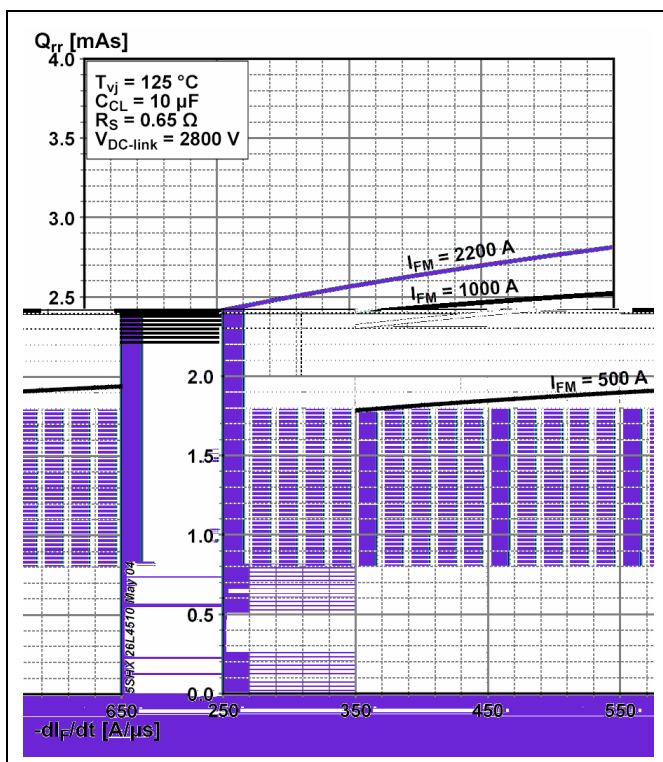


Fig. 15 Upper scatter range of diode reverse recovery charge vs decay rate of on-state current

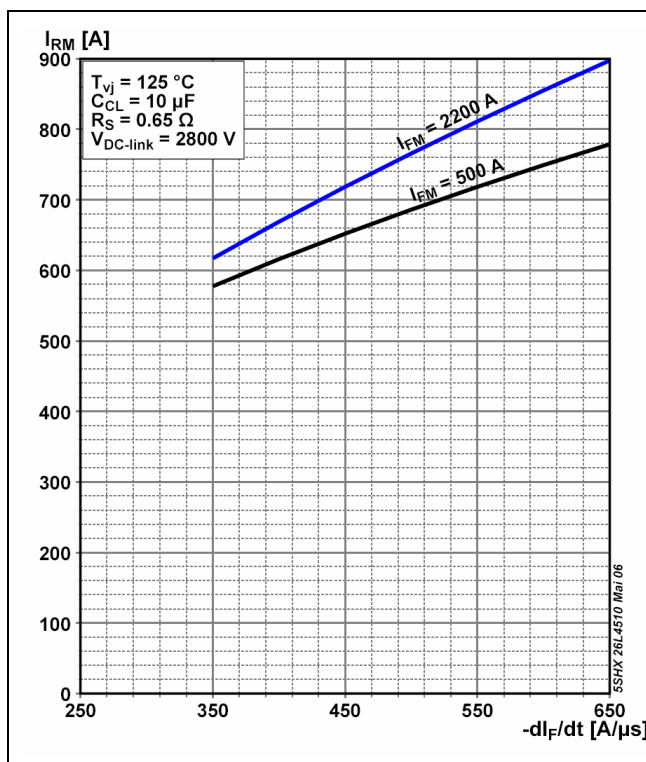


Fig. 16 Upper scatter range of diode reverse recovery current vs decay rate of on-state current

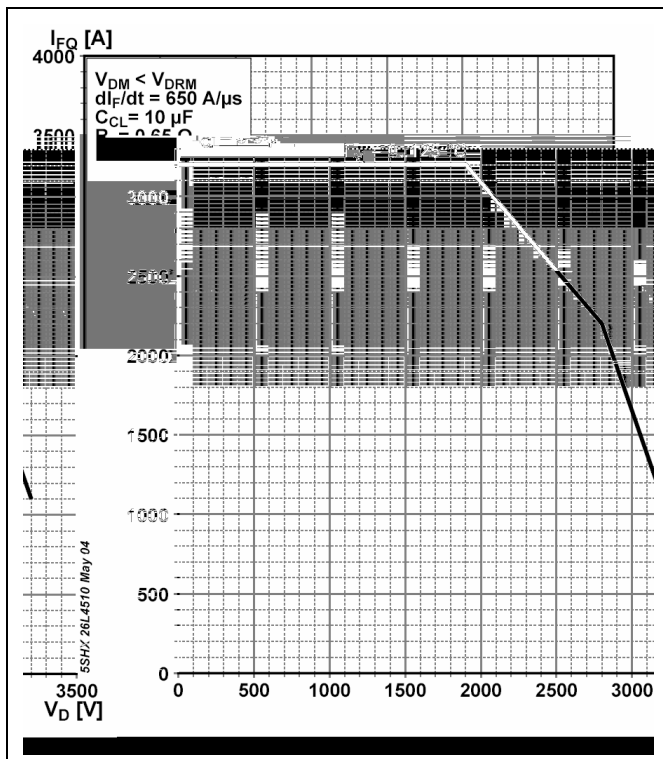


Fig. 17 Diode Safe Operating Area

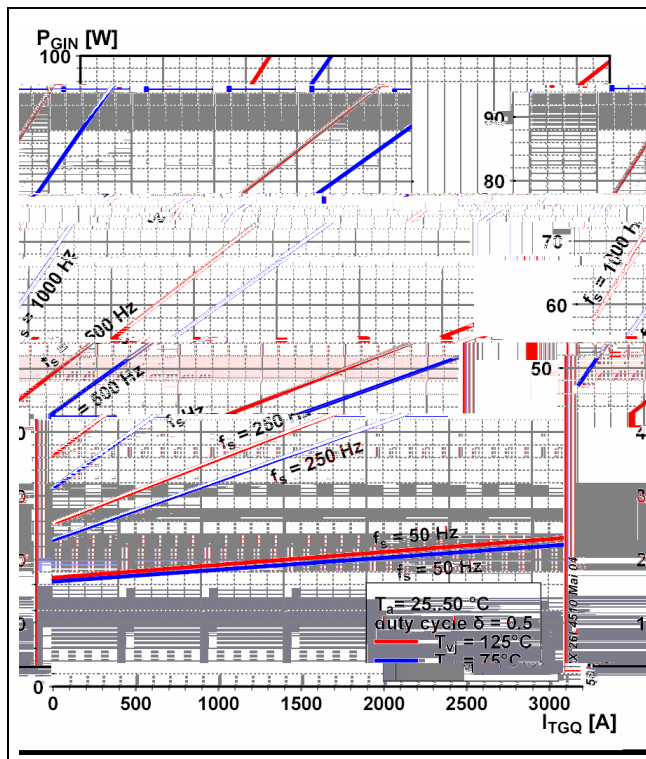


Fig. 18 Max. Gate Unit input power in chopper mode

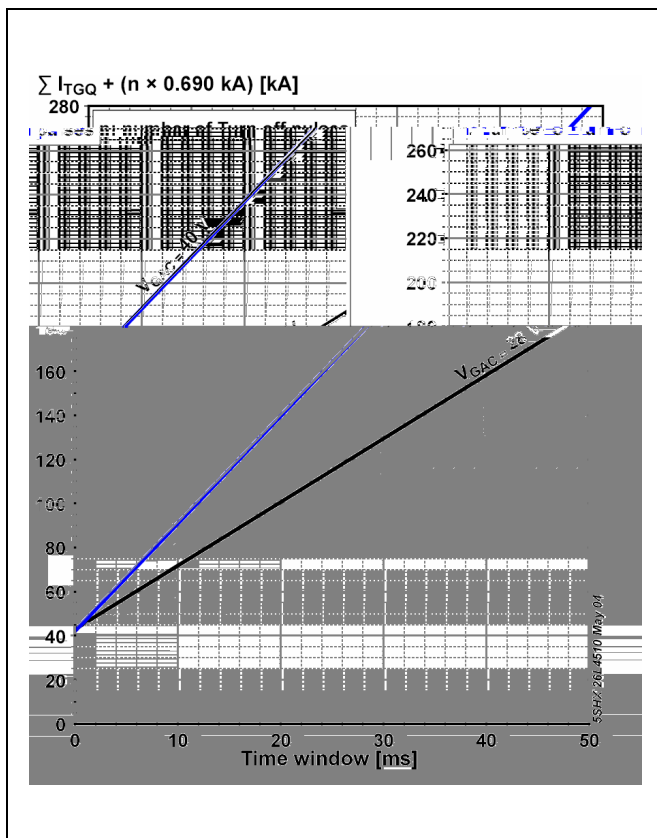


Fig. 19 Burst capability of Gate Unit

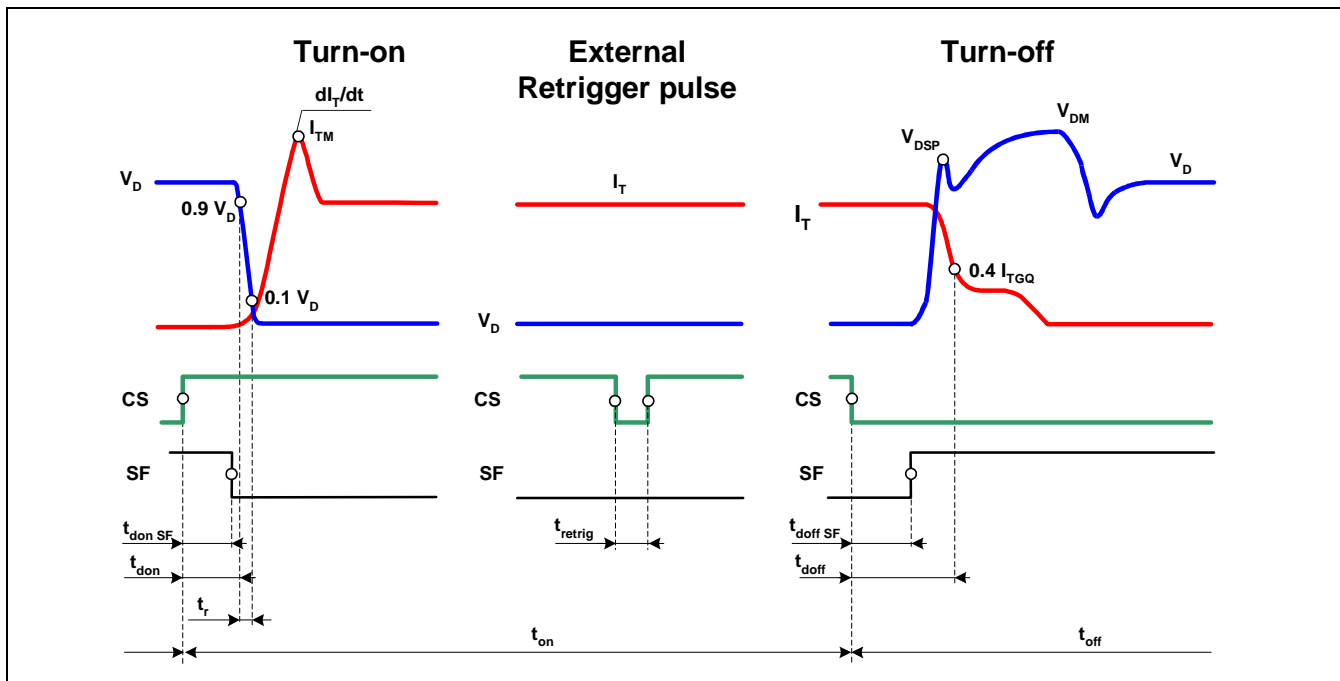


Fig. 23 General current and voltage waveforms with IGCT-specific symbols

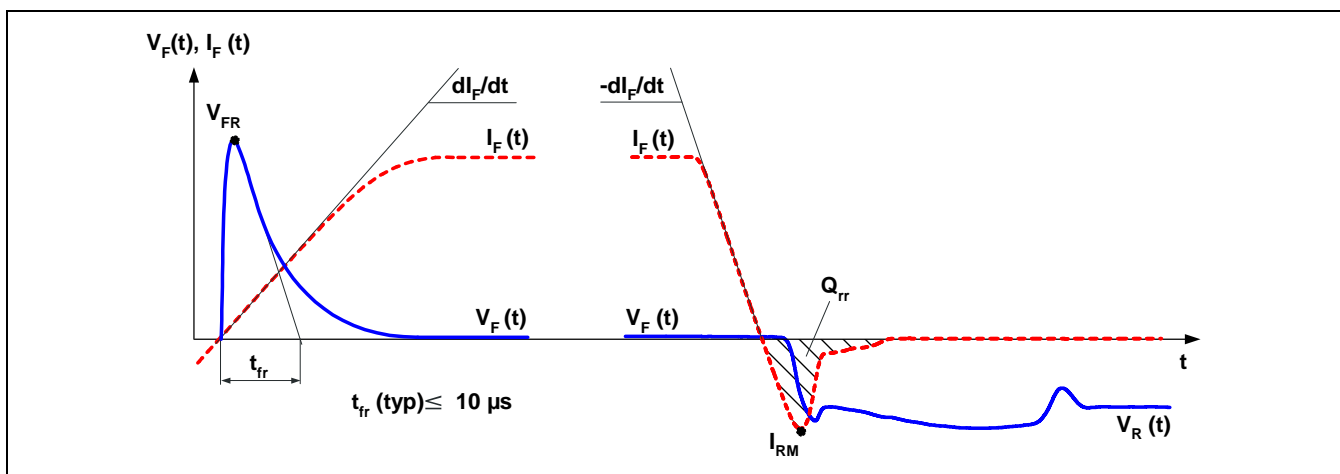


Fig. 24 General current and voltage waveforms with Diode-specific symbols

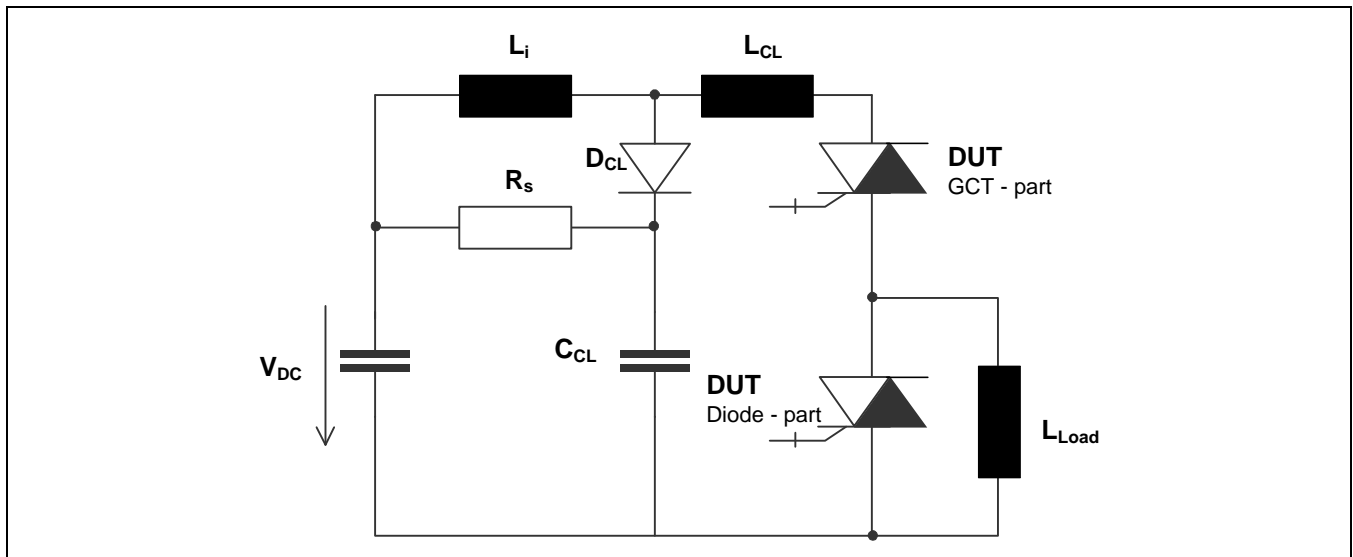


Fig. 25 Test circuit

Related documents:

5SYA 2031 e

ABB Switzerland Ltd, Semiconductors reserves the right to change specifications without notice.



ABB Switzerland Ltd
Semiconductors
 Fabrikstrasse 3
 CH-5600 Lenzburg, Switzerland

Doc. No. 5SYA1230-03 Aug 07

Telephone +41 (0)58 586 1419
 Fax +41 (0)58 586 1306
 Email abbsem@ch.abb.com
 Internet www.abb.com/semiconductors