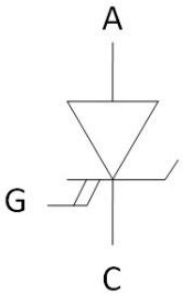
Integrated Gate Turn-off (IGTO) Thyristor

FEATURES

- High snubberless turn-off (4000A) capability
- Suitable for high frequency (>1kHz) operation
- Low gate drive power consumption
- Built-in over-current protection
- Optical trigger input and status feedback
- Suitable for series and parallel operation



Product Summary	
V_{DRM}	4500V
I_{TGQM}	4000A
I_{TSM}	25kA
V_{T0}	1.2V
V_{Dclink}	2800V

Absolute Maximum Ratings T_C = 25ºC, unless otherwise noted

Parameter	Symbol	Test Conditions	Value	Unit
Rep. Peak Off-state Voltage	V_{DRM}	Gate Unit Energized	4500	V
Long Term DC Voltage	V_{Dclink}	Ambient Cosmic Radiation at Sea Level in Open Air. Gate Unit Energized	2800	V
Rep. Peak Off-state Current	I_{DRM}	$V_D = V_{DRM}$, Gate Unit Energized	50	mA

Thermal Resistance

Parameter	Symbol	Value			Unit
		Min.	Typ.	Max.	
Junction Operating Temperature	T_{VJ}	-25	--	125	ºC
Storage Temperature Range	T_{stg}	-25	--	60	ºC
Ambient Temperature	T_A	-25	--	50	ºC
Thermal Resistance Junction to Case (Double side cooling)	$R_{th(J-C)}$	--	--	12.7	K/kW
Thermal Resistance Case to Heatsink (Double side cooling)	$R_{th(C-H)}$	--	--	3	K/kW

Specifications T_A = 25ºC, unless otherwise noted							
Parameter	**Symbol**	**Test Conditions**		**Value**			**Unit**
				Min.	**Typ.**	**Max.**	
Static							
Max. Peak Non-repetitive Surge Current	I_{TSM}	T_J = 125ºC	T_P = 10ms	--	--	25	KA
			T_P = 1ms	--	--	40	
On-state Voltage	V_T	T_J = 125ºC, I_{TGQ} = 2000A		--	2.7	2.9	V
Max. Average On-state Current	$I_{T(AV)M}$	Half Sine Wave, T_C = 85ºC, Double Side Cooling		--	--	1700	A
Threshold Voltage	V_{T0}	T_J = 125ºC, I_T = 1000...4000A		--	--	1.2	V
Turn-on Process							
Max. Rate of Rise of On-state Current	di/dt	$V_{DM} < V_{DRM}$, T_J = 125ºC V_D = 2250V		--	1000	--	A/μs
Turn-on Delay Time	T_{don}	$V_{DM} < V_{DRM}$, T_J = 125ºC V_D = 2250V, I_{TGQ} = 4000A		--	--	4	μs
Rise Time	T_r			--	--	1	μs
Min. On-time	$T_{on(min.)}$			40	--	--	μs
Turn-off Process							
Max. Controllable Turn-off Current	I_{TGQM}	$V_{DM} < V_{DRM}$, T_J = 125ºC V_D = 2250V		--	--	4000	A
Turn-off Delay Time	T_{doff}	$V_{DM} < V_{DRM}$, T_J = 125ºC V_D = 2250V, I_{TGQ} = 4000A		--	--	4	μs
Fall Time	T_f			--	--	0.8	μs
Min. Off-time	$T_{off(min.)}$			40	--	--	μs

Power Supply of Gate Unit						
Parameter	**Symbol**	**Test Conditions**	**Value**			**Unit**
			Min.	**Typ.**	**Max.**	
Power Supply Voltage	V_G	AC Square Wave Amplitude (15kHz-100kHz) or DC Voltage. NO Galvanic Isolation to Power Circuit	28	35	40	V
Gate Unit Power Consumption	P_G	f = 1kHz, δ = 0.5	--	--	30	W

Power Supply of Gate Unit			
Parameter	**Symbol**	**Test Conditions**	**Connector Description**
Receiver for Command Signal	CS	Light Trigger On	HFBR-2521
Transmitter for Status Feedback	SF	Light Output During On-state	HFBR-1521
Transmitter for Current Sensor Output	IS	PWM Light During On-state for Current Through	HFBR-1521
Transmitter for Temperature Sensors Output	TP	PWM Light for Temperature of ETO Cathode	HFBR-1521
Fault Feedback		YES	

Sensor Characteristics	
Symbol	**Typical Formula**
Duty_I	Duty_I = 0.000107×I_T+0.5
Duty_T	Duty_T = 0.0033×T+0.5

Protection Characteristics				
Parameter	**Symbol**	**Test Conditions**	**Default Setting**	**Unit**
Over-current Protection	Foc	Anode Current Exceeds Max Setting Value, Set by (1-4KA Adjustable)	3000	A

Protection Characteristics			
Parameter	**Symbol**	**Description**	**Color**
Power Supply Voltage OK	LED1	“light” When Power Supply is OK.	Green
Over-current Protection	LED2	“light” When ETO is Protected.	Red

Power supply of gate unit						
Parameter	**Symbol**	**Test Conditions**	**Value**			**Unit**
			Min.	**Typ.**	**Max.**	
Mounting Force	Fm	--	36	40	44	KN
Weight	M	--	--	3	--	Kg

Figure 1. Duty_I vs. Current

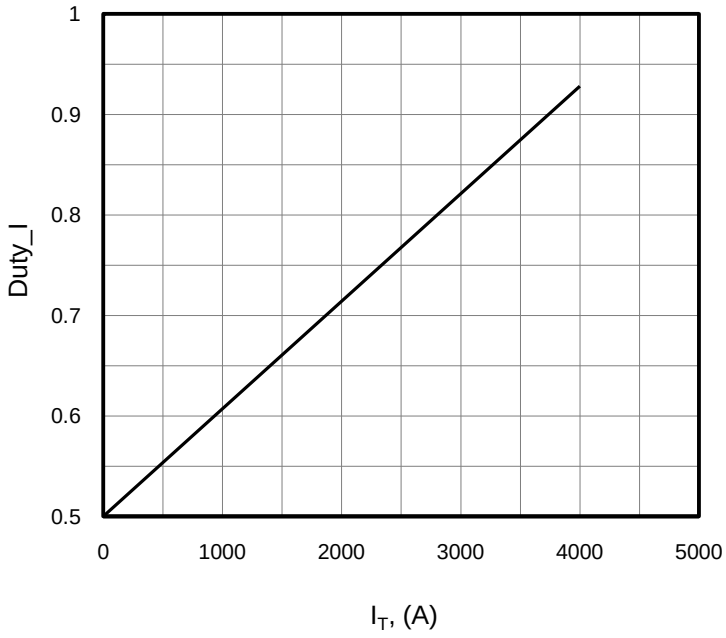


Figure 2. Duty_T vs. Temperature

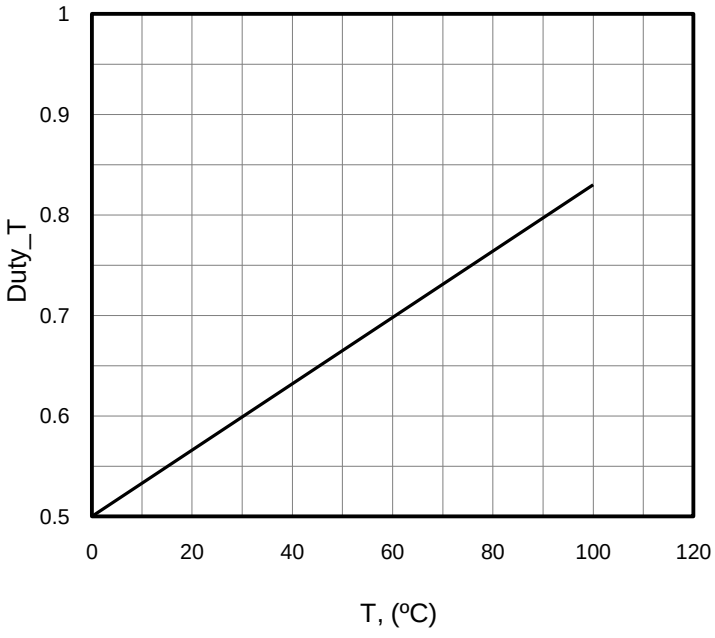


Figure 3. On-state characteristics

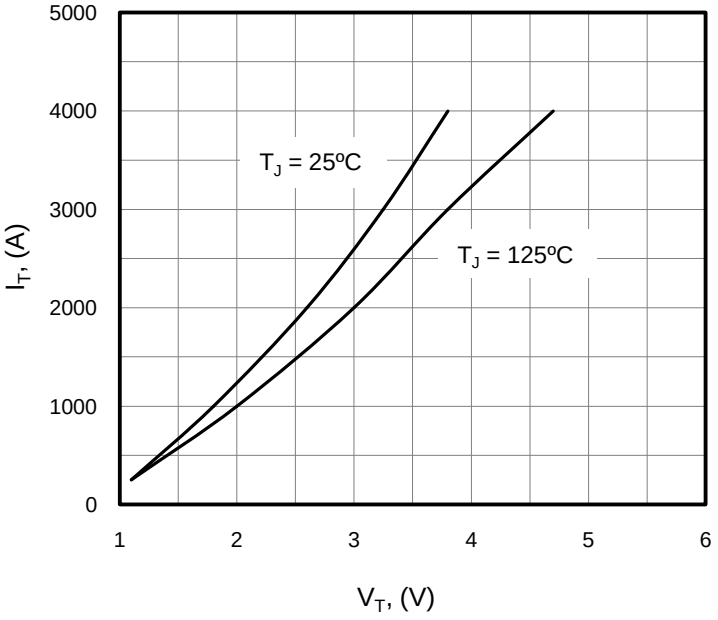


Figure 4. Turn-off loss

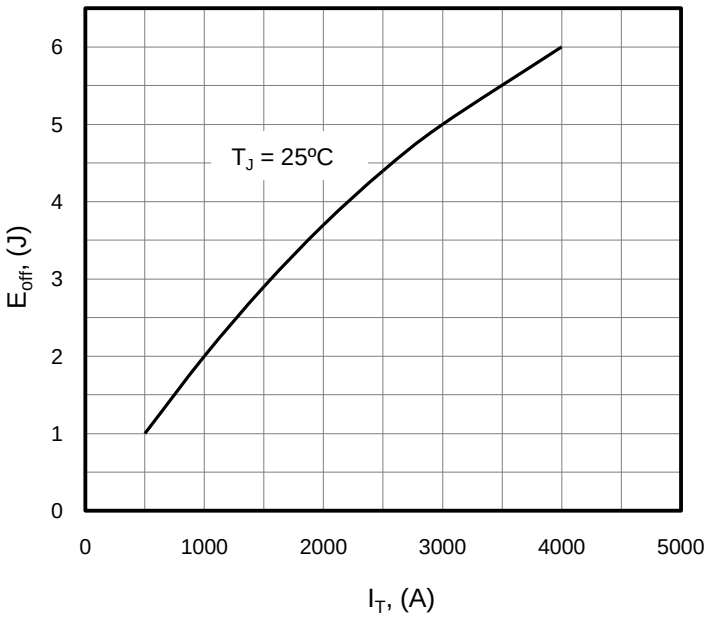


Figure 5. Gate Unit input power

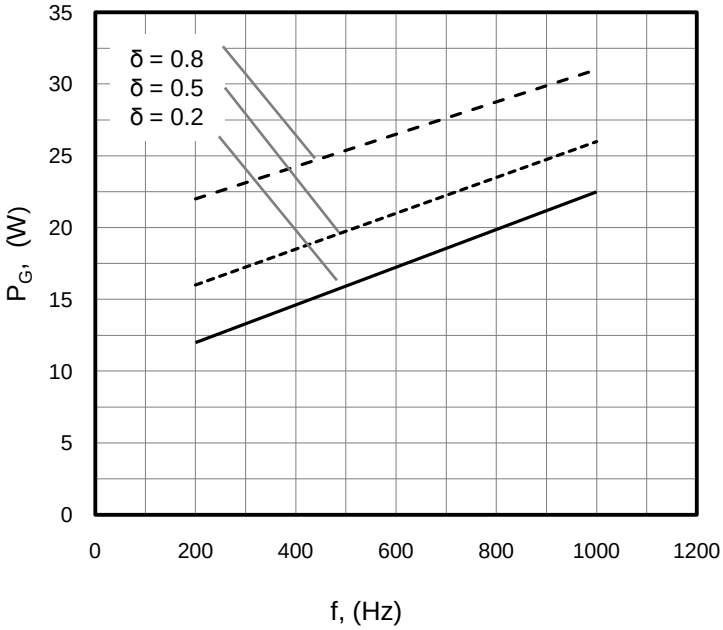


Figure 6. Outline Drawing (all dimensions are in MM)

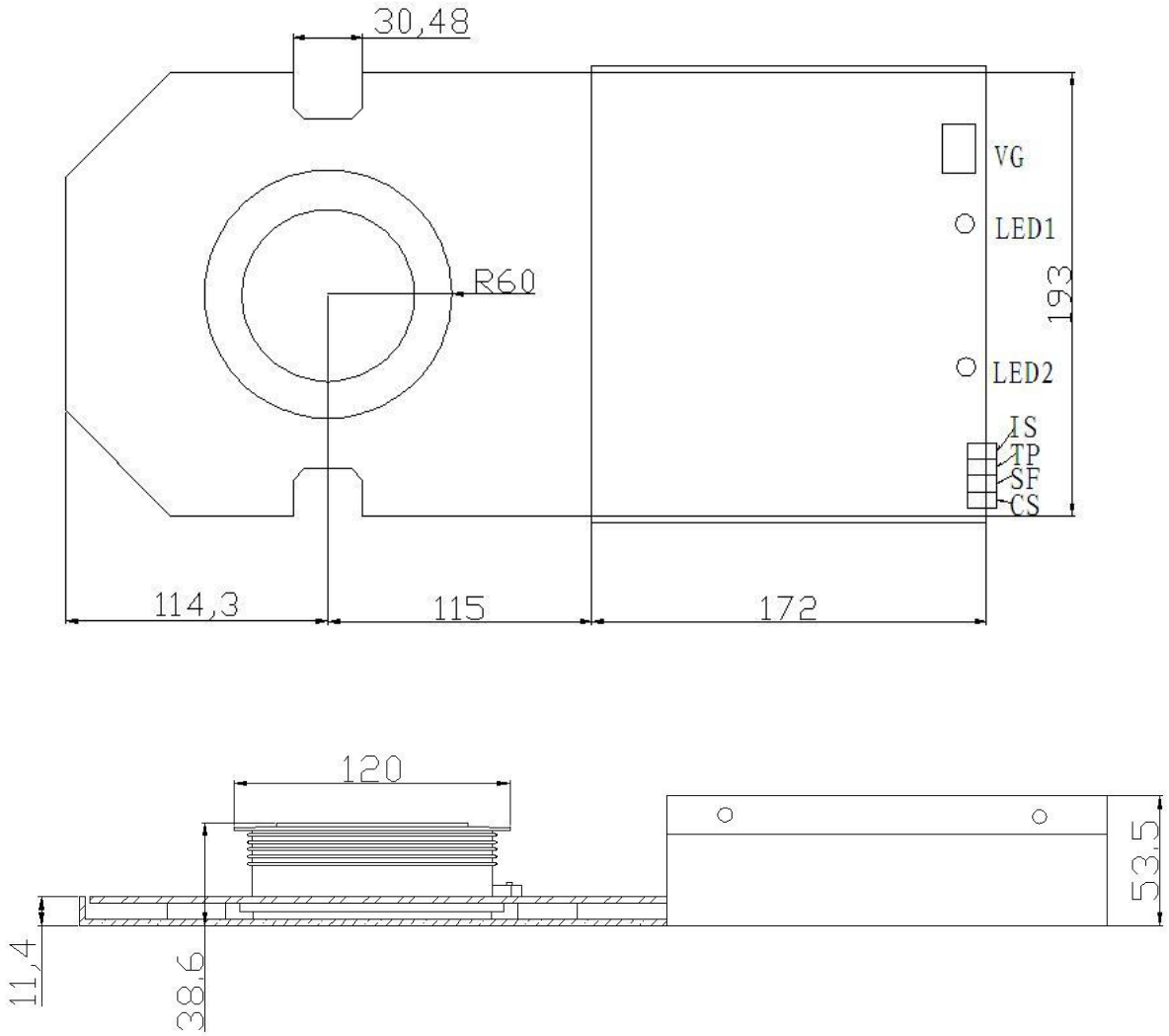
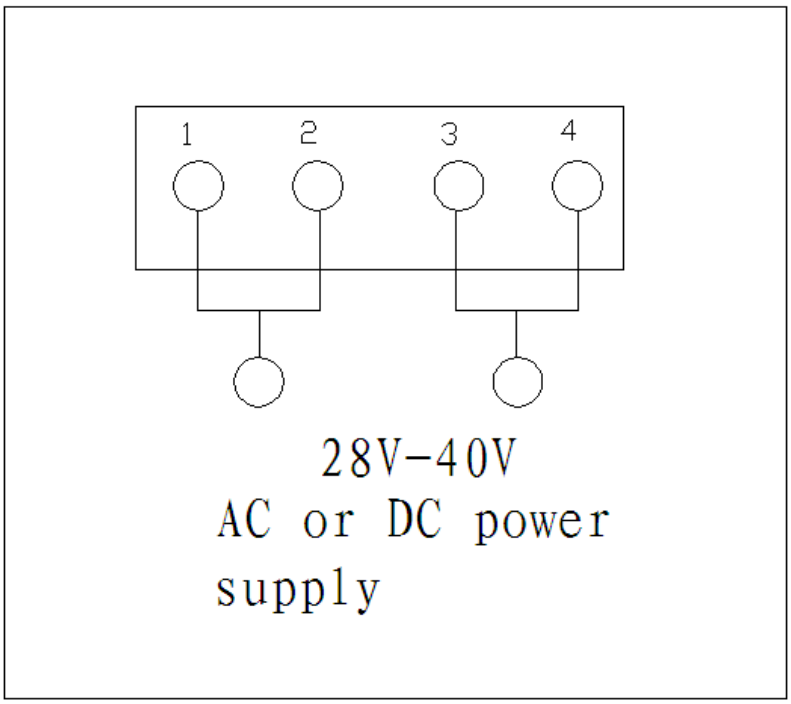


Figure 7. Explanation of power supply terminal



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