CSG30J4500

High-end Power Semiconductor Manufacturer

Gate Turn-off Thyristor

APPLICATION

- Variable speed A.C. motor drive inverters (VSD-AC).
- Uninterruptable Power Supplies
- High Voltage Converters.
- Choppers.
- Welding.
- DC/DC Converters.

KEY PARAMETERS

I_{TCM}	3000A
V_{DRM}	4500V
$I_{T(AV)}$	870A
dV_D/dt	1000V/μs
di_T/dt	300A/μs

FEATURES

- Double Side Cooling.
- High Reliability In Service.
- High Voltage Capability.
- Fault Protection Without Fuses.
- High Surge Current Capability.
- Turn-off Capability Allows Reduction In Equipment Size And Weight. Low Noise Emission Reduces Acoustic Cladding Necessary For Environmental Requirements.

VOLTAGE RATINGS

Type Number	Repetitive Peak Off-state Voltage V_{DRM} V	Repetitive Peak Reverse Voltage V_{RRM} V	Conditions
CSG30J4500	4500	16	T_{vj} = 125°C, I_{DM} = 100mA, I_{RRM} = 50mA

CURRENT RATINGS

Symbol	Parameter	Conditions	Max.	Units
I_{TCM}	Repetitive peak controllable on-state current	V_D = 66% V , Tj = 125°C, di /dt = 40A/μs, Cs = 6μF.	3000	A
$I_{T(AV)}$	Mean on-state current	T_{HS} = 80°C. Double side cooled. Half sine 50Hz.	870	A
$I_{T(RMS)}$	RMS on-state current	T_{HS} = 80°C. Double side cooled. Half sine 50Hz.	1365	A

SURGE RATINGS

Symbol	Parameter	Conditions	Max.	Units
I_{TSM}	Surge (non-repetitive) on-state current	10ms half sine. T_j = 125 °C	16.0	kA
I^2t	I^2t for fusing	10ms half sine. T_j =125 °C	1.28×10^6	A^2s
di_T/dt	Critical rate of rise of on-state current	V_D = 3000V, I_T = 3000A, T_j = 125°C, I_{FG} > 40A, Rise time > 1.0μs	300	A/μs
dV_D/dt	Rate of rise of off-state voltage	To 66% V_{DRM} ; $R_{GK} \leq 1.5\Omega$, T_j = 125°C	100	V/μs
		To 66% V_{DRM} ; V_{RG} = -2V, T_j = 125°C	1000	V/μs
L_S	Peak stray inductance in snubber circuit	-	200	nH

GATE RATINGS

Symbol	Parameter	Conditions	Min.	Max.	Units
V_{RGM}	Peak reverse gate voltage	This value maybe exceeded during turn-off	-	16	V
I_{FGM}	Peak forward gate current		-	100	A
$P_{FG(AV)}$	Average forward gate power		-	20	W
P_{RGM}	Peak reverse gate power		-	24	kW
di_{GQ}/dt	Rate of rise of reverse gate current		30	60	A/μs
$t_{ON(min)}$	Minimum permissable on time		50	-	μs
$t_{OFF(min)}$	Minimum permissable off time		100	-	μs

THERMAL AND MECHANICAL RATINGS

Symbol	Parameter	Conditions		Min.	Max.	Units
$R_{th(j-hs)}$	DC thermal resistance - junction to heatsink surface	Double side cooled		-	0.0146	°C/W
		Anode side cooled		-	0.0233	°C/W
		Cathode side cooled		-	0.0392	°C/W
$R_{th(c-hs)}$	Contact thermal resistance	Clamping force 35.0kN With mounting compound	per contact	-	0.0036	°C/W
T_{vj}	Virtual junction temperature			-40	125	°C
T_{OP}/T_{stg}	Operating junction/storage temperature range			-40	125	°C
-	Clamping force			33.0	37.0	kN

GTO CHARACTERISTICS

T_j = 125℃ unless stated otherwise					
Symbol	**Parameter**	**Conditions**	**Min.**	**Max.**	**Units**
V_{TM}	On-state voltage	At 3000A peak, $I_{G(ON)}$ = 8A d.c.	-	4.0	V
I_{DM}	Peak off-state current	V_{DRM} = 4500V, V_{RG} = 0V	-	100	mA
I_{RRM}	Peak reverse current	At V_{RRM}	-	50	mA
V_{GT}	Gate trigger voltage	V_D = 24V, I_T = 100A, T_j = 25℃	-	1.2	V
I_{GT}	Gate trigger current	V_D = 24V, I_T = 100A, T_j = 25℃	-	3.5	A
I_{RGM}	Reverse gate cathode current	V_{RGM} = 16V, No gate/cathode resistor	-	50	mA
E_{ON}	Turn-on energy	V_D = 2250V	-	3000	mJ
t_d	Delay time	I_T = 3000A, dI_T/dt = 300A/μs	-	1.5	μs
t_r	Rise time	I_{FG} = 40A, rise time < 1.0μs	-	3.0	μs
E_{OFF}	Turn-off energy	I_T = 3000A, V_{DM} = 3000V Snubber Cap Cs = 6.0μF, di_{GQ}/dt = 40A/μs	-	6300	mJ
t_{gs}	Storage time		-	20.6	μs
t_{gf}	Fall time		-	2.2	μs
t_{gq}	Gate controlled turn-off time		-	22.8	μs
Q_{GQ}	Turn-off gate charge		-	10000	μC
Q_{GQT}	Total turn-off gate charge		-	20000	μC
I_{GQM}	Peak reverse gate current		-	830	A

CURVES

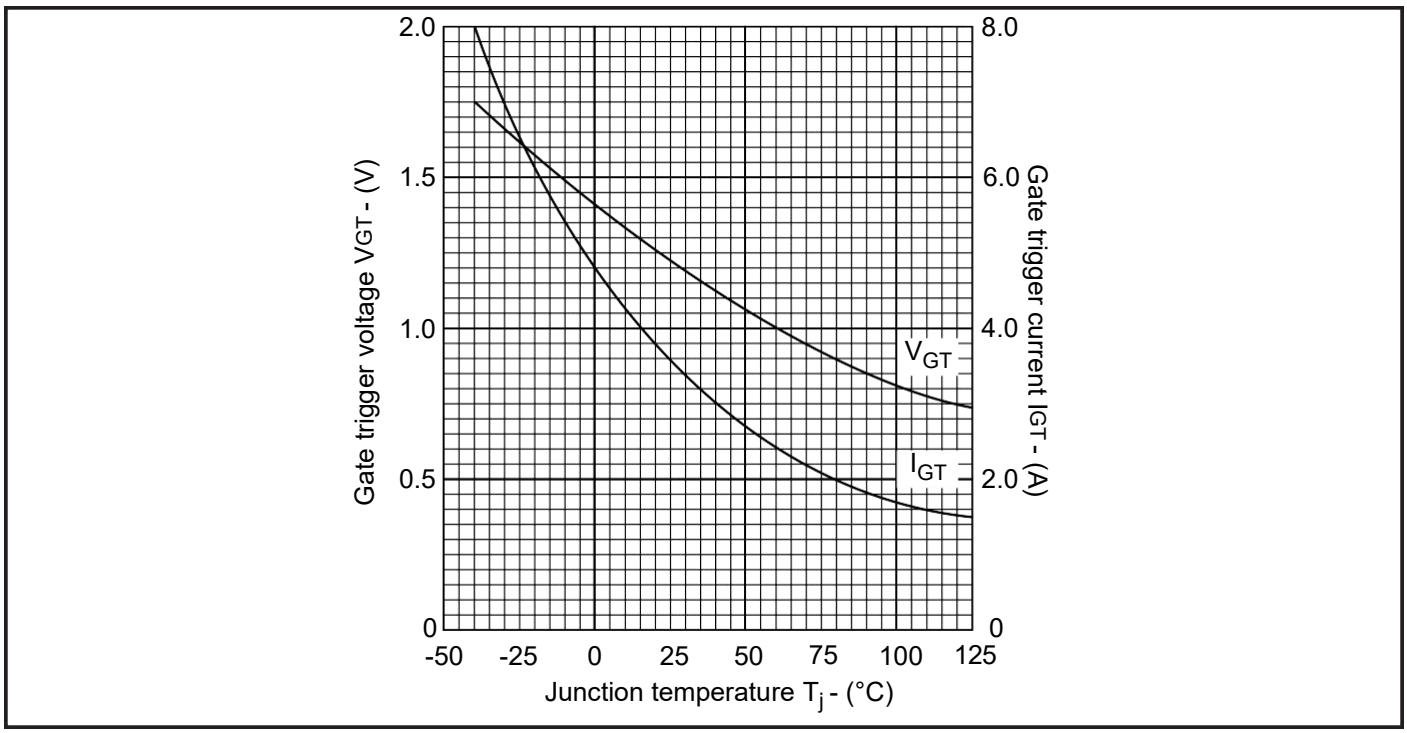


Fig.1 Maximum gate trigger voltage/current vs junction temperature

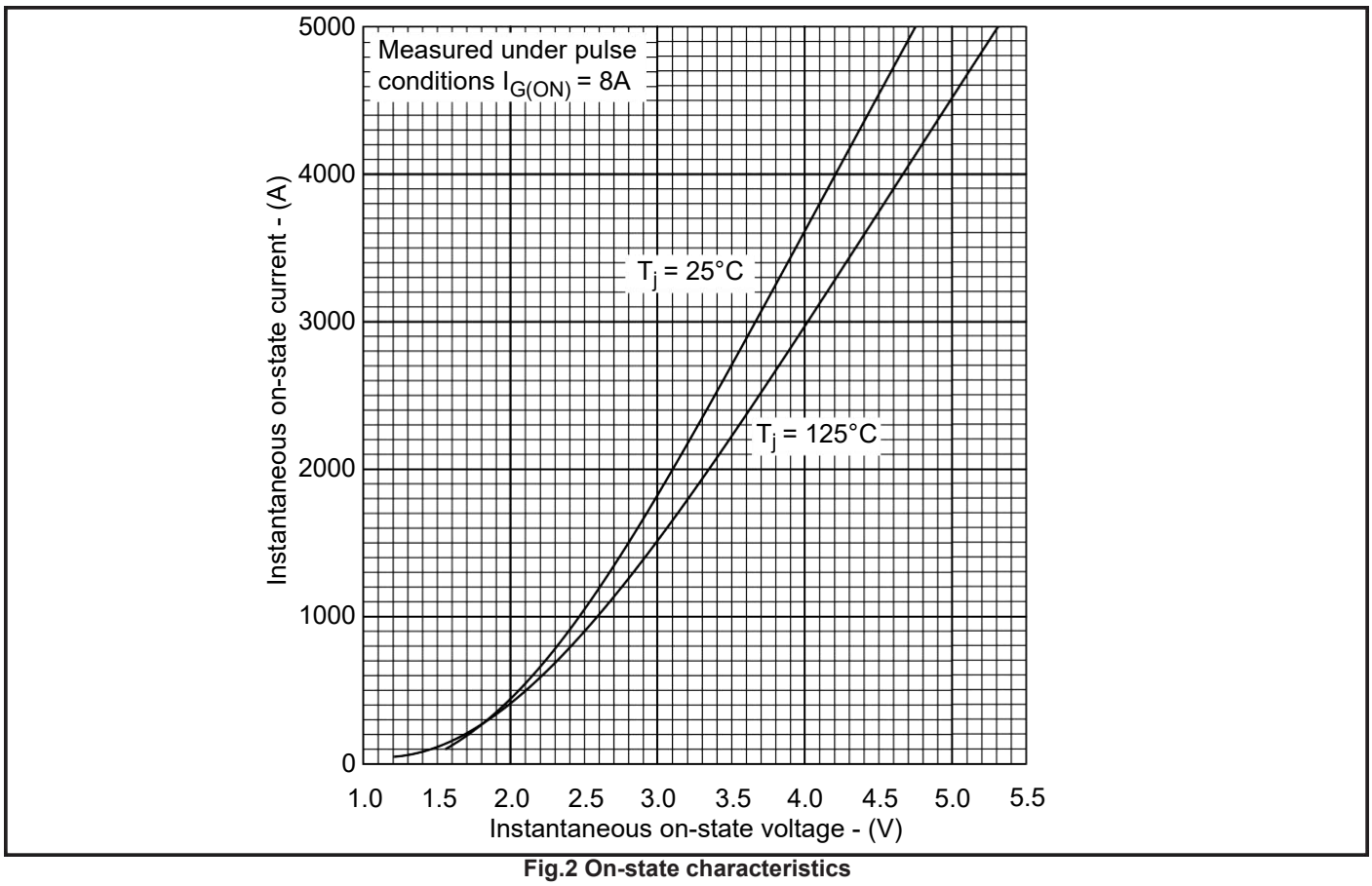


Fig.2 On-state characteristics

CURVES

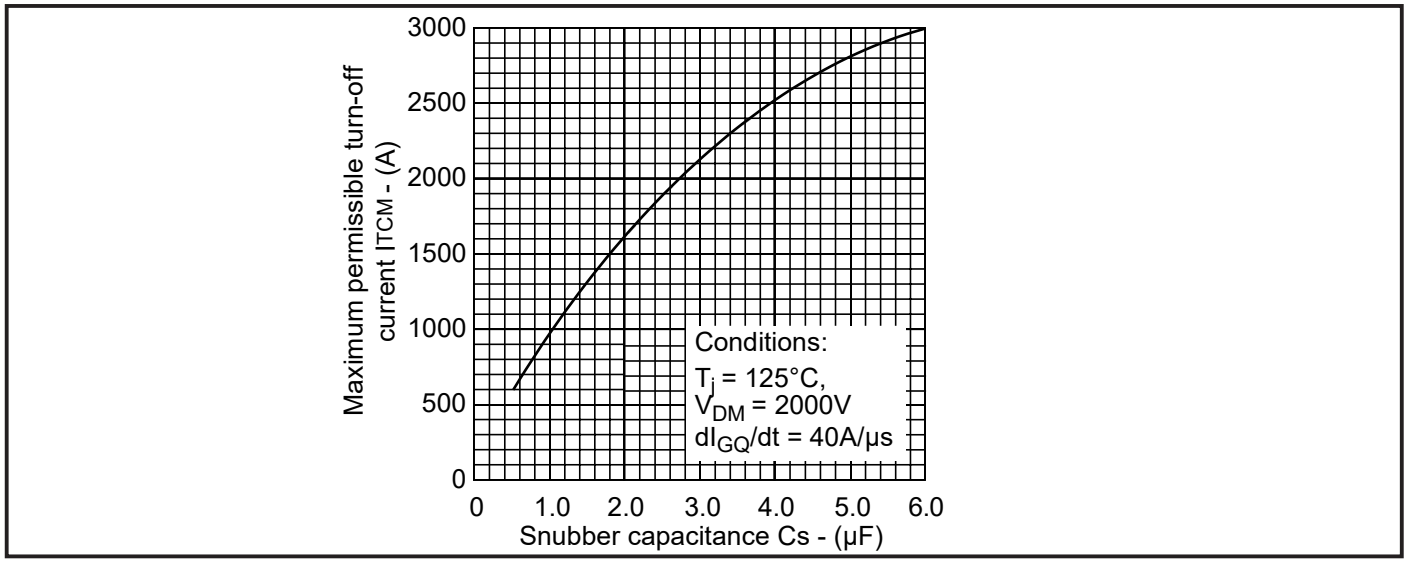


Fig.3 Maximum dependence of I_{TCM} on C_S

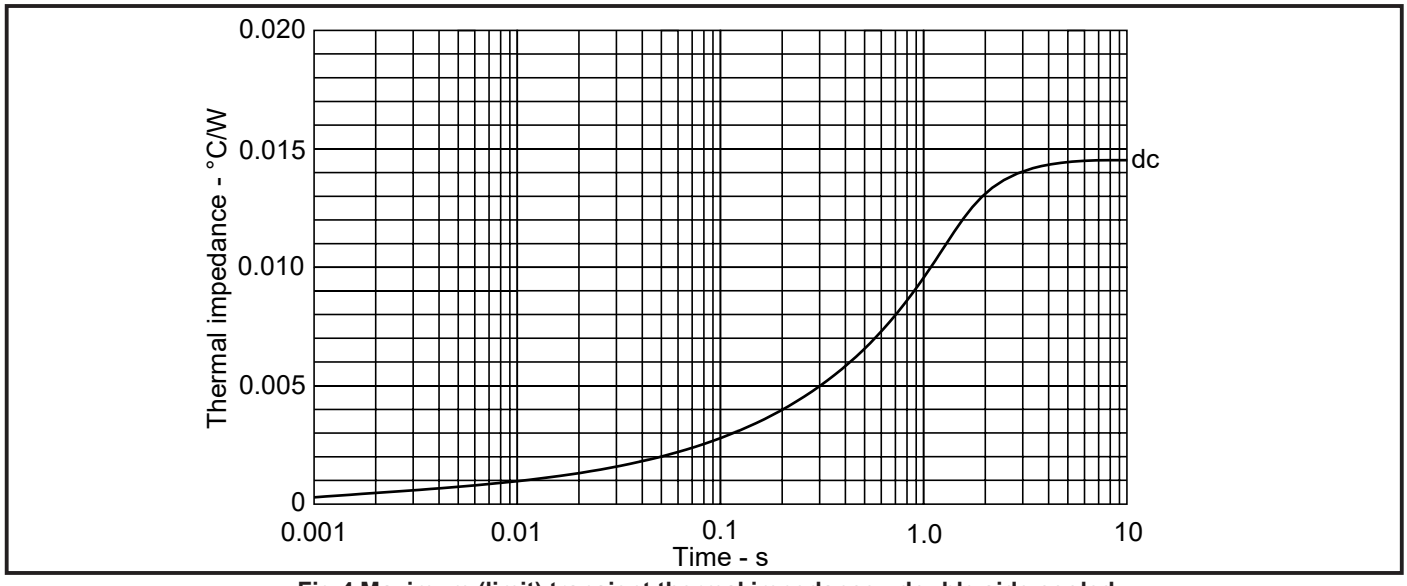


Fig.4 Maximum (limit) transient thermal impedance - double side cooled

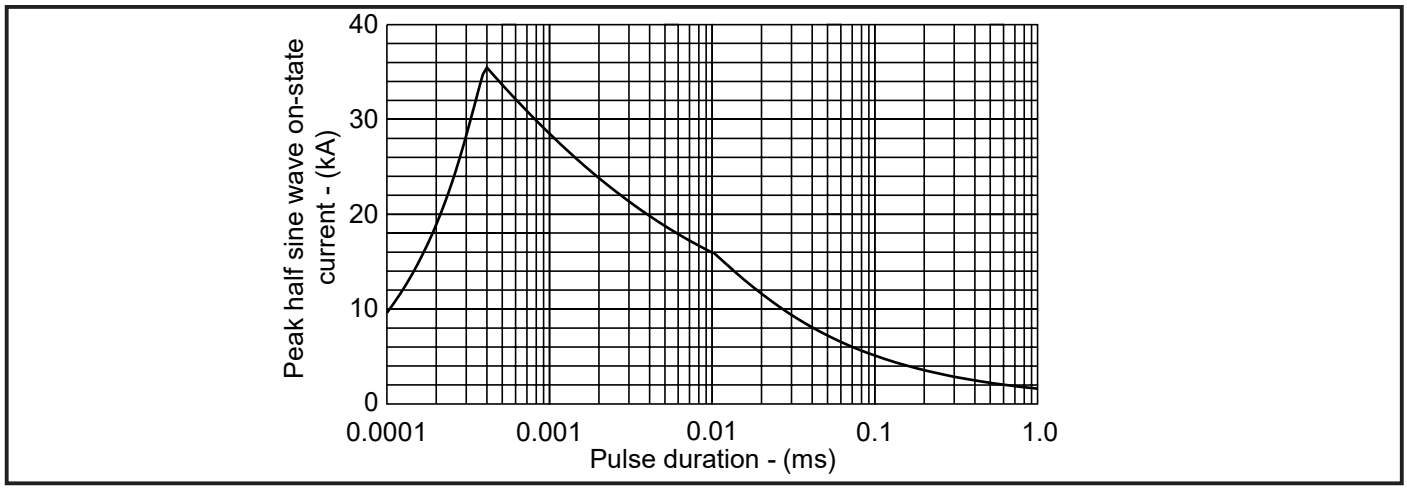


Fig.5 Surge (non-repetitive) on-state current vs time

CURVES

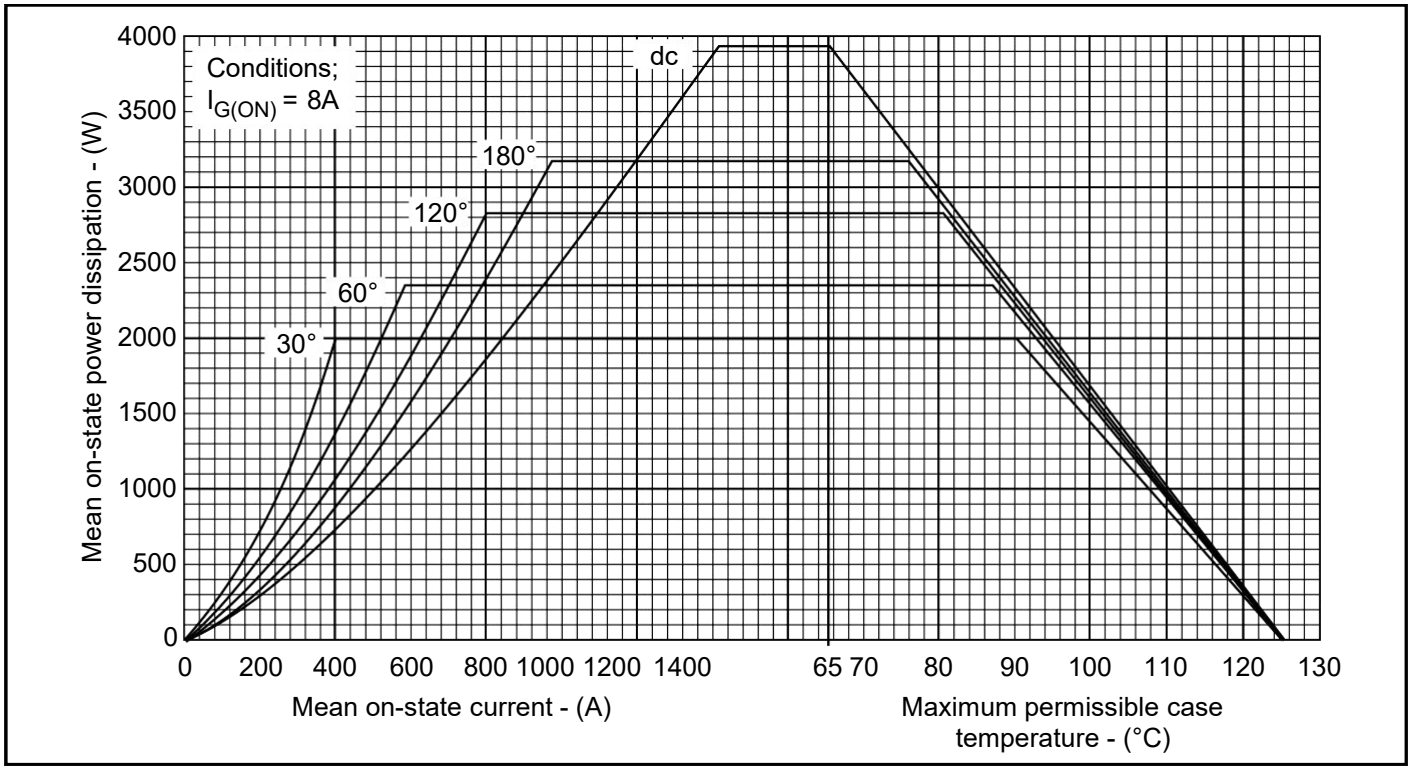


Fig.6 Steady state rectangluar wave conduction loss - double side cooled

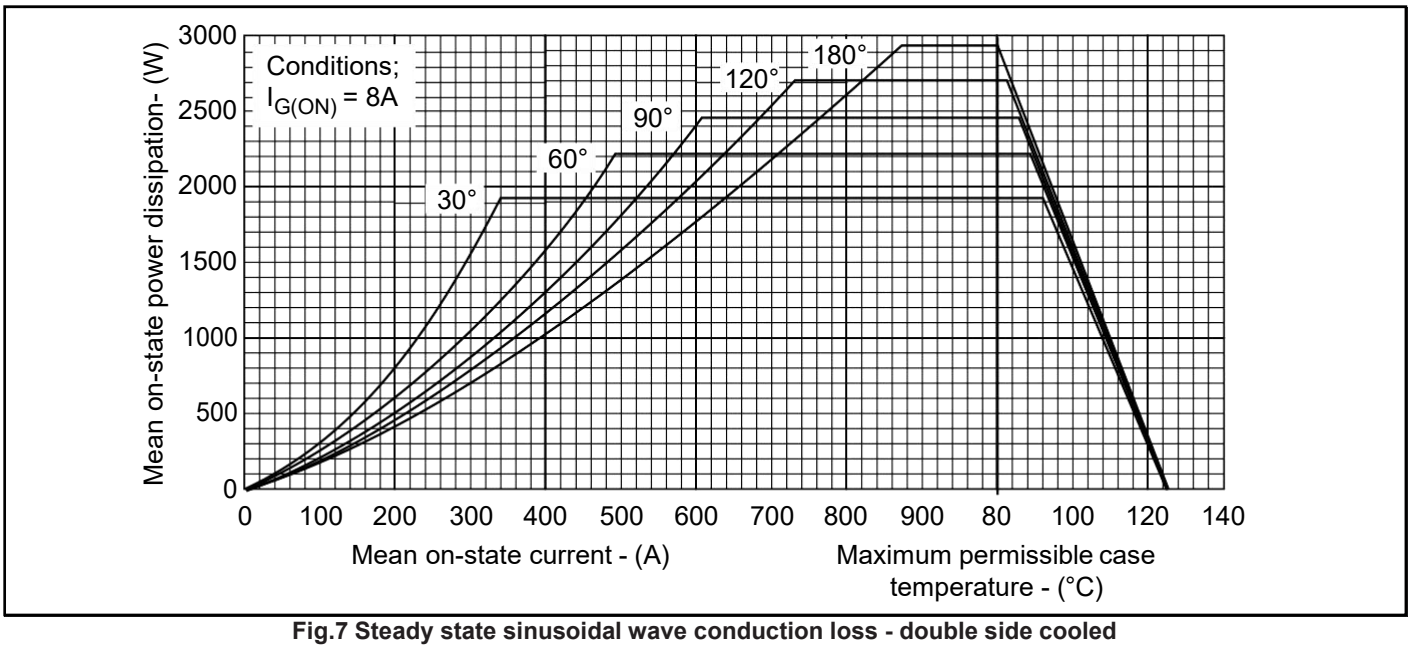


Fig.7 Steady state sinusoidal wave conduction loss - double side cooled

CURVES

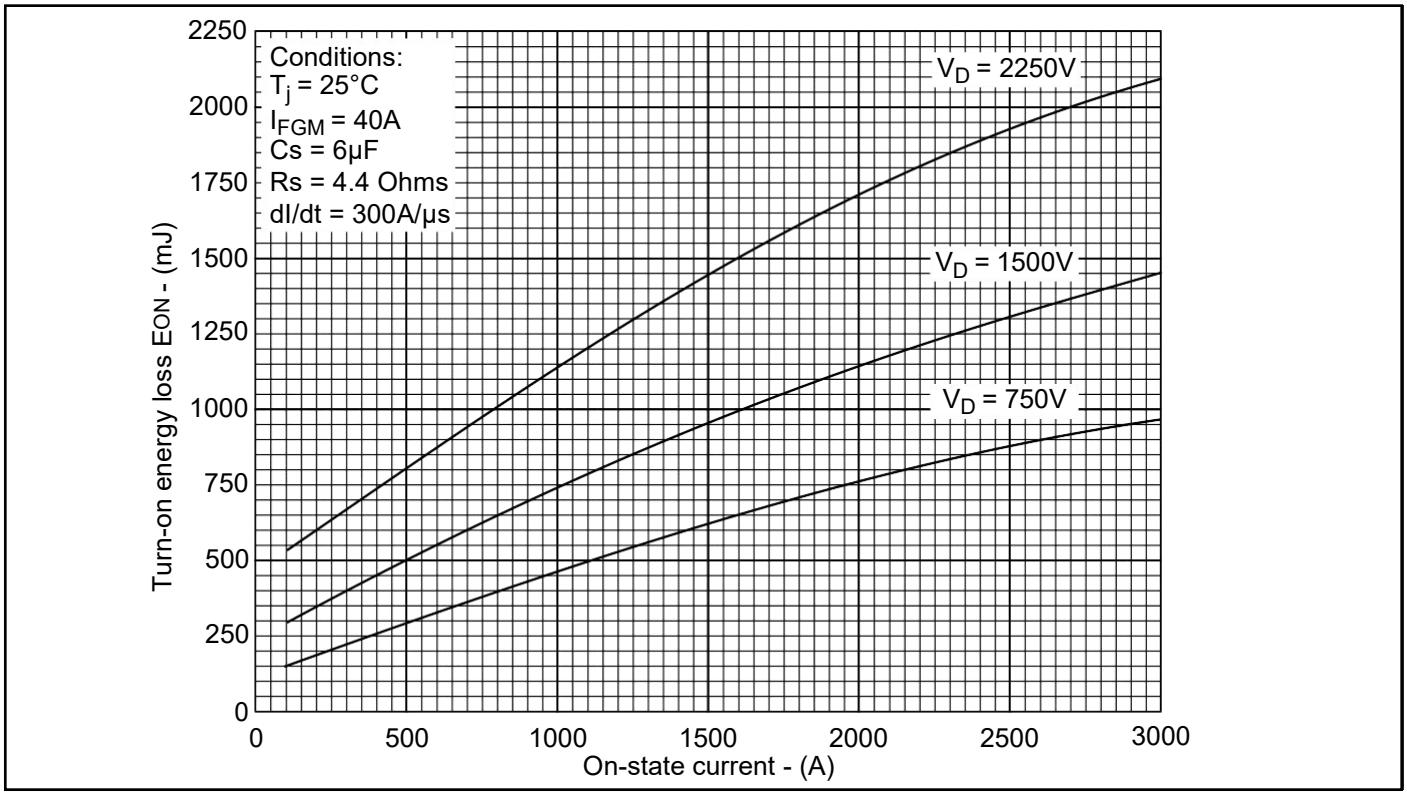


Fig.8 Turn-on energy vs on-state current

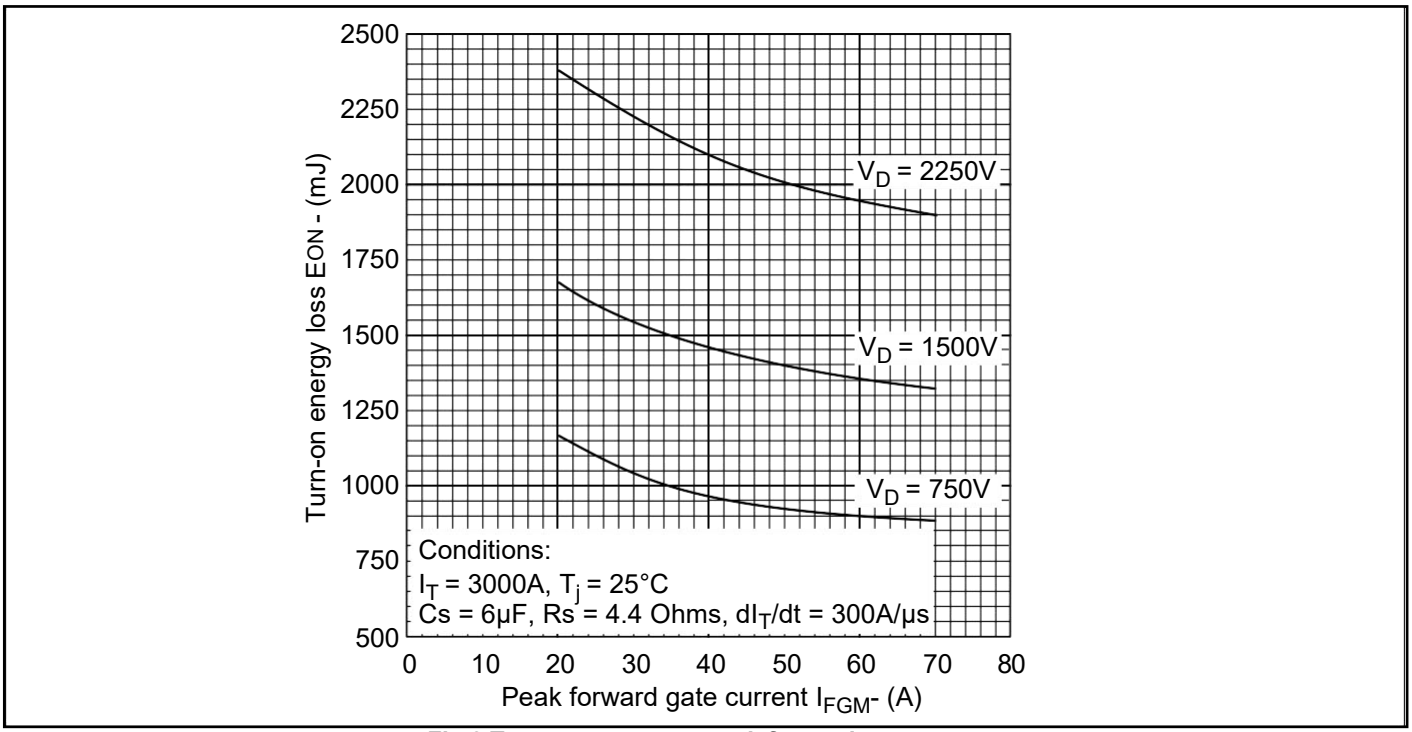


Fig.9 Turn-on energy vs peak forward gate current

CURVES

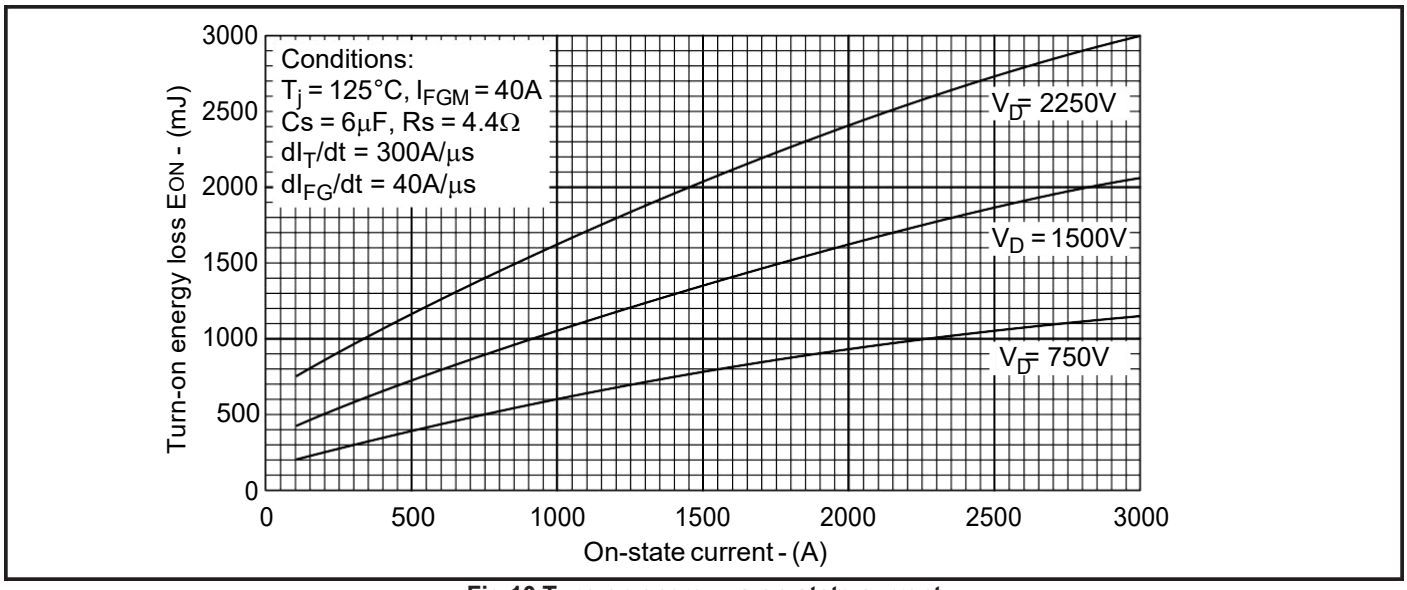


Fig.10 Turn-on energy vs on-state current

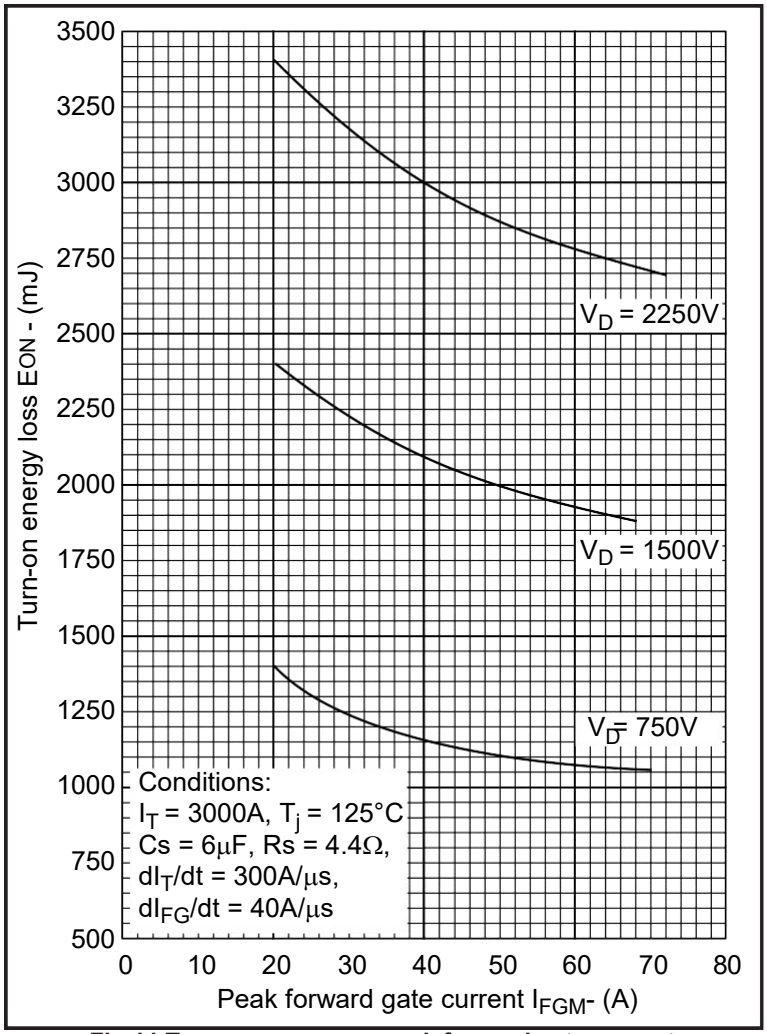


Fig.11 Turn-on energy vs peak forward gate current

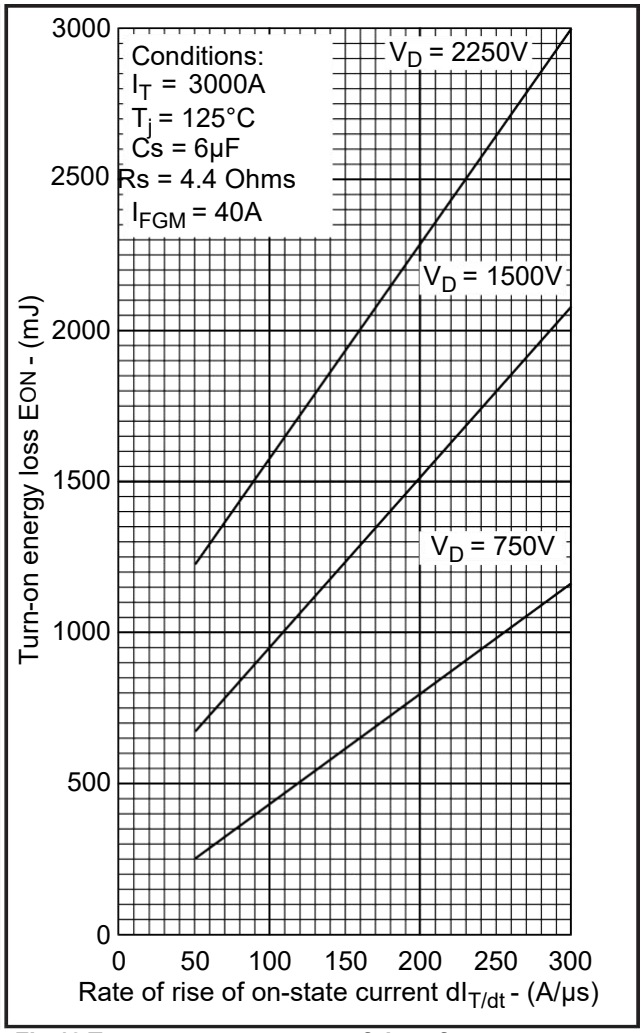


Fig.12 Turn-on energy vs rate of rise of on-state current

CURVES

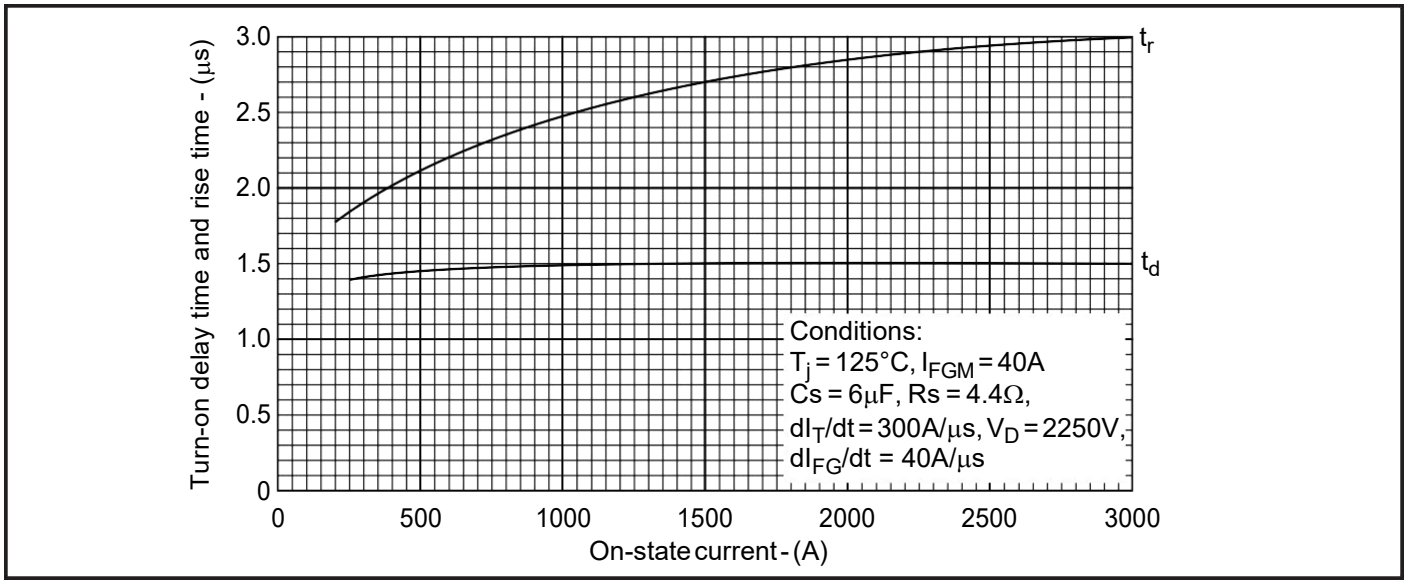


Fig.13 Delay time & rise time vs turn-on current

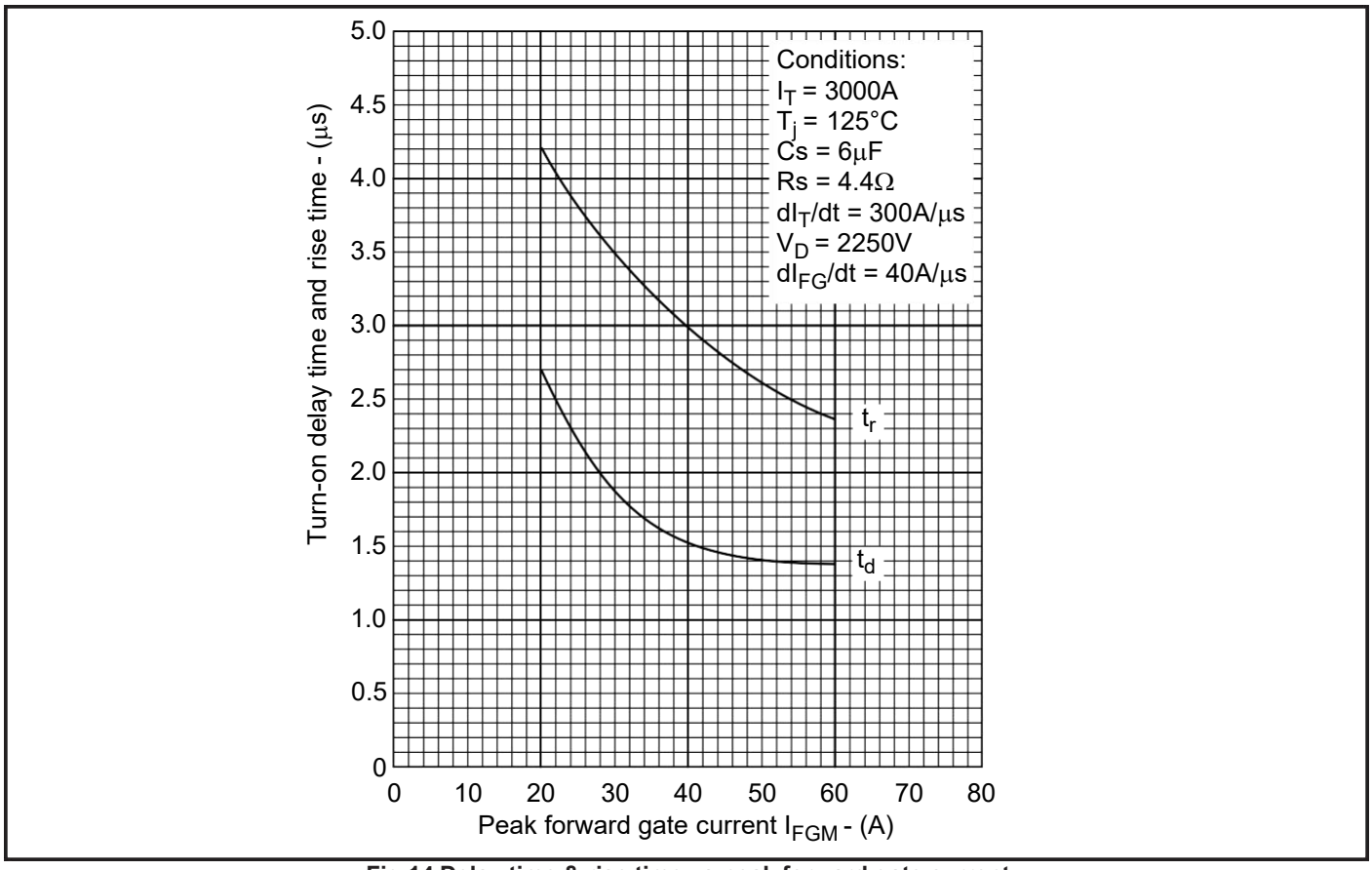


Fig.14 Delay time & rise time vs peak forward gate current

CURVES

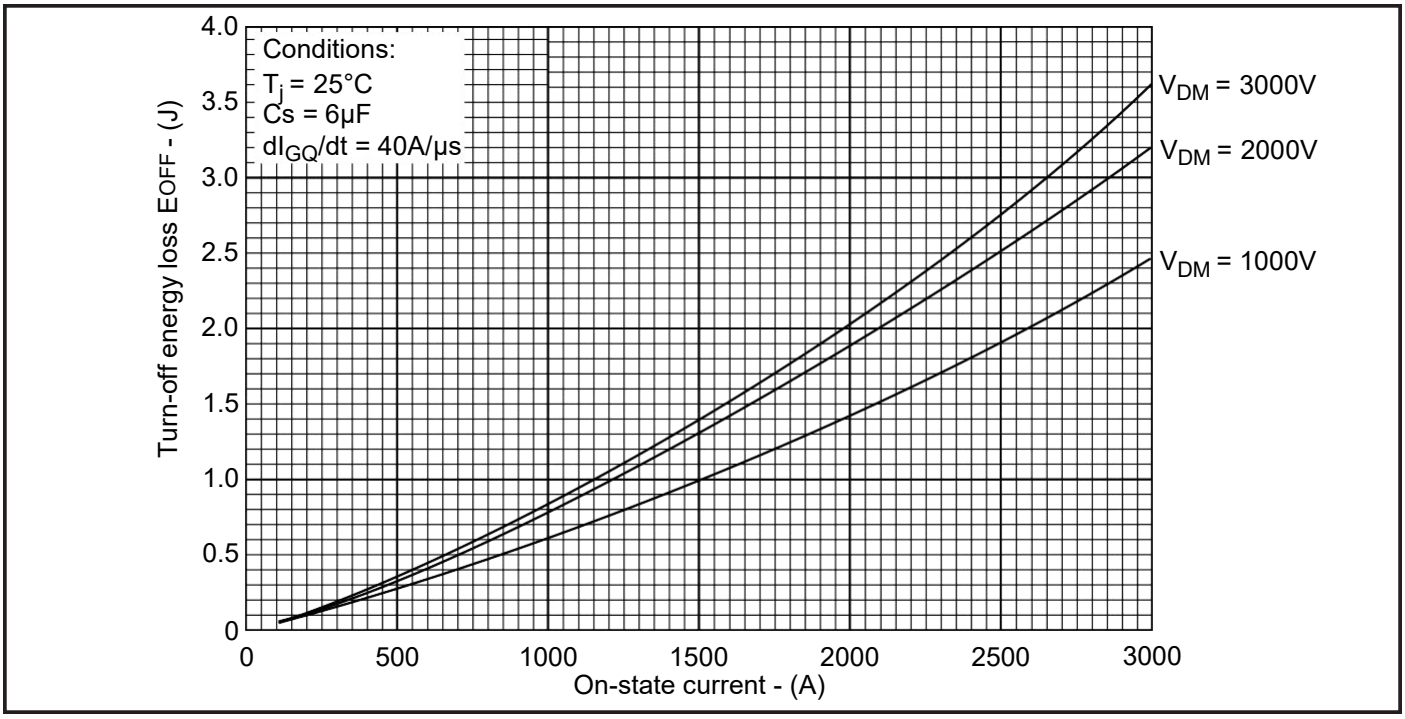


Fig.15 Turn-off energy vs on-state current

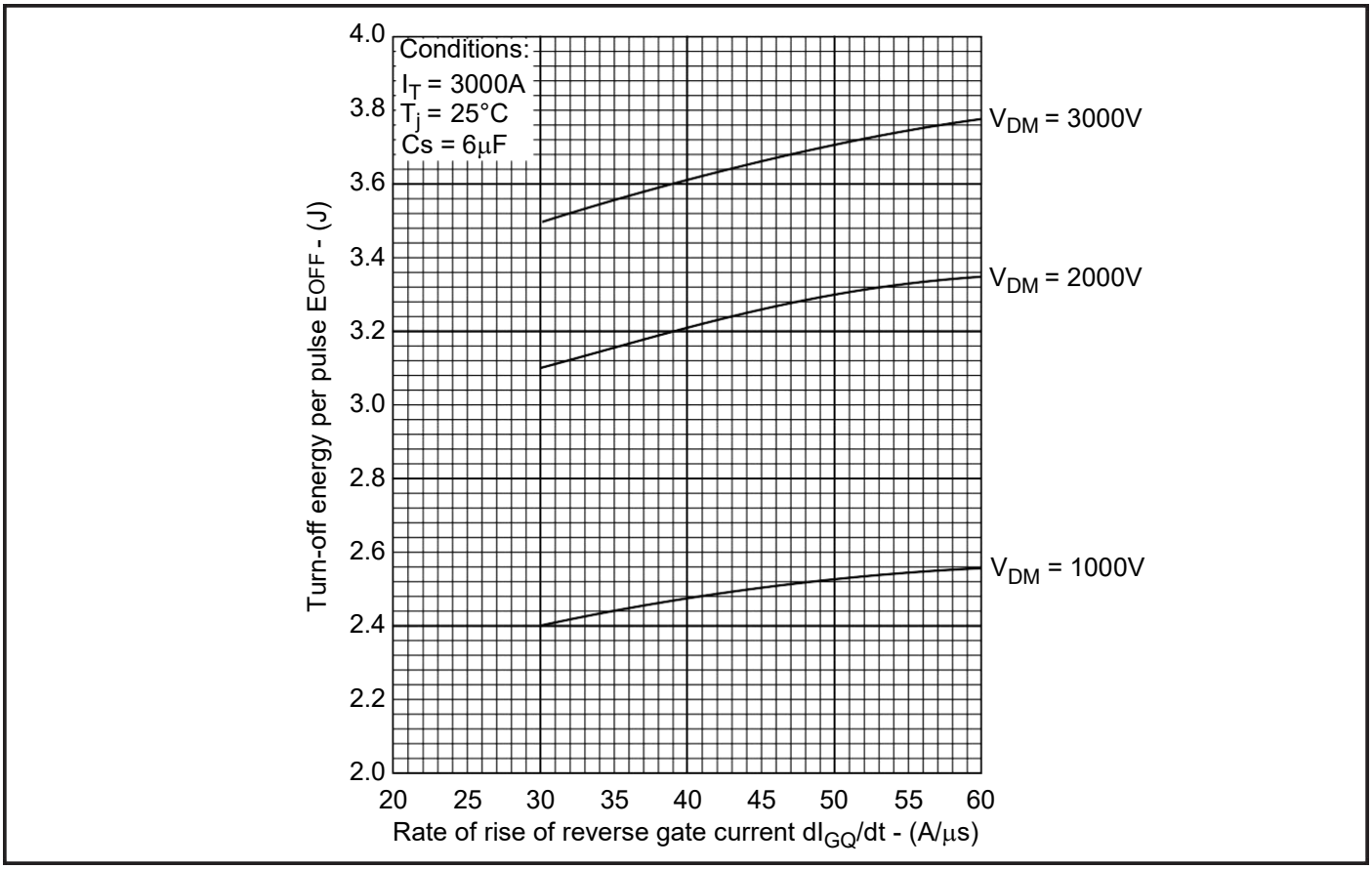


Fig.16 Turn-off energy vs rate of rise of reverse gate current

CURVES

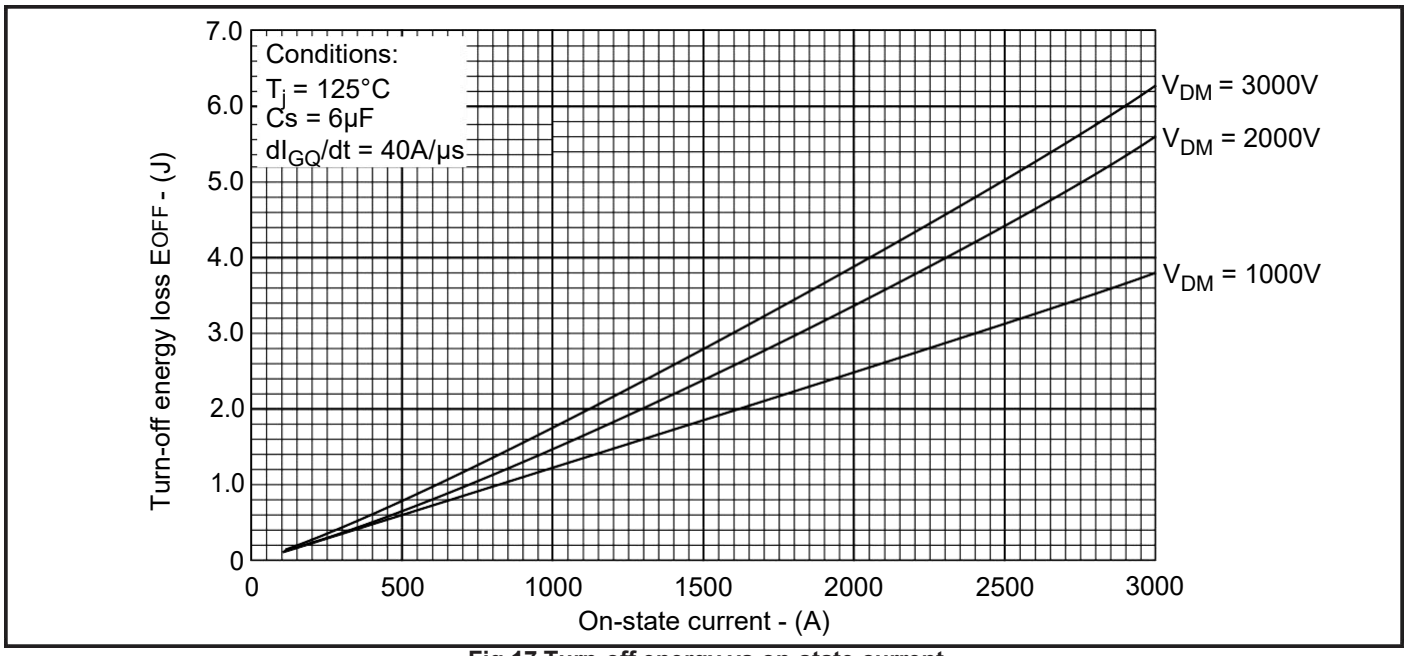


Fig.17 Turn-off energy vs on-state current

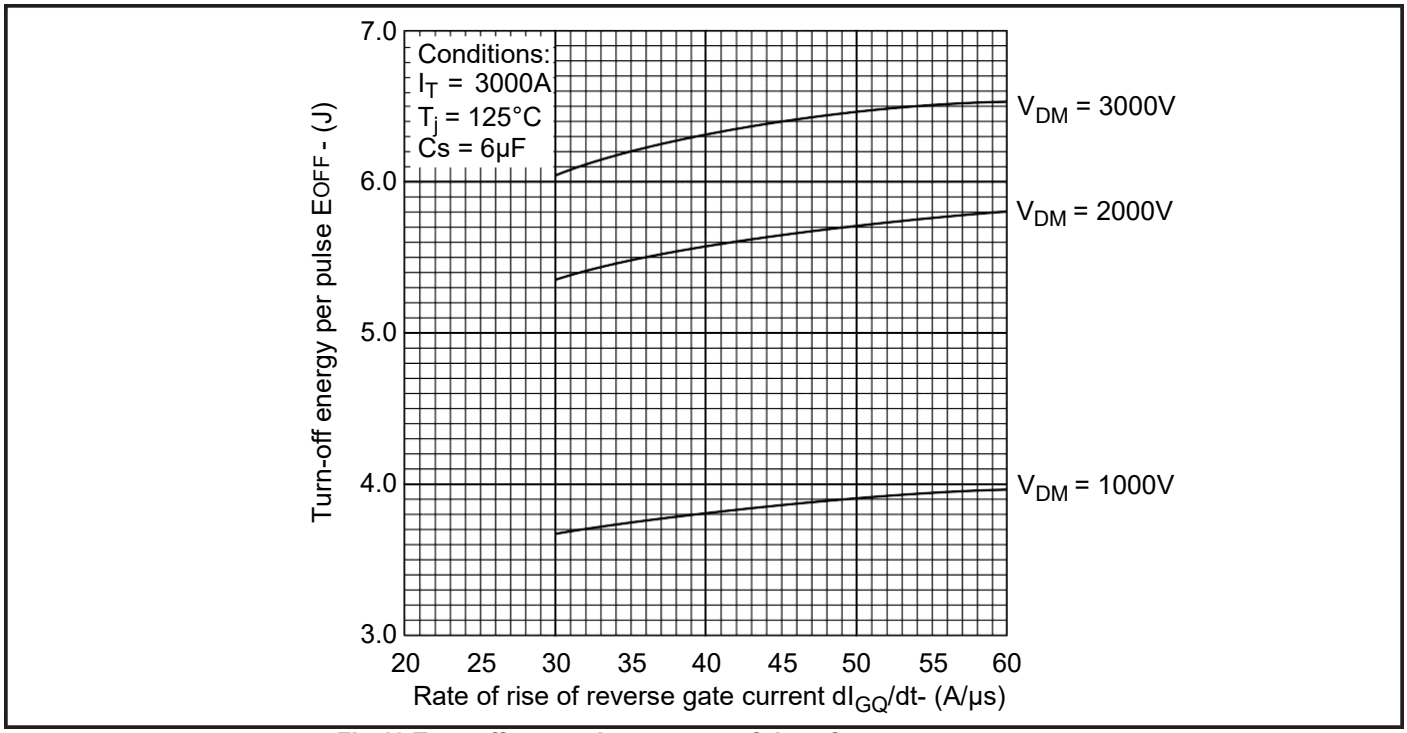


Fig.18 Turn-off energy loss vs rate of rise of reverse gate current

CURVES

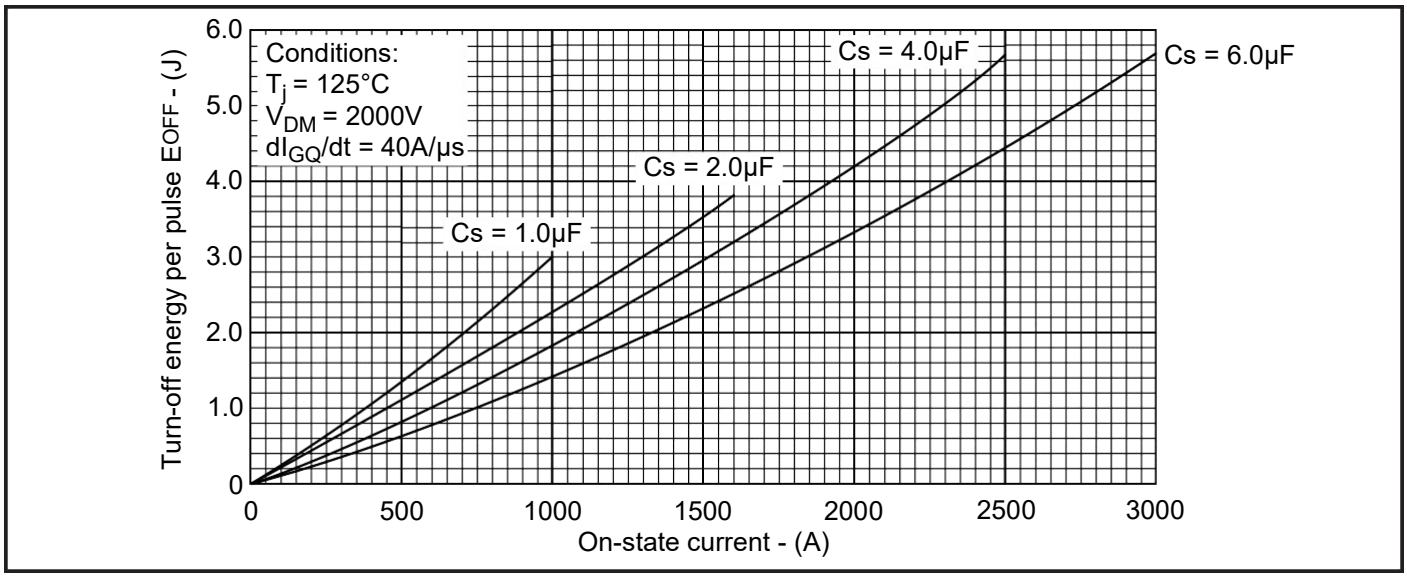


Fig.19 Turn-off energy vs on-state current

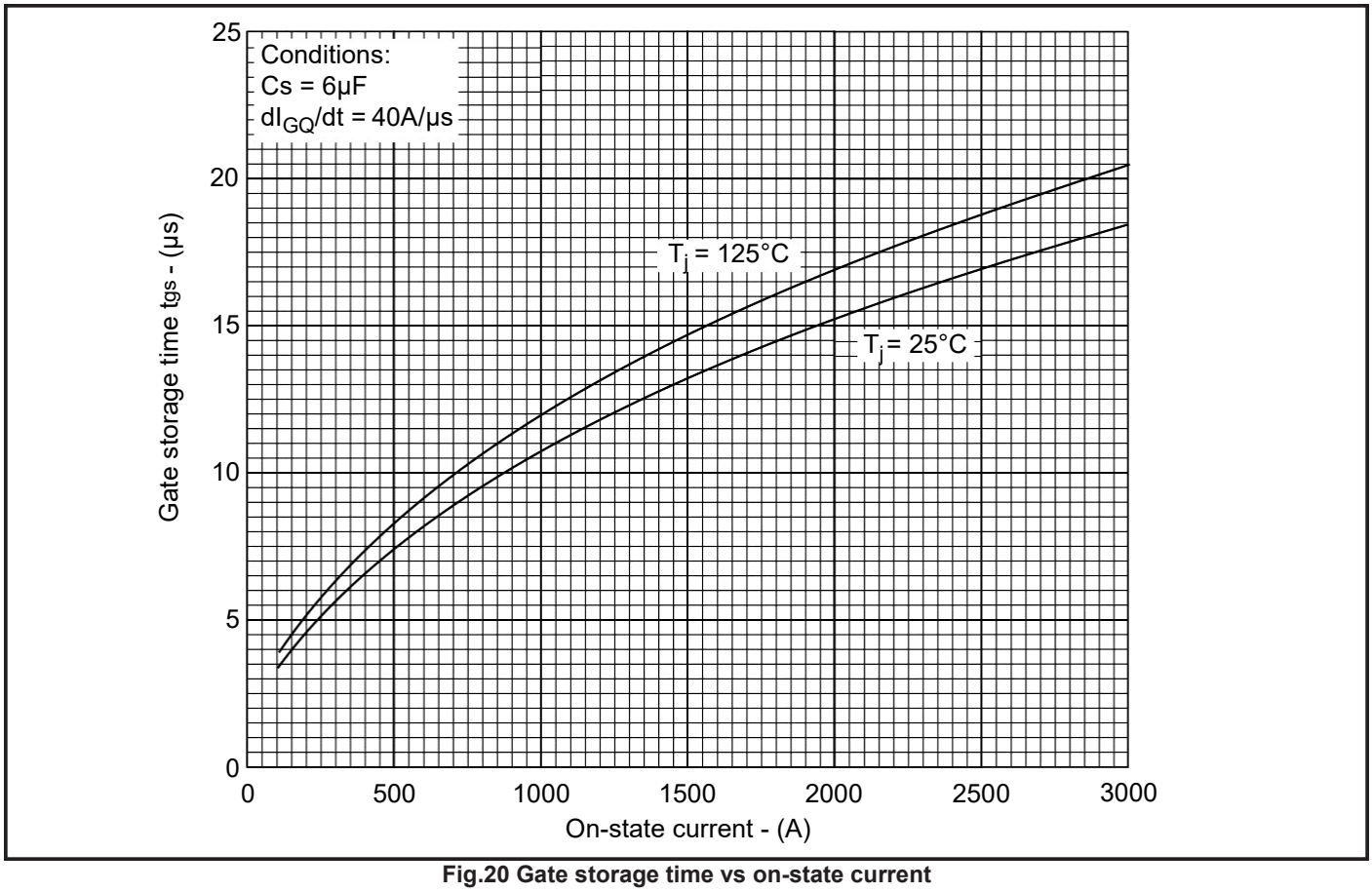


Fig.20 Gate storage time vs on-state current

CURVES

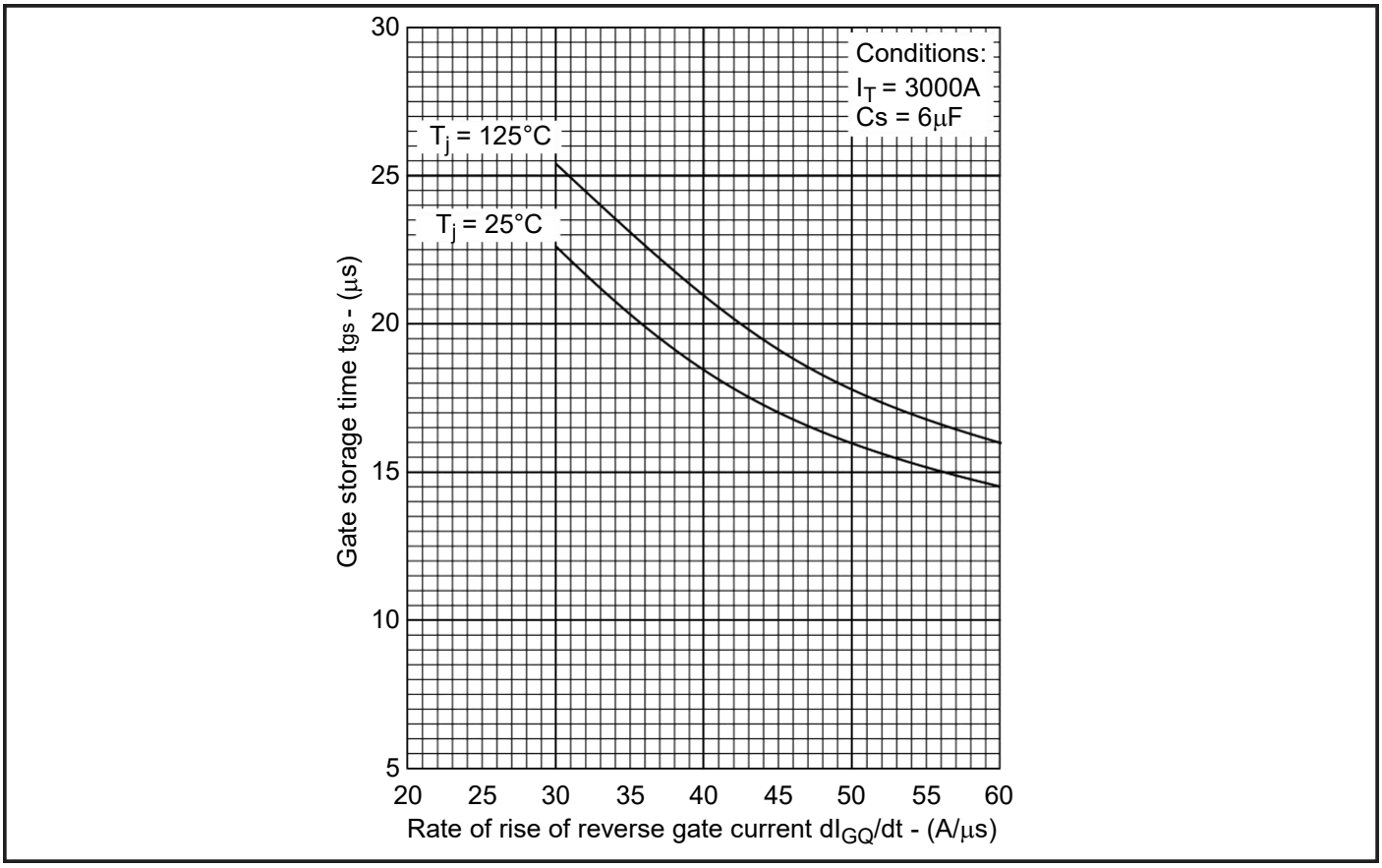


Fig.21 Gate storage time vs rate of rise of reverse gate current

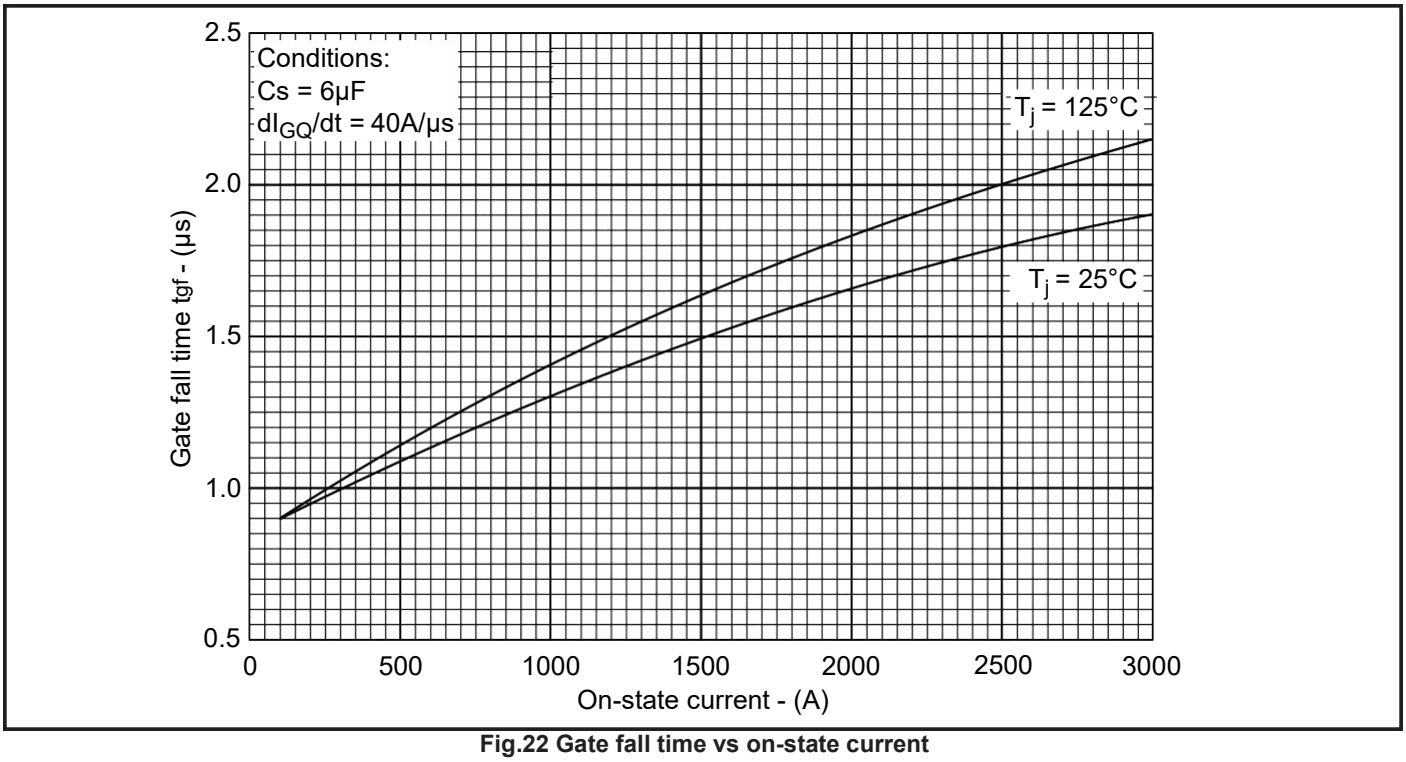


Fig.22 Gate fall time vs on-state current

CURVES

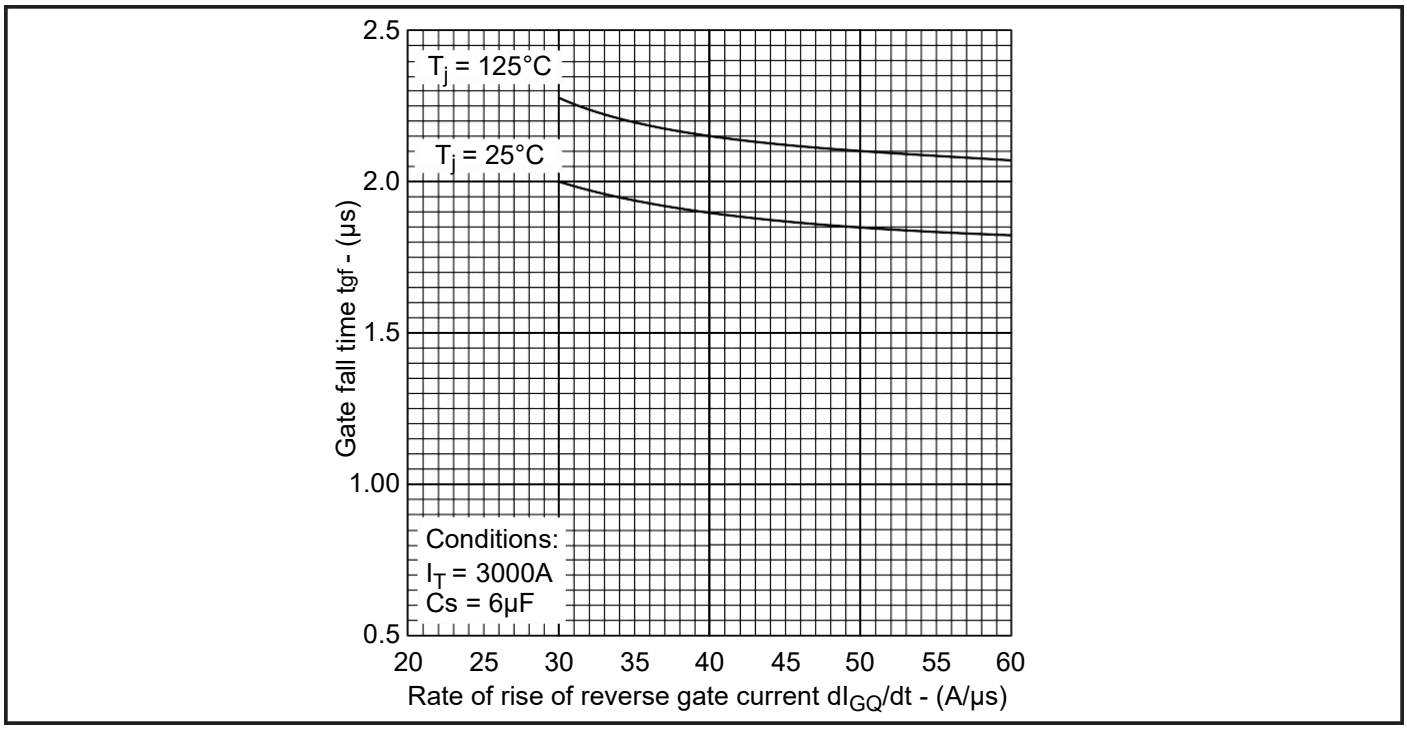


Fig.23 Gate fall time vs rate of rise of reverse gate current

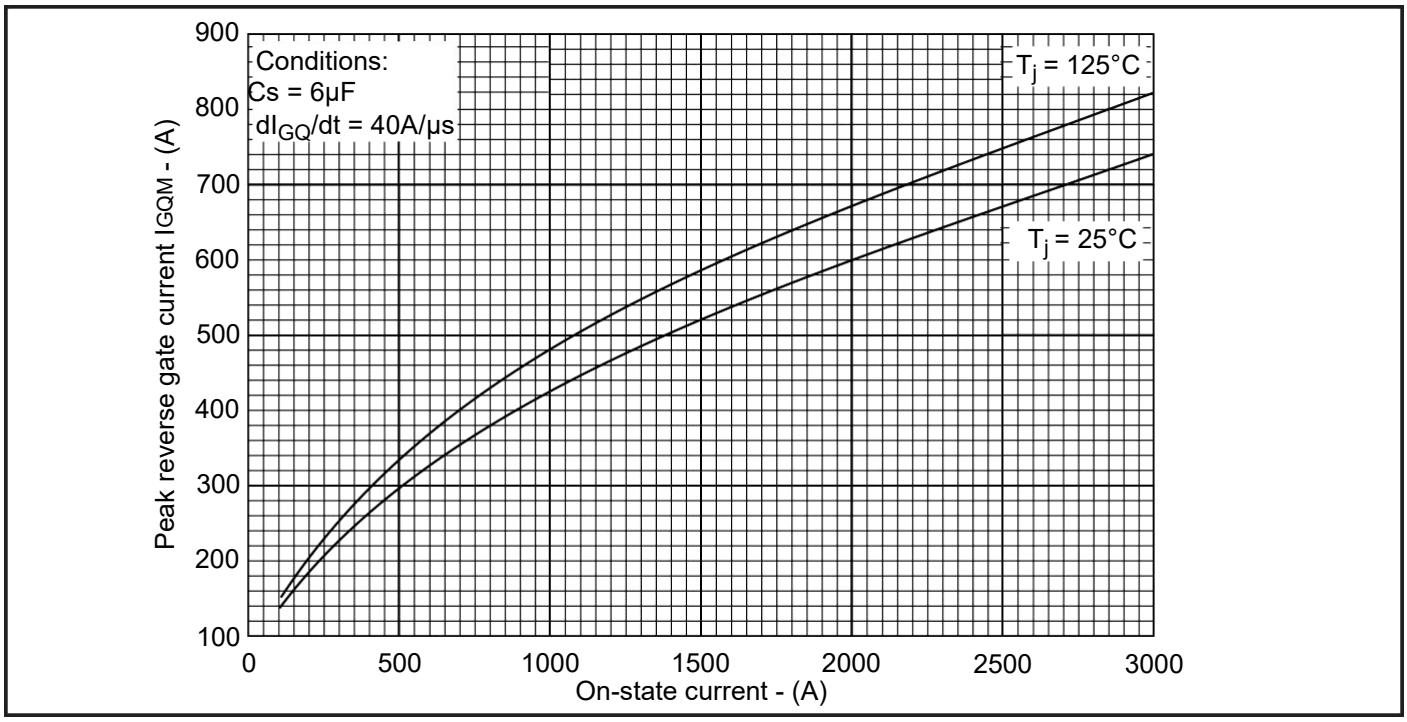


Fig.24 Peak reverse gate current vs turn-off current

CURVES

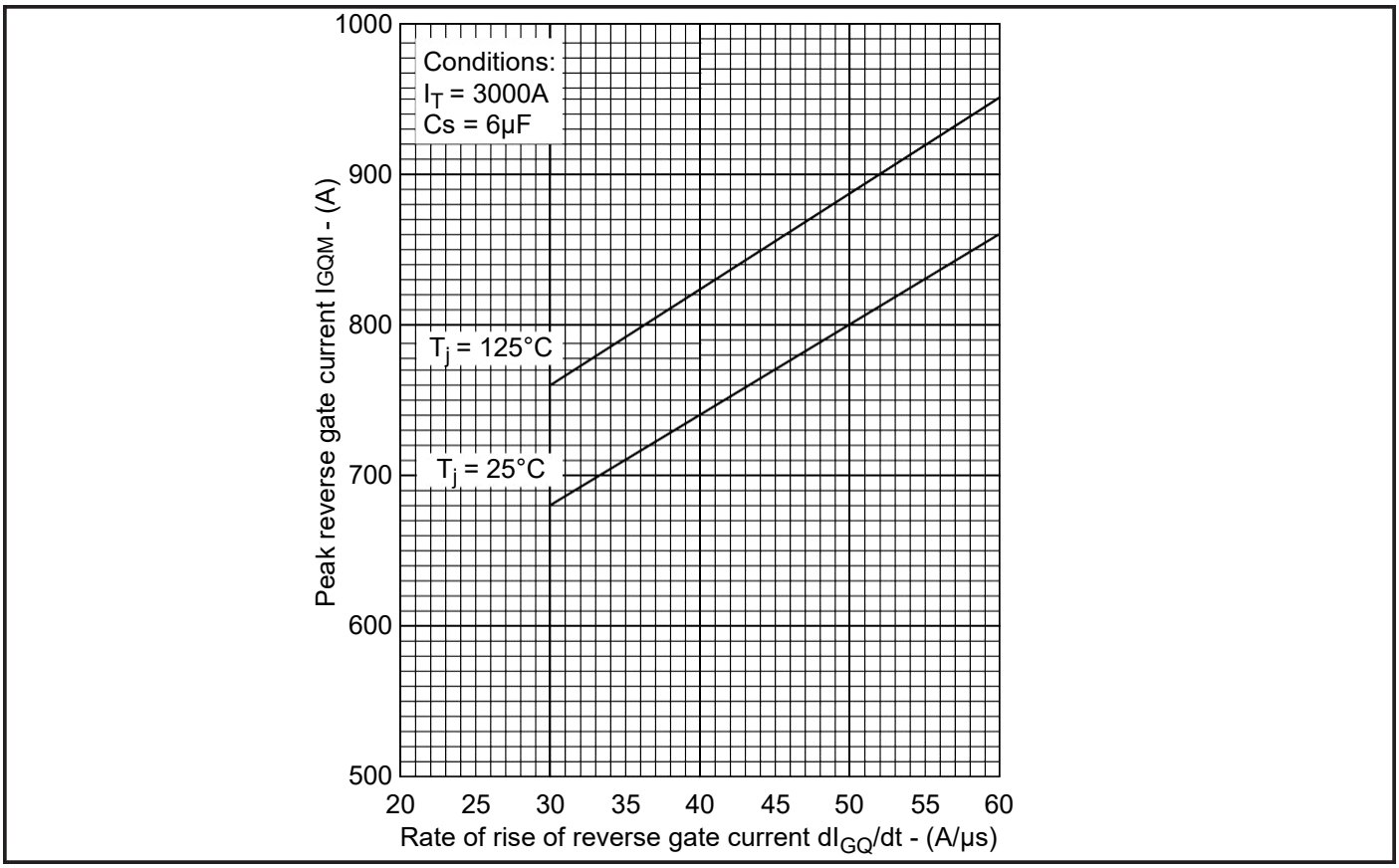


Fig.25 Peak reverse gate current vs rate of rise of reversegate current

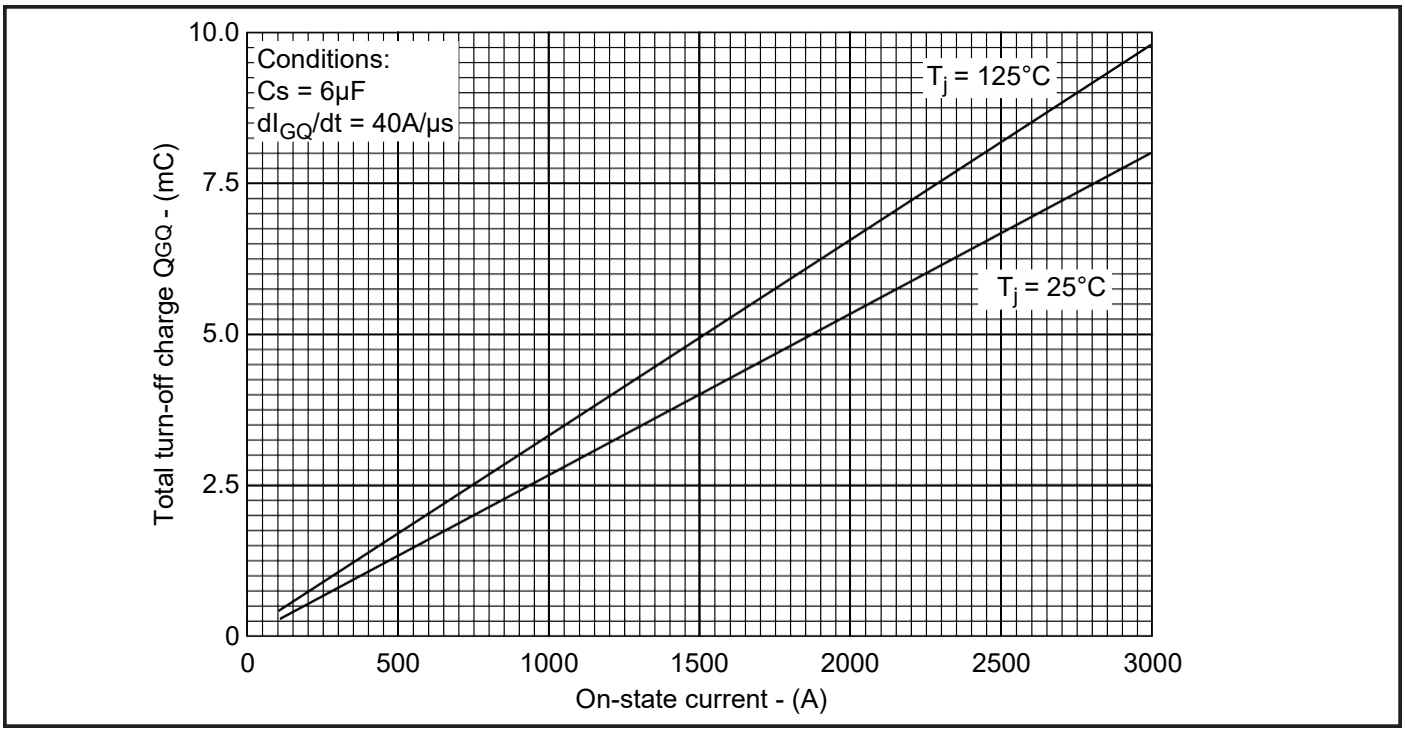


Fig.26 Turn-off gate charge vs on-state current

CURVES

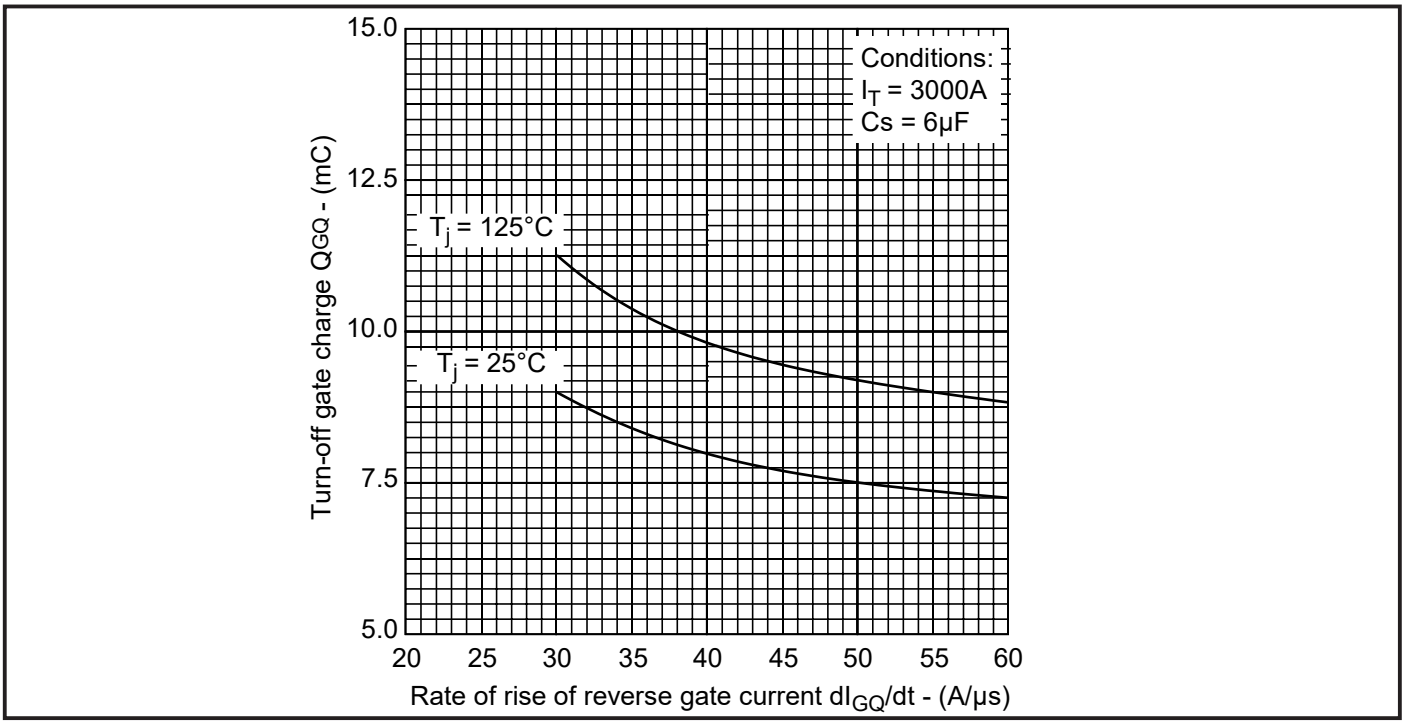


Fig.27 Turn-off gate charge vs rate of rise of reverse gate current

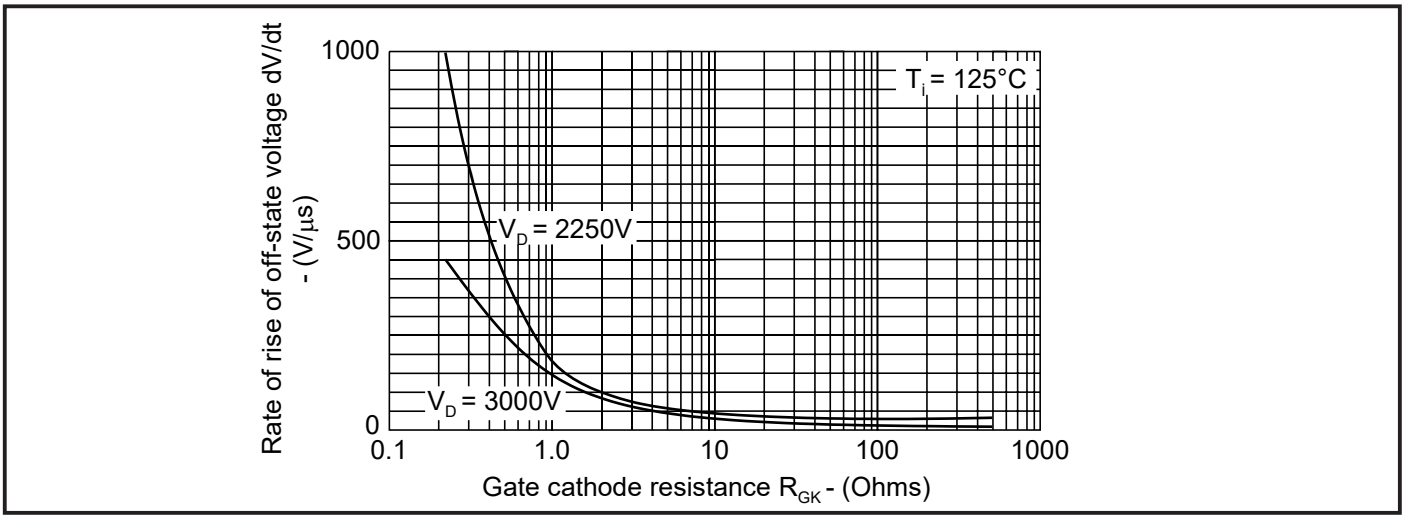
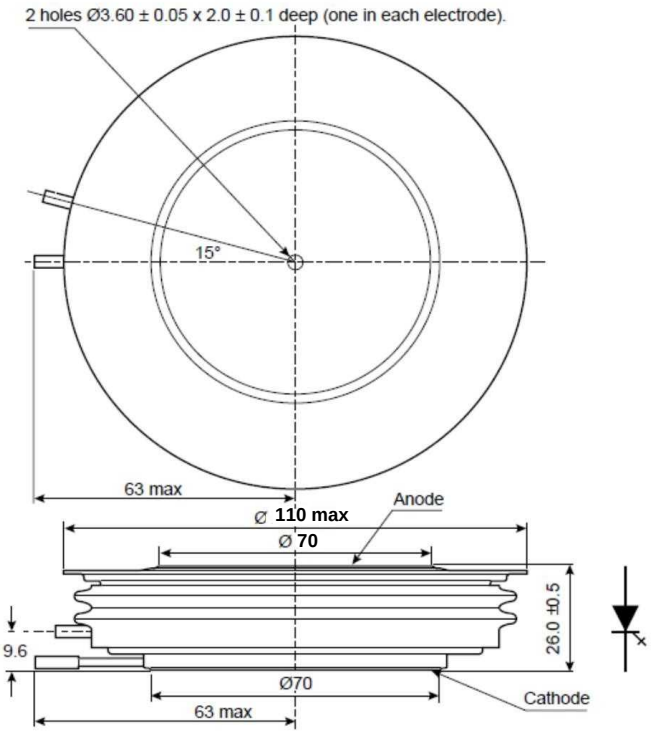


Fig.28 Rate of rise of off-state voltage vs gate cathode resistance

OUTLINE

For further package information, please contact Customer Services. All dimensions in mm, unless stated otherwise.
DO NOT SCALE.



Nominal weight: 1200g
Clamping force: 35kN ±10%
Lead coaxial, length: 600mm