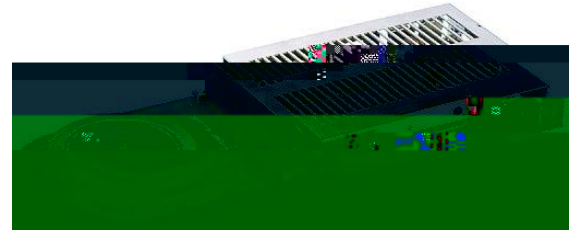


V_{DRM}	=	5500 V
I_{TGQM}	=	1800 A
I_{TSM}	=	18×10^3 A
$V_{\text{(T0)}}$	=	1.9 V
r_{T}	=	0.9 mW
$V_{\text{DC-link}}$	=	3300 V

Reverse Conducting Integrated Gate-Commutated Thyristor 5SHX 19L6010

Doc. No. 5SYA1229-02 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	Unit
Repetitive peak off-state voltage	V_{DRM}	Gate Unit energized			5500	V
Permanent DC voltage for 100 FIT failure rate of RC-GCT	$V_{\text{DC-link}}$	Ambient cosmic radiation at sea level in open air. Gate Unit energized			3300	V

Characteristic values

Parameter	Symbol	Conditions	min	typ	max	Unit
Repetitive peak off-state current	I_{DRM}	$V_{\text{D}} = V_{\text{DRM}}$, Gate Unit energized			50	mA

Mechanical data (see Fig. 20, 21)

Maximum rated values ^{Note 1}

Parameter	Symbol	Conditions	min	typ	max	Unit
Mounting force	F_{m}		42	44	46	kN

Characteristic values

Parameter	Symbol	Conditions	min	typ	max	Unit
Pole-piece diameter	D_{p}	± 0.1 mm		85		mm
Housing thickness	H		25.4		25.9	mm
Weight	m				2.9	kg
Surface creepage distance	D_{s}	Anode to Gate	33			mm
Air strike distance	D_{a}	Anode to Gate	10			mm
Length	l	± 1.0 mm		439		mm
Height	h	± 1.0 mm		40		mm
Width IGCT	w	± 1.0 mm		173		mm

Note 1 Maximum rated values indicate limits beyond which damage to the device may occur

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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, $T_C = 85\text{ °C}$				

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	-15		-1	dBm
Optical noise power	$P_{off CS}$				-45	dBm
Optical output power	$P_{on SF}$		-19		-1	dBm
Optical noise power	$P_{off SF}$					

GCT Part**Max. on-state characteristic model:**

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

Valid for $i_T = 300 - 15000$ A

A_{2525alif}**Max. on-state characteristic model:**

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

Valid for $i_T = 300 - 15000$ A

)5 0 T-.44 08 50 Tc (f15. Tf154.4BT3 (1) Tj-30.12 0 Tj) Tj/F5 f31010

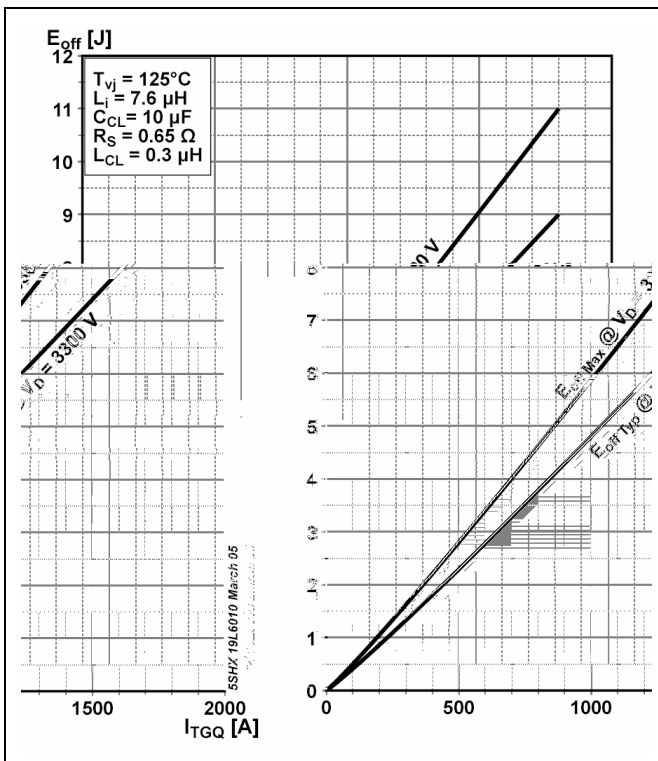


Fig. 7 GCT turn-off energy per pulse vs. turn-off current

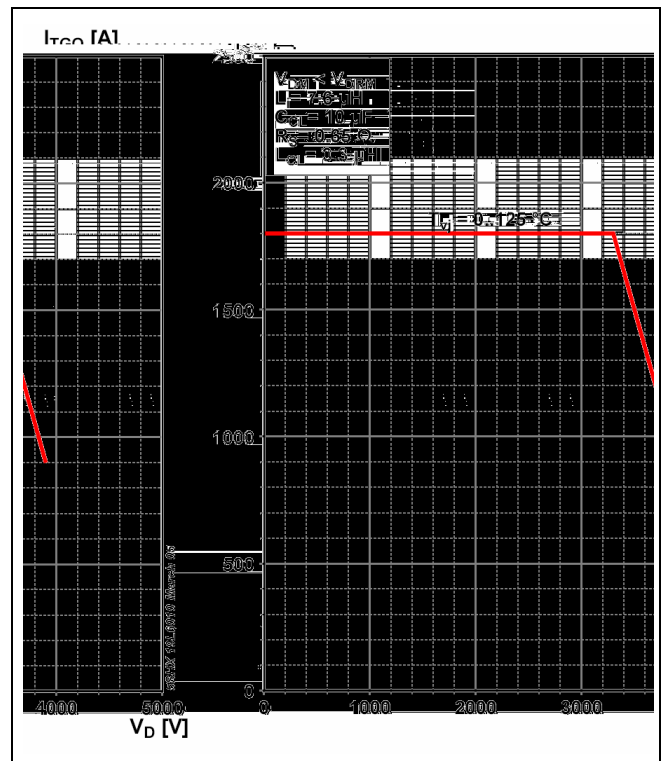


Fig. 8 GCT Safe Operating Area

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

A ₂₅	B ₂₅	C ₂₅	D ₂₅
-1.1	1.3×10^{-3}	654.4×10^{-3}	0.0

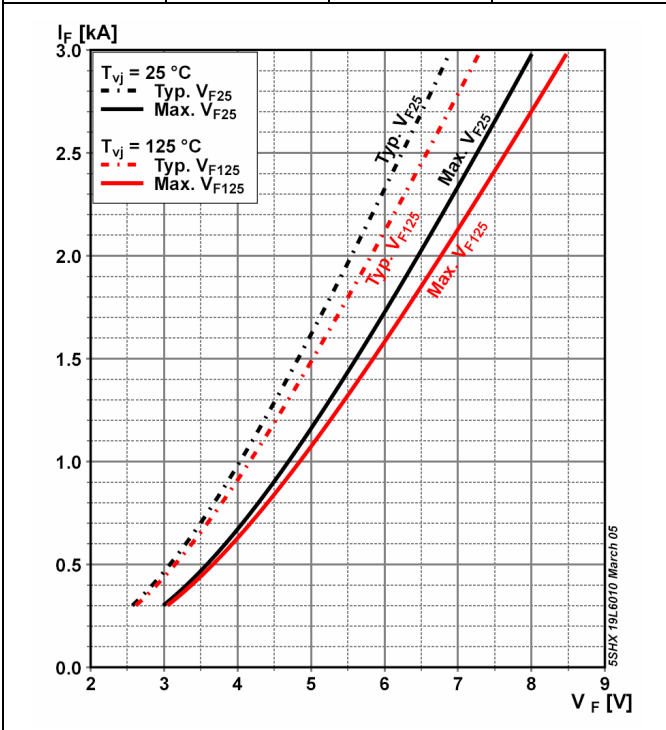


Fig. 9 Max. on-state voltage characteristics

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

A ₁₂₅	B ₁₂₅	C ₁₂₅	D ₁₂₅
-1.0	1.5×10^{-3}	637.4×10^{-3}	0.0

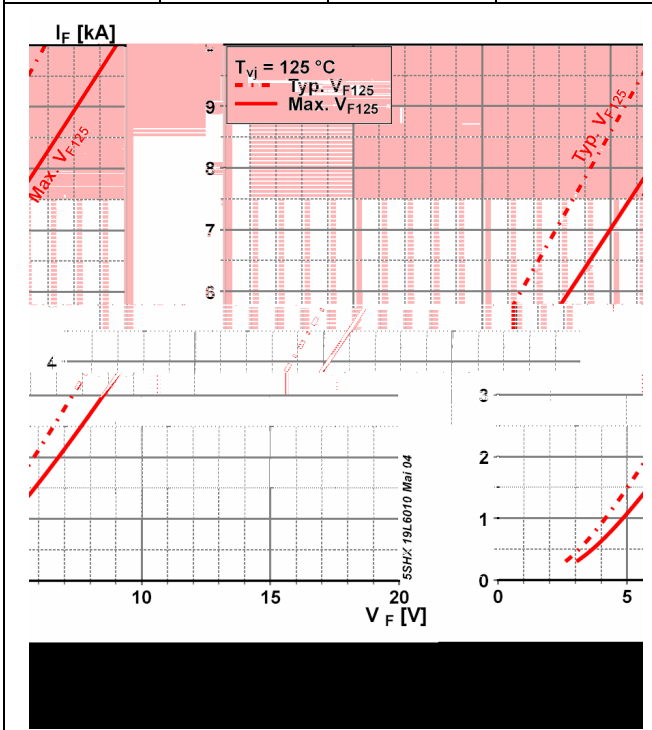


Fig. 10 Max. on-state voltage characteristics

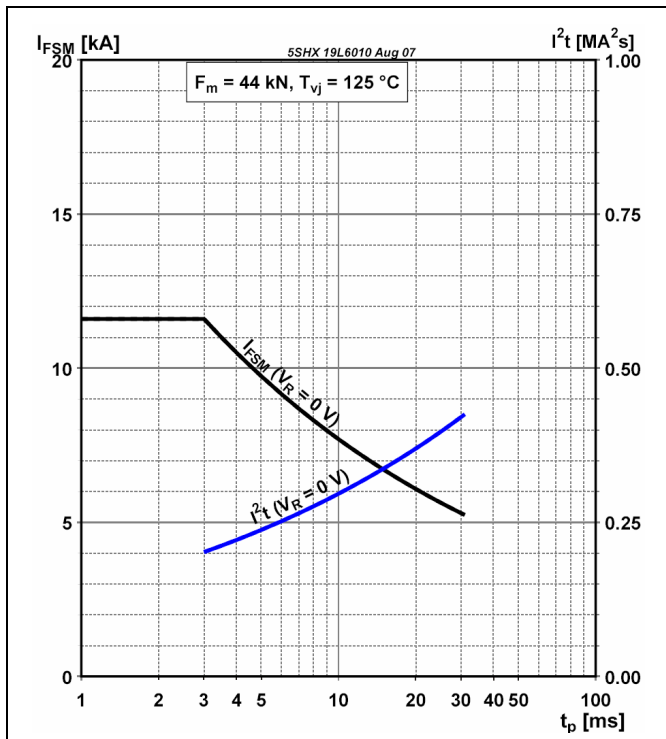


Fig. 11 Surge on-state current vs. pulse length, half-sine wave

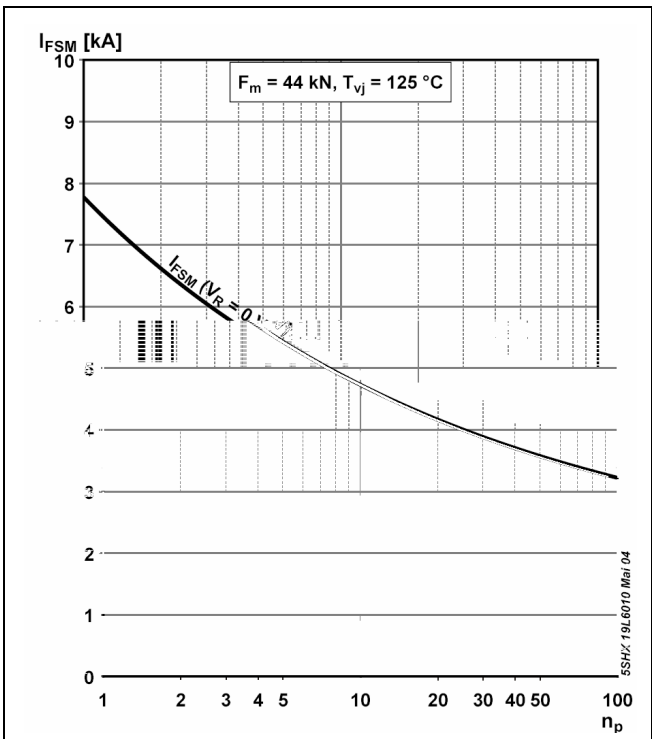


Fig. 12 Surge on-state current vs. number of pulses, half-sine wave, 10 ms, 50Hz

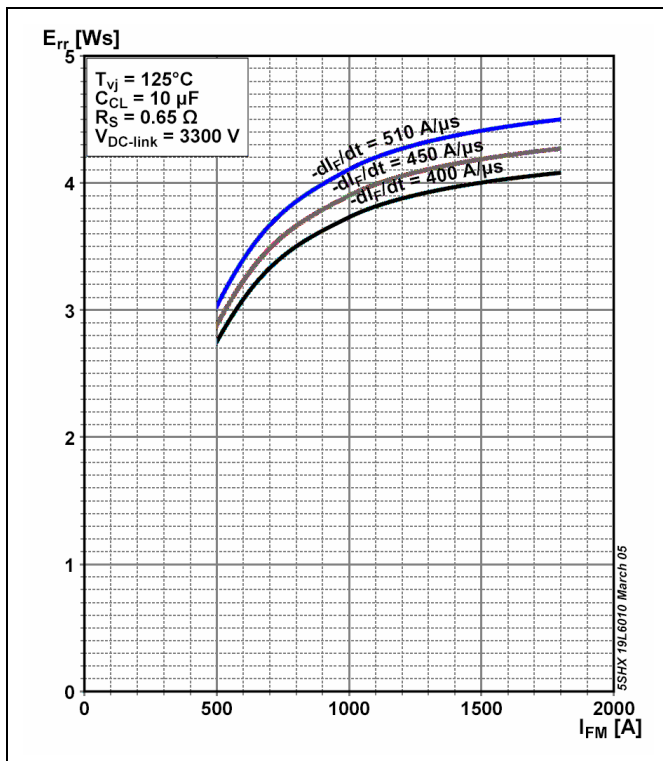


Fig. 13 Upper scatter range of Turn-off energy per pulse vs. turn-off current

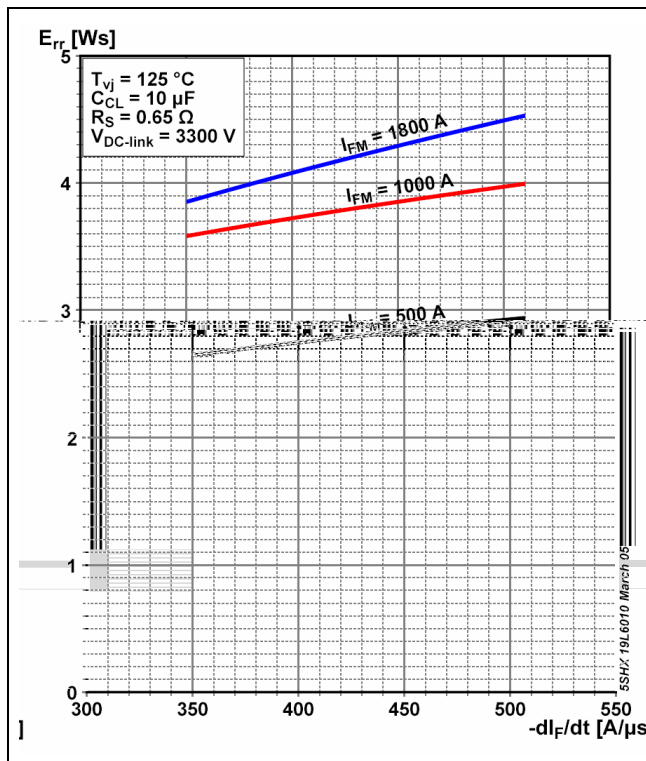


Fig. 14 Upper scatter range of turn-off energy per pulse vs reverse current rise rate

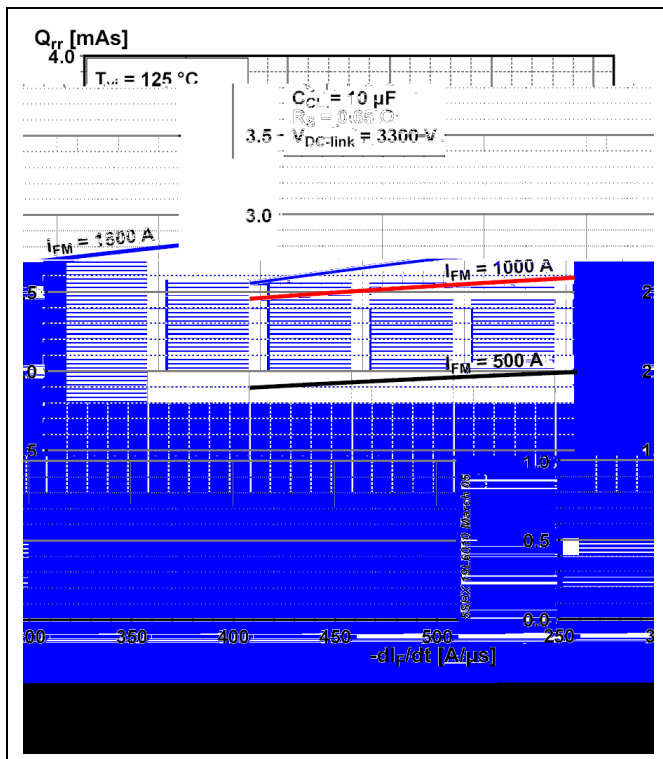


Fig. 15 Upper scatter range of reverse recovery charge vs reverse current rise rate

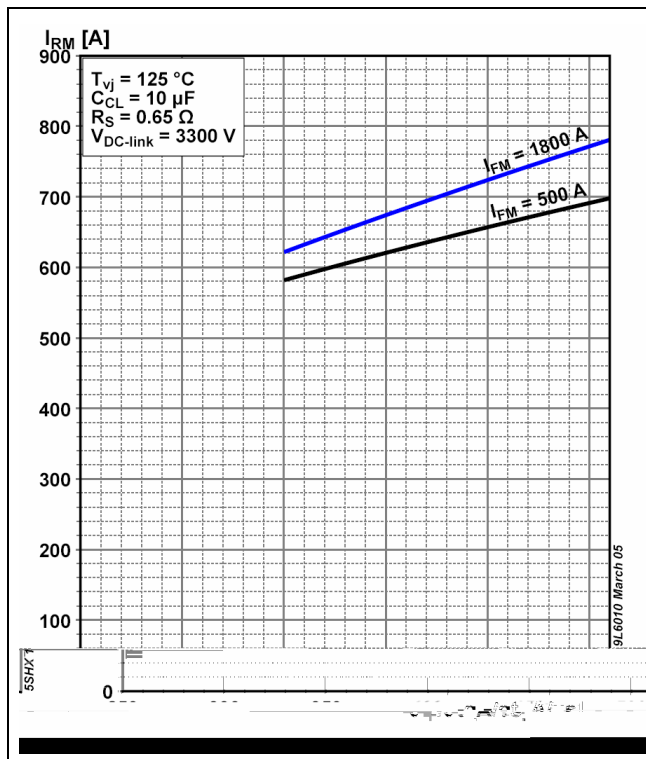


Fig. 16 Upper scatter range of reverse recovery current vs reverse current rise rate

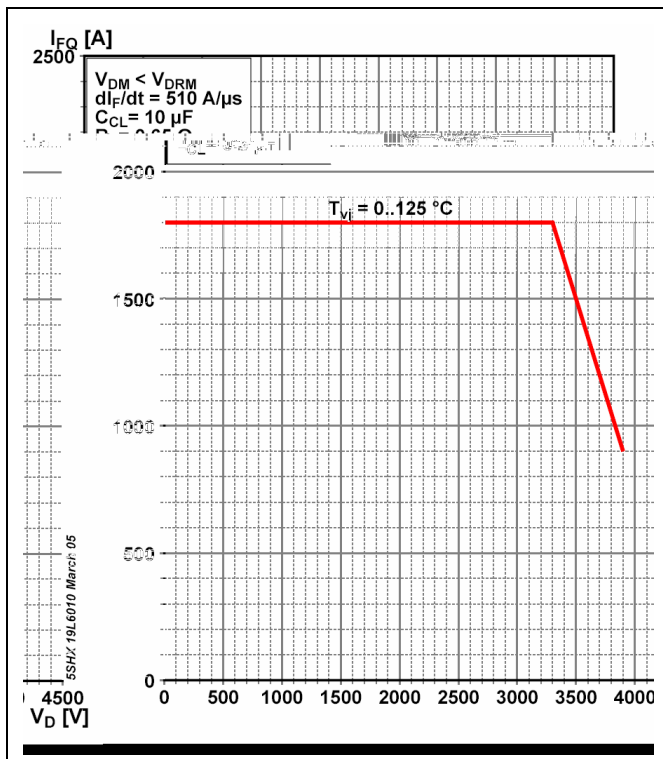


Fig. 17 Diode Safe Operating Area

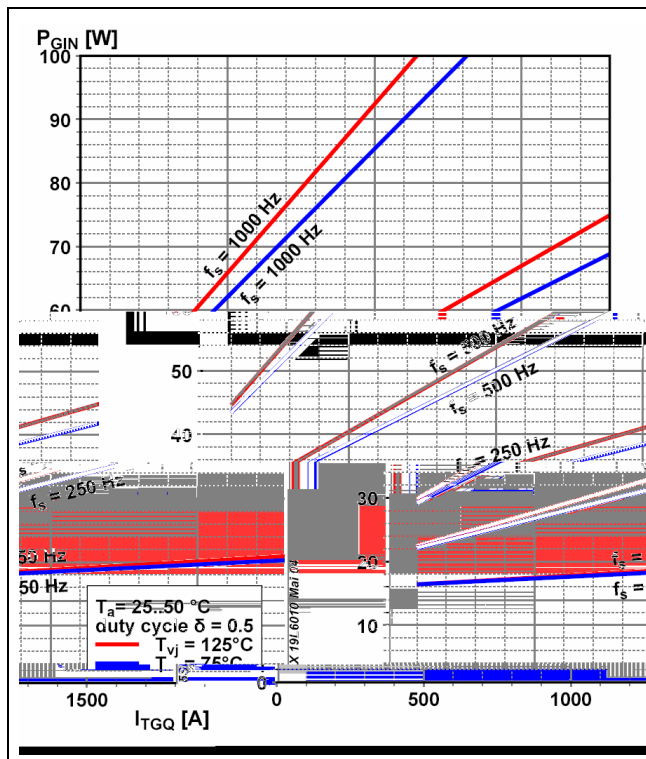


Fig. 18 Max. Gate Unit input power in chopper mode

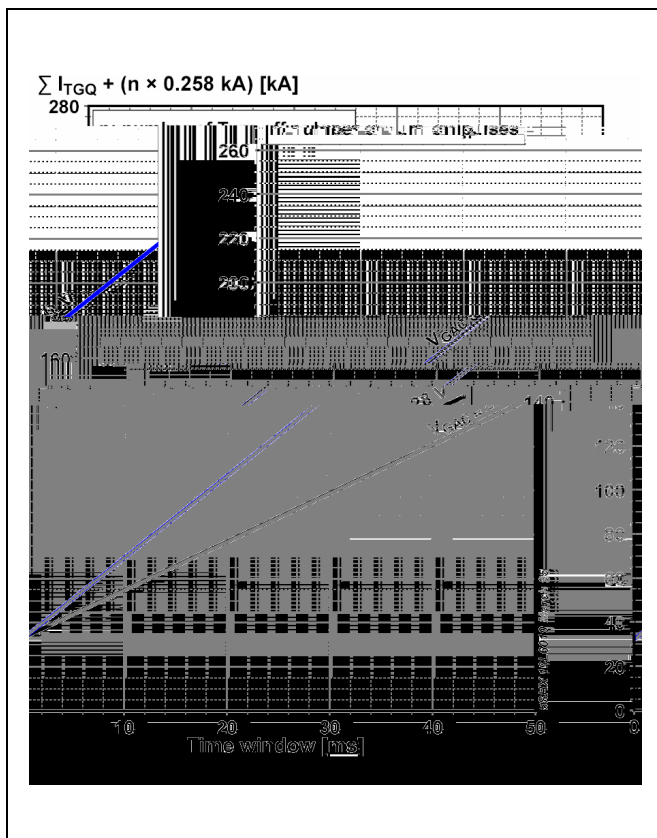


Fig. 19 Burst capability of Gate Unit

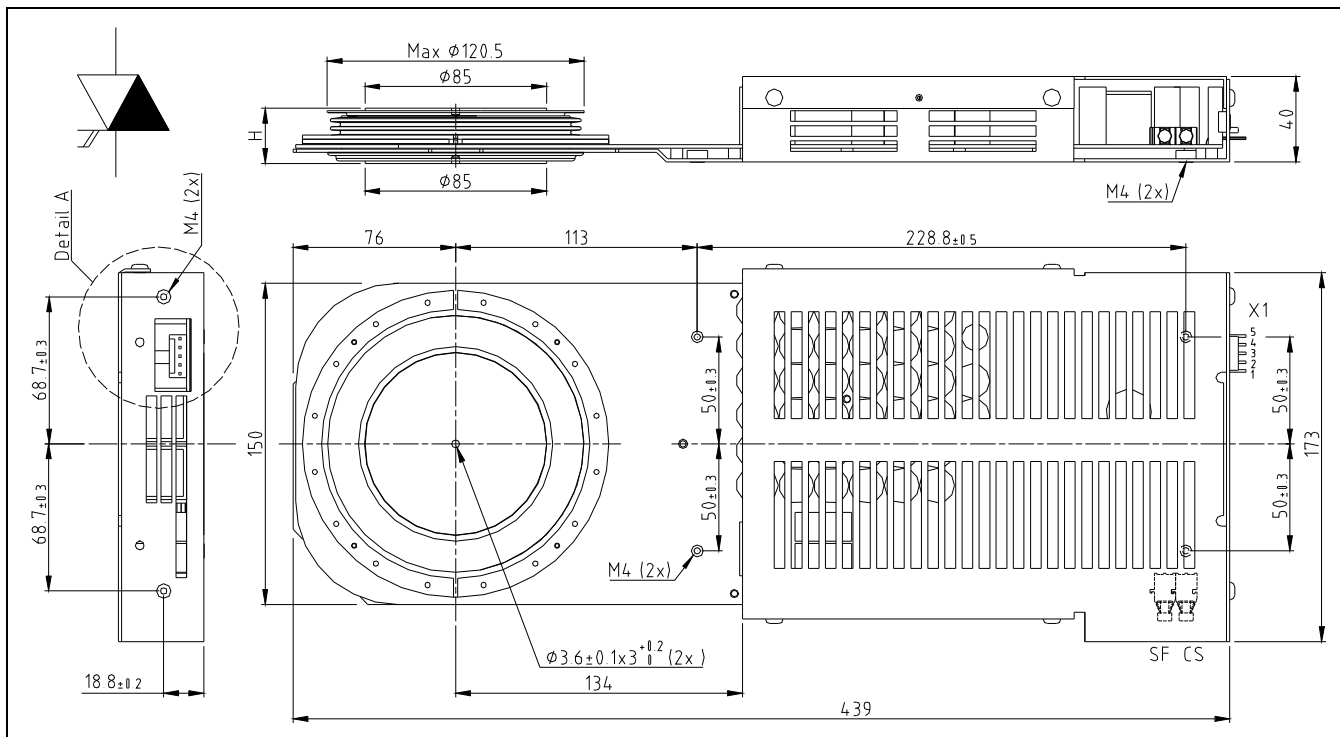


Fig. 20 Outline drawing; all dimensions are in millimeters and represent nominal values unless stated otherwise

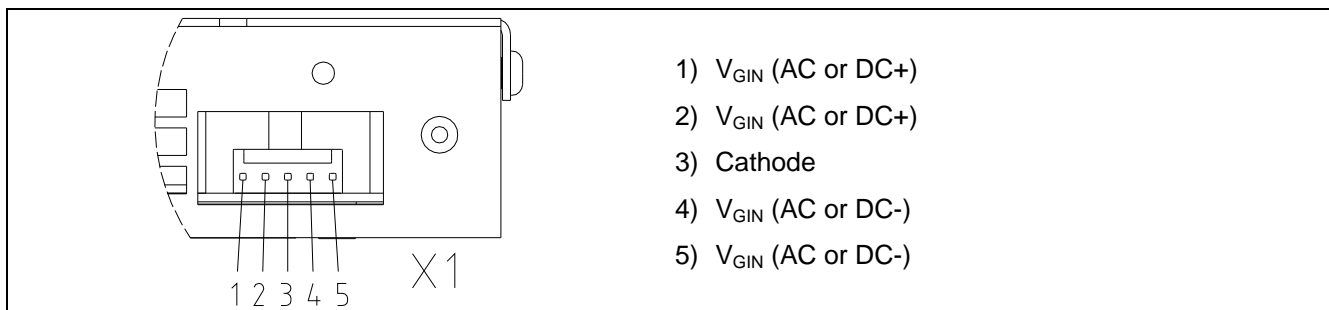


Fig. 21 Detail A: pin out of supply connector X1.

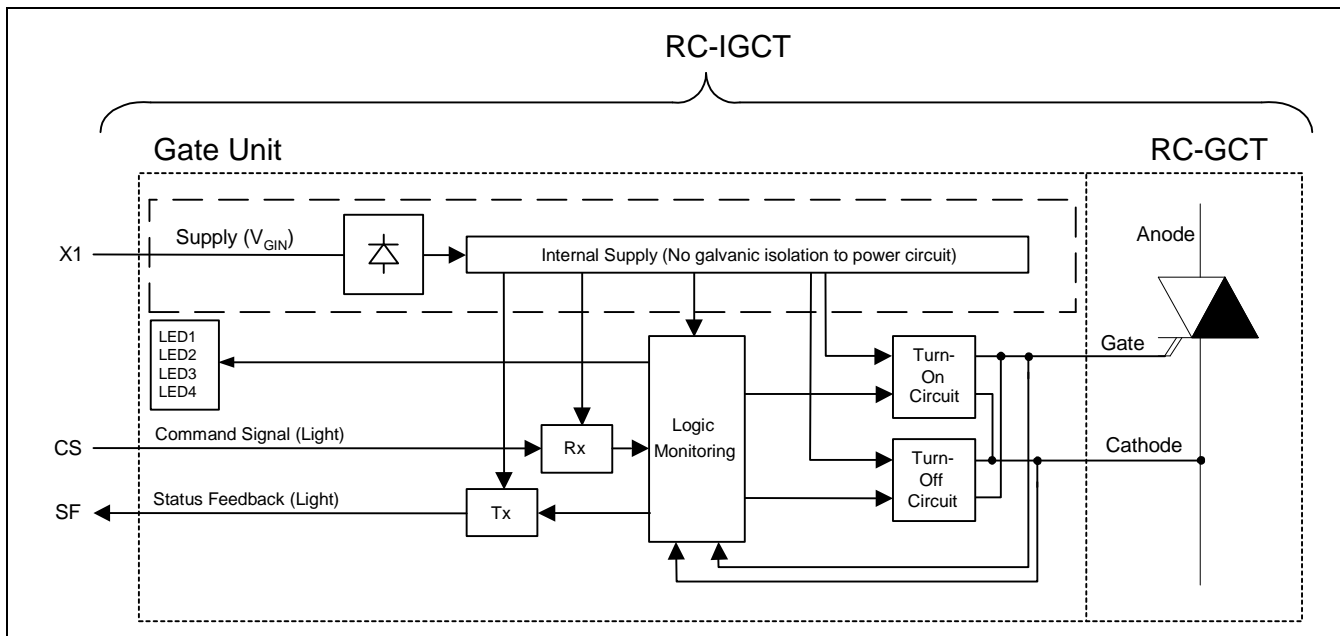
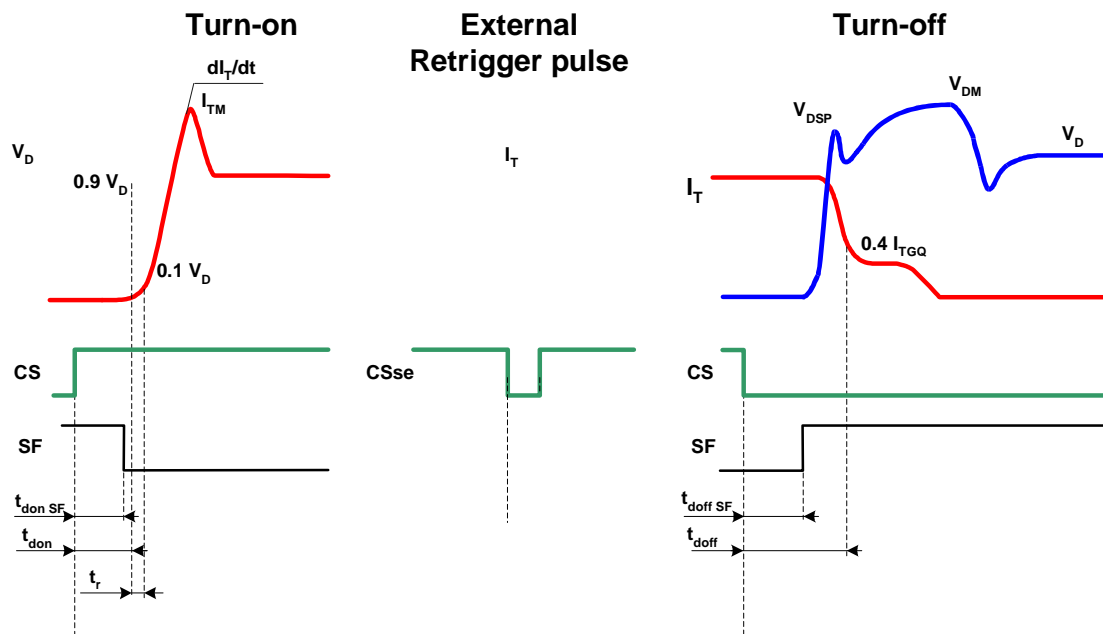


Fig. 22 Block diagram



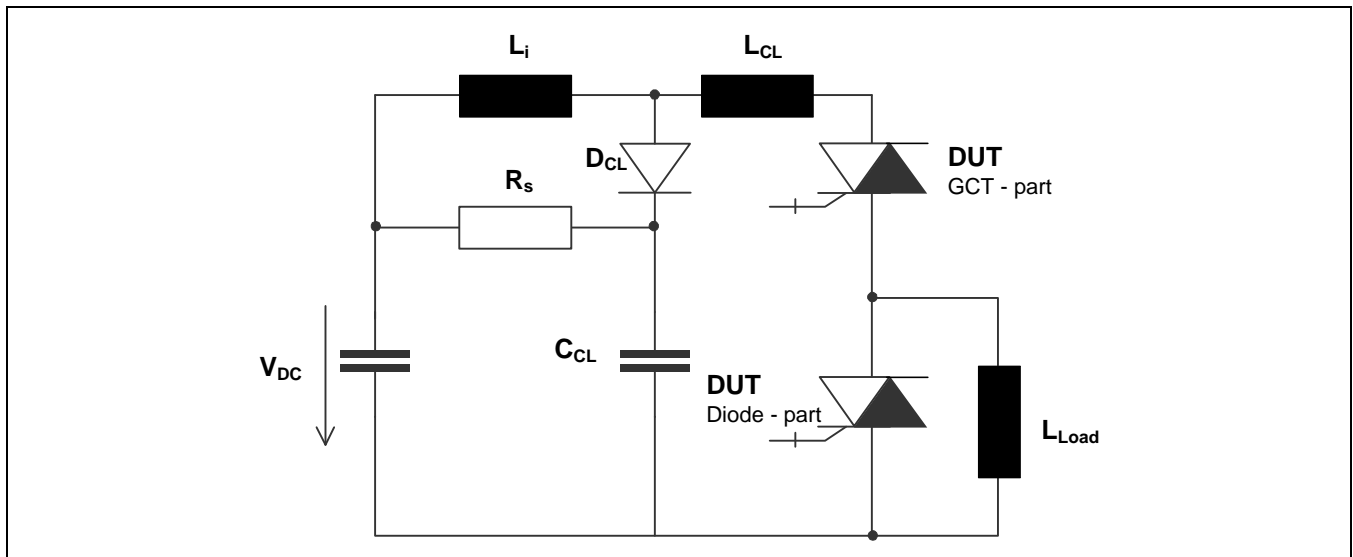


Fig. 25 Test circuit

Related documents:

5SYA 2031	Applying IGCT Gate Units
5SYA 2032	Applying IGCTs
5SYA 2036	Recommendations regarding mechanical clamping of Press Pack High Power Semiconductors
5SYA 2046	Failure rates of IGCTs due to cosmic rays
5SYA 2048	Field measurements on High Power Press Pack Semiconductors
5SYA 2051	Voltage ratings of high power semiconductors
5SZK 9107	Specification of environmental class for pressure contact IGCTs, OPERATION available on request, please contact factory

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