

APPLICATIONS

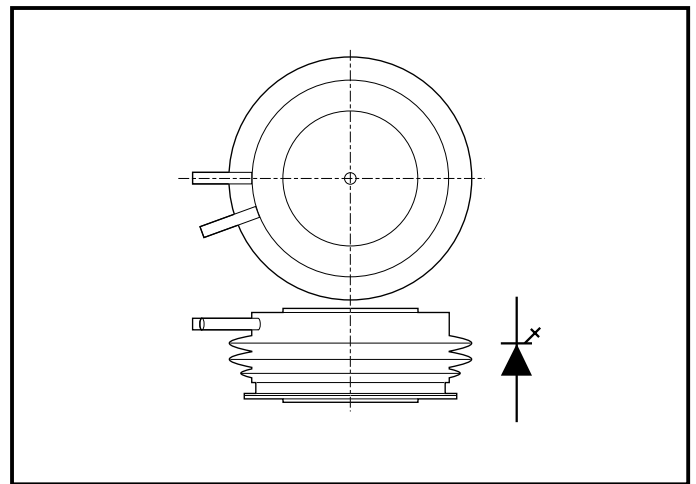
- Variable speed A.C. motor drive inverters (VSD-AC).
- Uninterruptable Power Supplies
- High Voltage Converters.
- Choppers.
- Welding.
- Induction Heating.
- DC/DC Converters.

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.

KEY PARAMETERS

I_{TCM}	1200A
V_{DRM}	2500V
$I_{T(AV)}$	500A
dV_D/dt	1000V/ μ s
di_T/dt	300A/ μ s



Outline type code: P.
See Package Details for further information.

VOLTAGE RATINGS

Type Number	Repetitive Peak Off-state Voltage V_{DRM} V	Repetitive Peak Reverse Voltage V_{RRM} V	Conditions
DG406BP25	2500	16	$T_{vj} = 125^{\circ}\text{C}$, $I_{DM} = 50\text{mA}$, $I_{RRM} = 50\text{mA}$

CURRENT RATINGS

Symbol	Parameter	Conditions	Max.	Units
I_{TCM}	Repetitive peak controllable on-state current	$V_D = V_{DRM}$, $T_j = 125^{\circ}\text{C}$, $di_{GQ}/dt = 30\text{A}/\mu\text{s}$, $C_s = 1.5\mu\text{F}$	1200	A
$I_{T(AV)}$	Mean on-state current	$T_{HS} = 80^{\circ}\text{C}$. Double side cooled. Half sine 50Hz.	500	A
$I_{T(RMS)}$	RMS on-state current	$T_{HS} = 80^{\circ}\text{C}$. Double side cooled. Half sine 50Hz.	630	A

DG406BP25

SURGE RATINGS

Symbol	Parameter	Conditions	Max.	Units
I_{TSM}	Surge (non-repetitive) on-state current	10ms half sine. $T_j = 125^\circ\text{C}$	8.0	kA
I^2t	I^2t for fusing	10ms half sine. $T_j = 125^\circ\text{C}$	0.32×10^6	A^2s
di_T/dt	Critical rate of rise of on-state current	$V_D = 2000\text{V}$, $I_T = 1000\text{A}$, $T_j = 125^\circ\text{C}$, $I_{FG} \geq 30\text{A}$, Rise time $> 1.0\mu\text{s}$	300	$\text{A}/\mu\text{s}$
dV_D/dt	Rate of rise of off-state voltage	To 66% V_{DRM} ; $R_{GK} \leq 1.5\Omega$, $T_j = 125^\circ\text{C}$	500	$\text{V}/\mu\text{s}$
		To 66% V_{DRM} ; $V_{RG} = -2\text{V}$, $T_j = 125^\circ\text{C}$	1000	$\text{V}/\mu\text{s}$
L_S	Peak stray inductance in snubber circuit	$I_T = 1000\text{A}$, $V_D = V_{DRM}$, $T_j = 125^\circ\text{C}$, $di_{GQ}/dt = 30\text{A}/\mu\text{s}$, $C_s = 1.0\mu\text{F}$	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		20	70	A
$P_{FG(AV)}$	Average forward gate power		-	10	W
P_{RGM}	Peak reverse gate power		-	15	kW
di_{GQ}/dt	Rate of rise of reverse gate current		15	60	$\text{A}/\mu\text{s}$
$t_{ON(min)}$	Minimum permissible on time		20	-	μs
$t_{OFF(min)}$	Minimum permissible off time		100	-	μs

THERMAL RATINGS AND MECHANICAL DATA

Symbol	Parameter	Conditions	Min.	Max.	Units
$R_{th(j-hs)}$	DC thermal resistance - junction to heatsink surface	Double side cooled	-	0.041	$^\circ\text{C}/\text{W}$
		Anode side cooled	-	0.07	$^\circ\text{C}/\text{W}$
		Cathode side cooled	-	0.1	$^\circ\text{C}/\text{W}$
$R_{th(c-hs)}$	Contact thermal resistance	Clamping force 12.0kN With mounting compound	-	0.009	$^\circ\text{C}/\text{W}$
T_{vj}	Virtual junction temperature		-	125	$^\circ\text{C}$
T_{OP}/T_{stg}	Operating junction/storage temperature range		-40	125	$^\circ\text{C}$
-	Clamping force		11.0	15.0	kN

CHARACTERISTICS

$T_j = 125^\circ\text{C}$ unless stated otherwise					
Symbol	Parameter	Conditions	Min.	Max.	Units
V_{TM}	On-state voltage	At 1000A peak, $I_{G(ON)} = 4\text{A d.c.}$	-	2.5	V
I_{DM}	Peak off-state current	$V_{DRM} = 2500\text{V}$, $V_{RG} = 0\text{V}$	-	50	mA
I_{RRM}	Peak reverse current	At V_{RRM}	-	50	mA
V_{GT}	Gate trigger voltage	$V_D = 24\text{V}$, $I_T = 100\text{A}$, $T_j = 25^\circ\text{C}$	-	1.0	V
I_{GT}	Gate trigger current	$V_D = 24\text{V}$, $I_T = 100\text{A}$, $T_j = 25^\circ\text{C}$	-	1.5	A
I_{RGM}	Reverse gate cathode current	$V_{RGM} = 16\text{V}$, No gate/cathode resistor	-	50	mA
E_{ON}	Turn-on energy	$V_D = 2000\text{V}$	-	1040	mJ
t_d	Delay time	$I_T = 1000\text{A}$, $di_T/dt = 300\text{A}/\mu\text{s}$	-	1.5	μs
t_r	Rise time	$I_{FG} = 30\text{A}$, rise time $\leq 1.0\mu\text{s}$	-	3.0	μs
E_{OFF}	Turn-off energy		-	2300	mJ
t_{gs}	Storage time		-	14.0	μs
t_{gf}	Fall time	$I_T = 1000\text{A}$, $V_{DM} = 2500\text{V}$	-	1.5	μs
t_{gq}	Gate controlled turn-off time	Snubber Cap $C_s = 1.0\mu\text{F}$,	-	15.5	μs
Q_{GQ}	Turn-off gate charge	$di_{GQ}/dt = 30\text{A}/\mu\text{s}$	-	3000	μC
Q_{GQT}	Total turn-off gate charge		-	6000	μC
I_{GQM}	Peak reverse gate current		-	420	A

CURVES

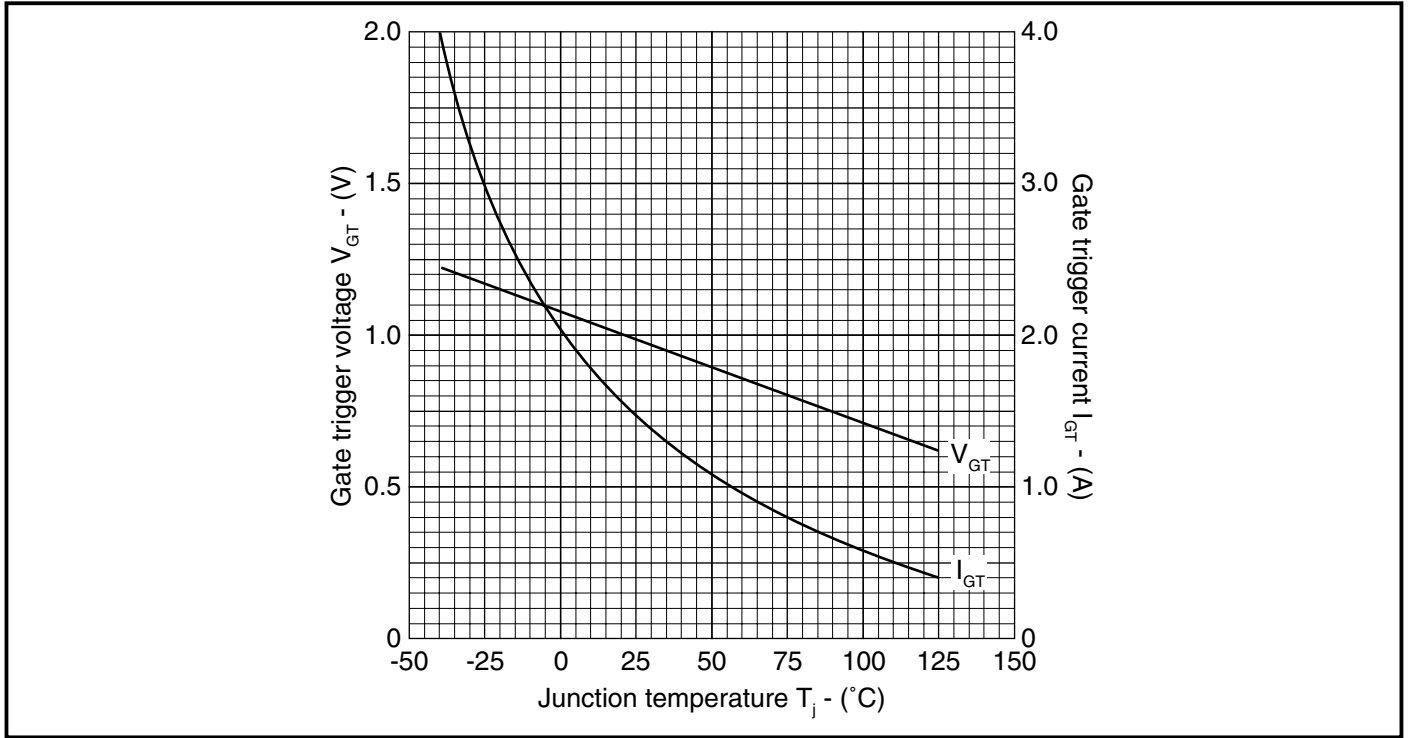


Fig.1 Maximum gate trigger voltage/current vs junction temperature

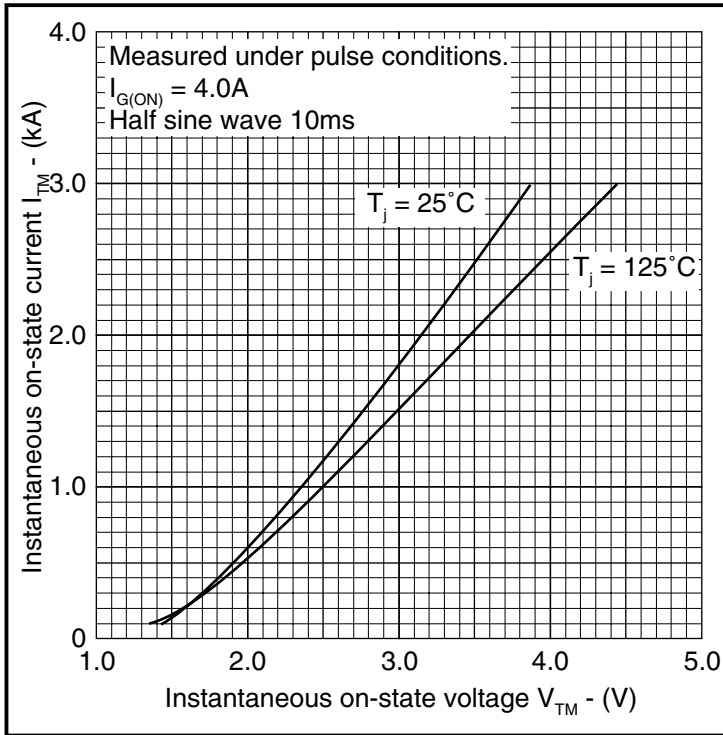


Fig.2 On-state characteristics

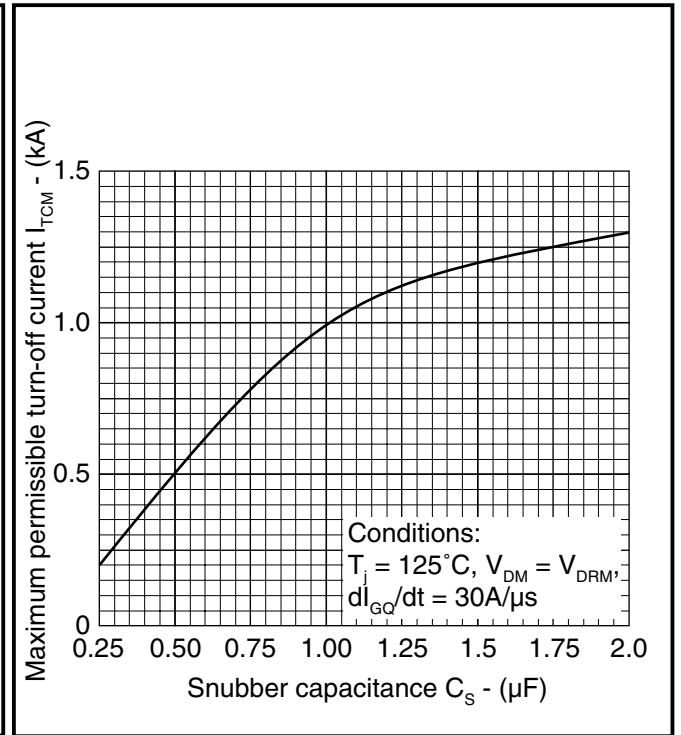


Fig.3 Maximum dependence of I_{TCM} on C_S

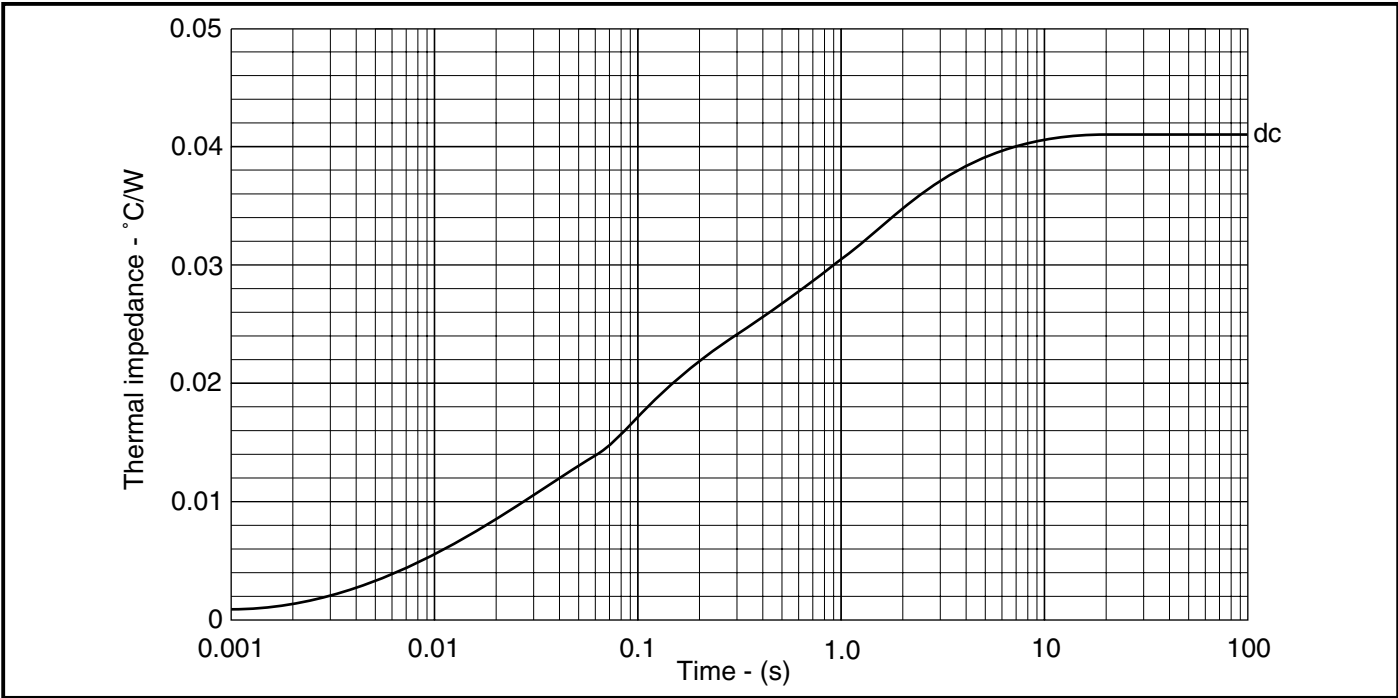


Fig.4 Maximum (limit) transient thermal impedance - double side cooled

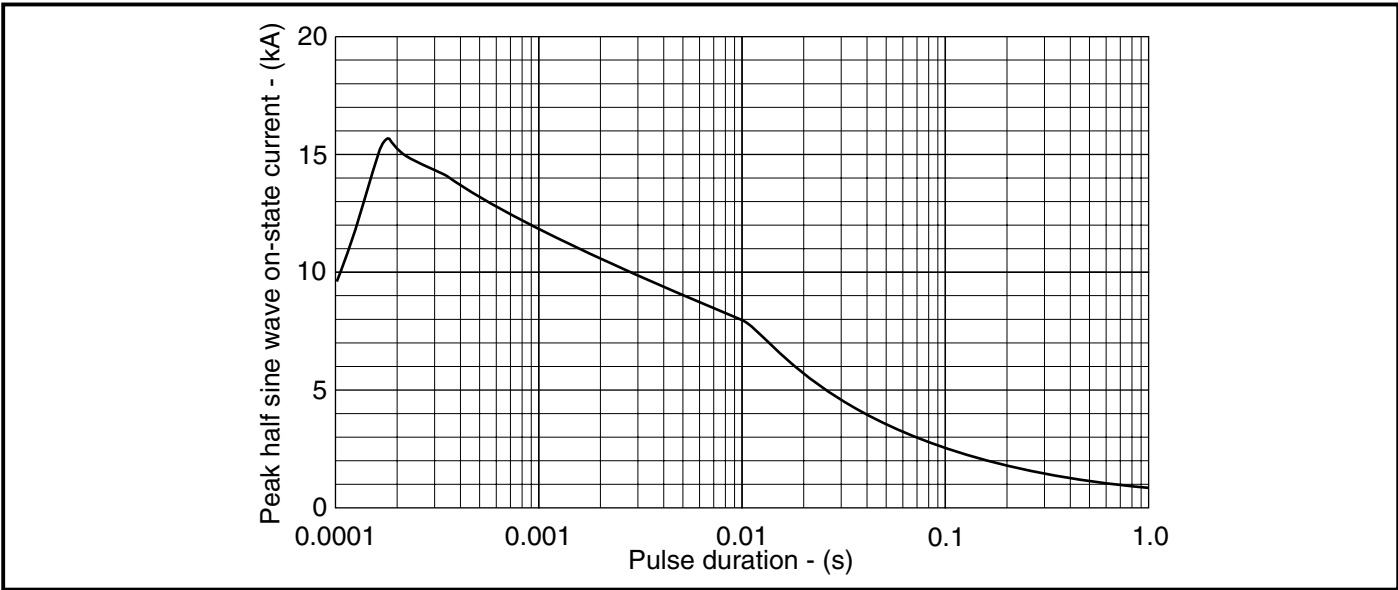


Fig.5 Surge (non-repetitive) on-state current vs time

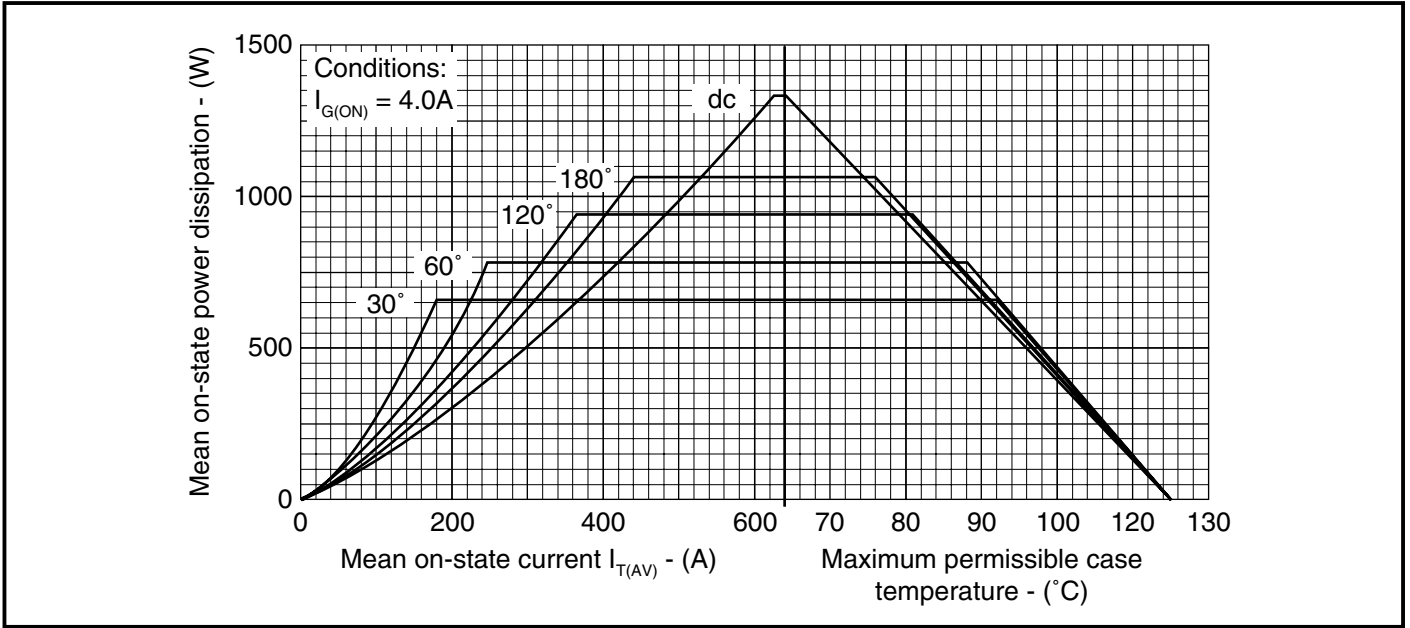


Fig.6 Steady state rectangular wave conduction loss - double side cooled

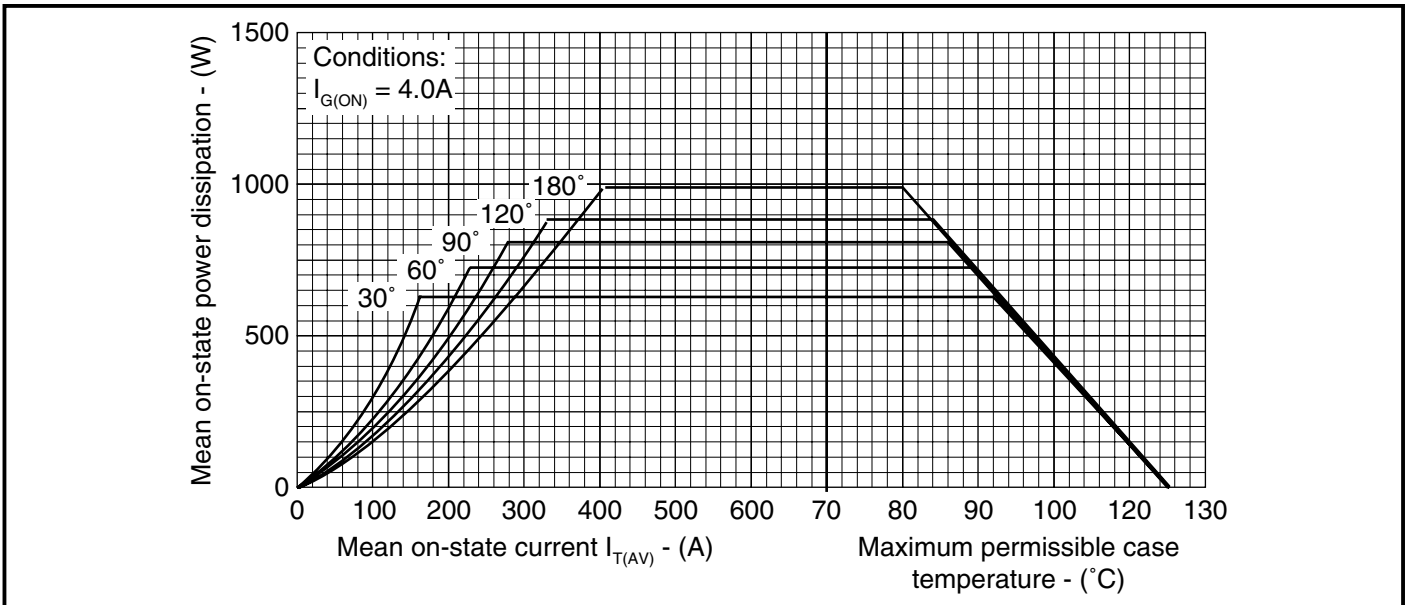


Fig.7 Steady state sinusoidal wave conduction loss - double side cooled

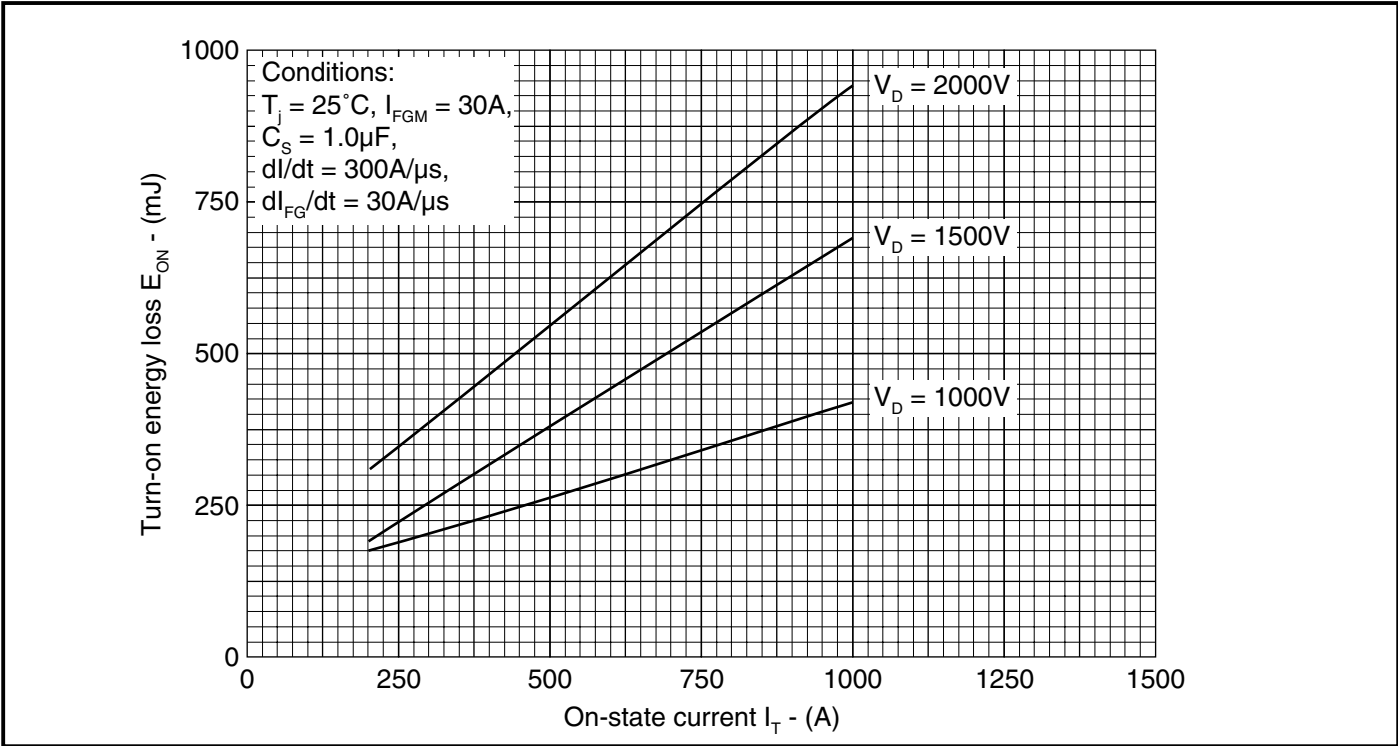


Fig.8 Turn-on energy vs on-state current

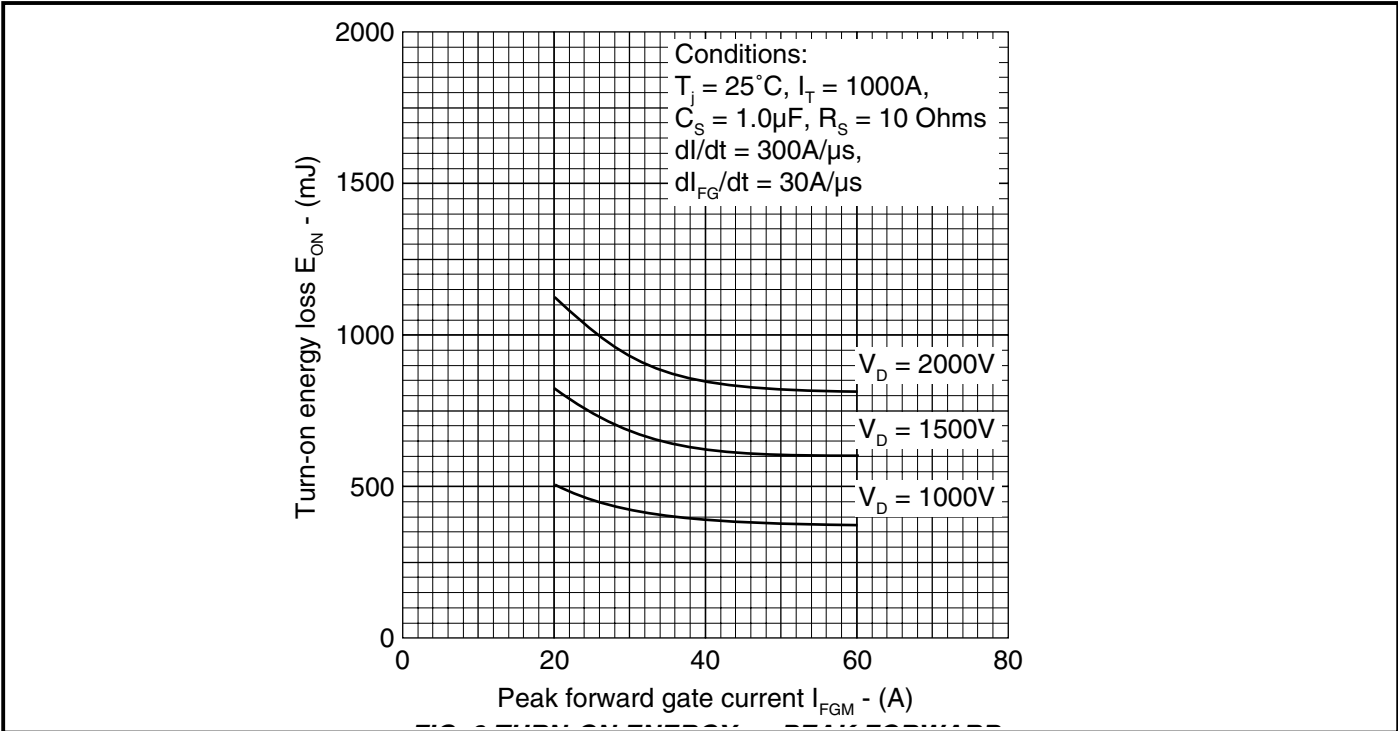


Fig.9 Turn-on energy vs peak forward gate current

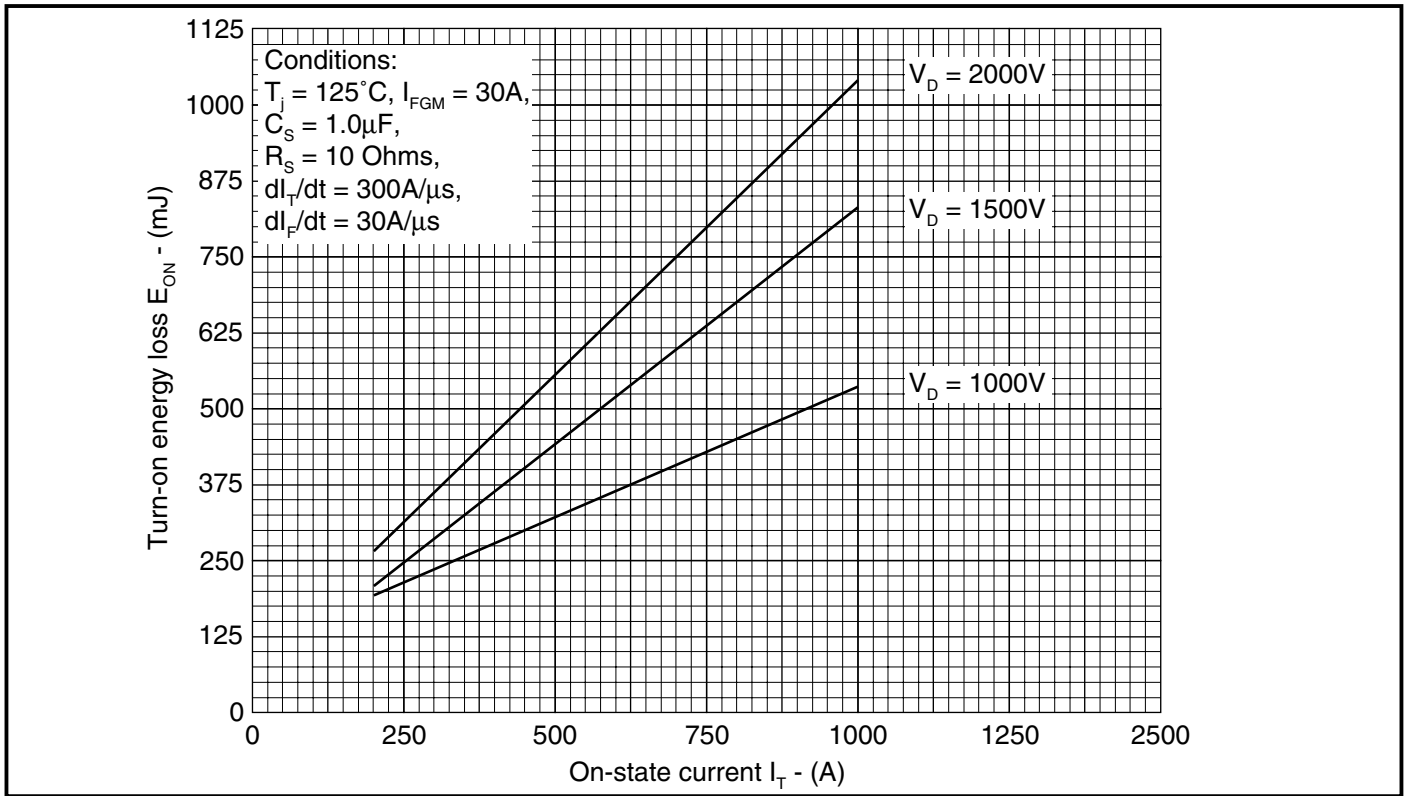


Fig.10 Turn-on energy vs on-state current

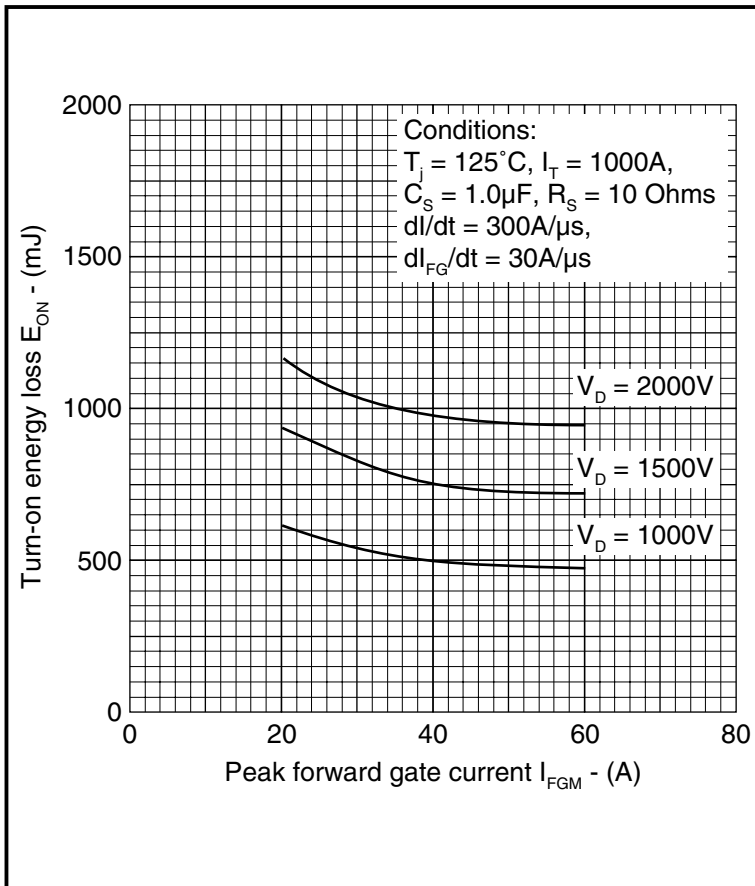


Fig.11 Turn-on energy vs peak forward gate current

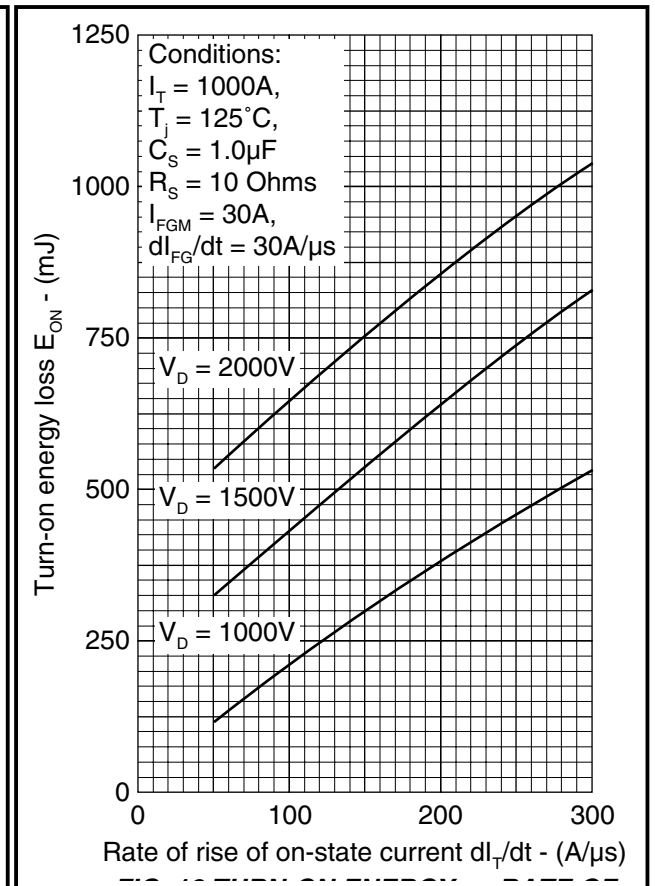


Fig.12 Turn-on energy vs rate of rise of on-state current

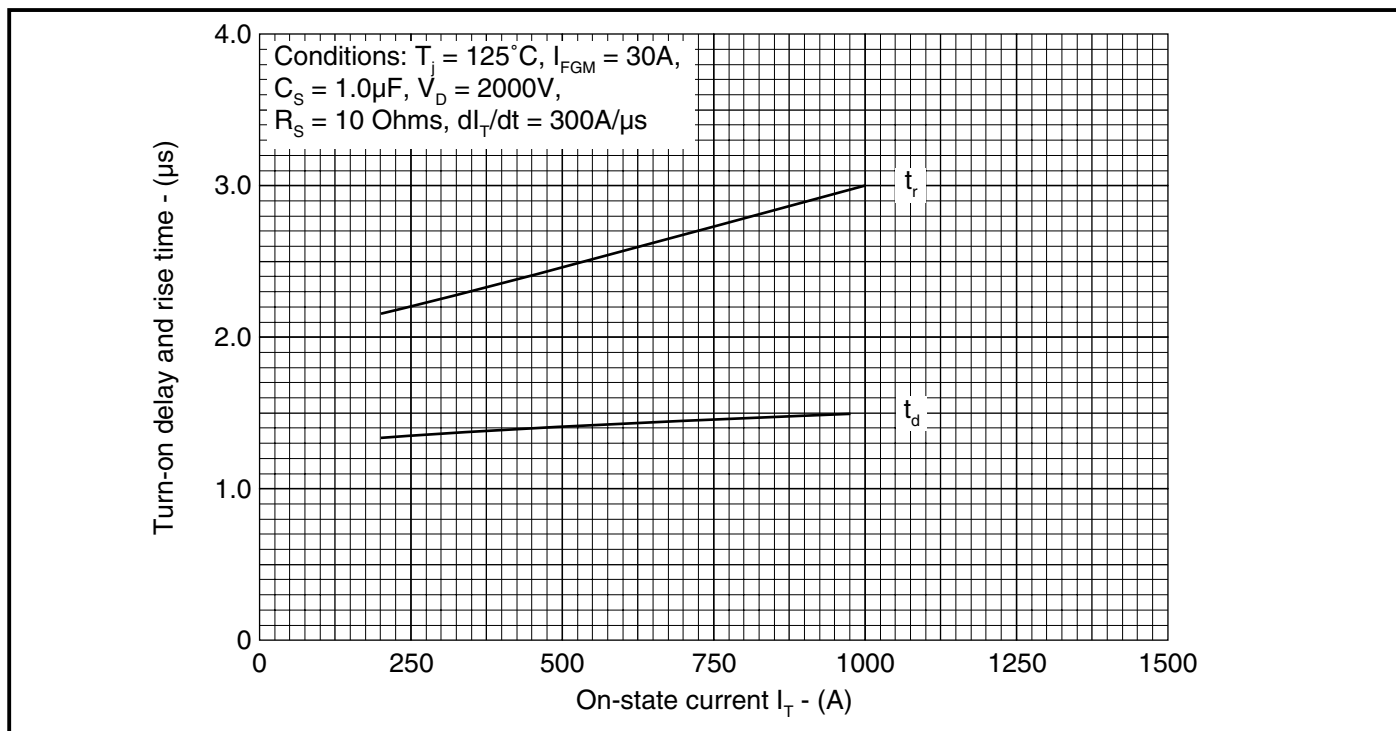


Fig.13 Delay time & rise time vs turn-on current

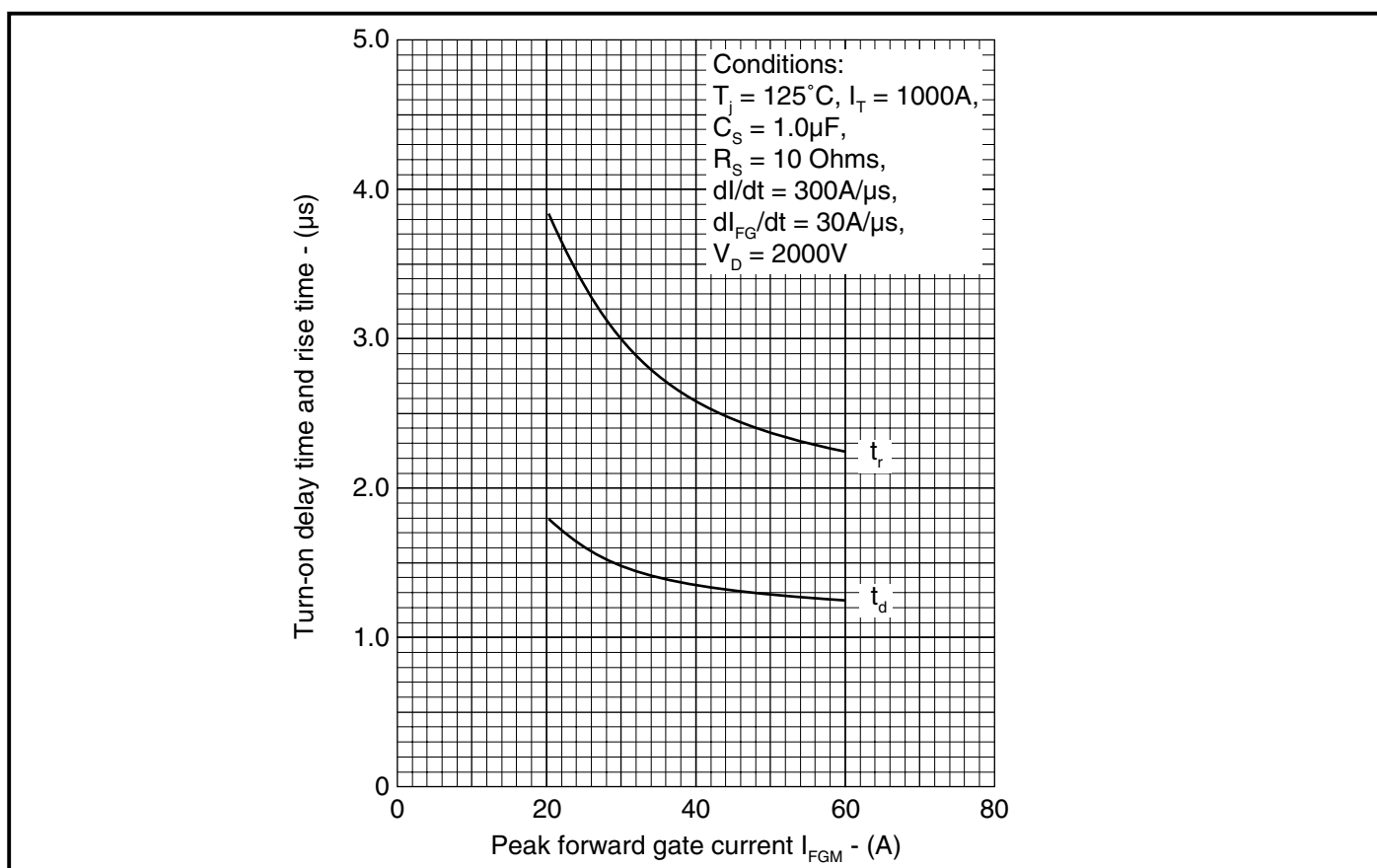


Fig.14 Delay time & rise time vs peak forward gate current

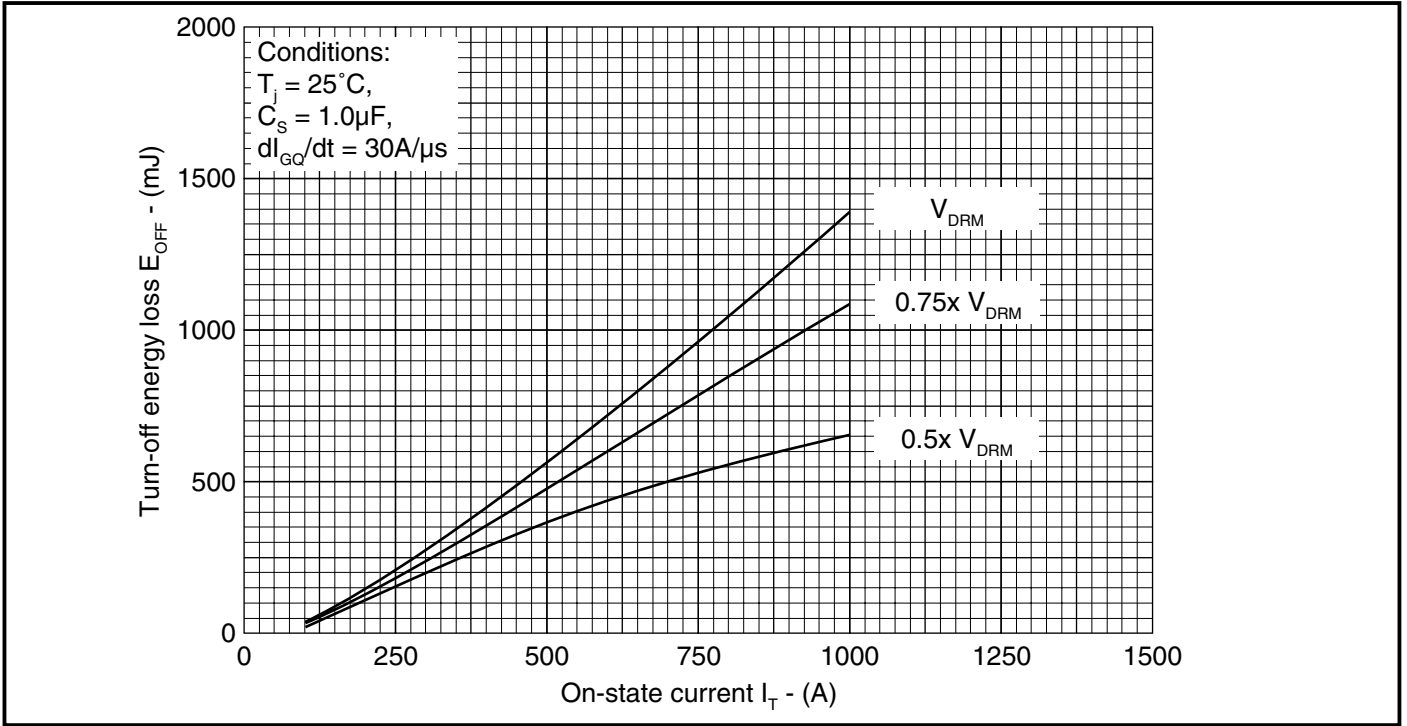


Fig.15 Turn-off energy vs on-state current

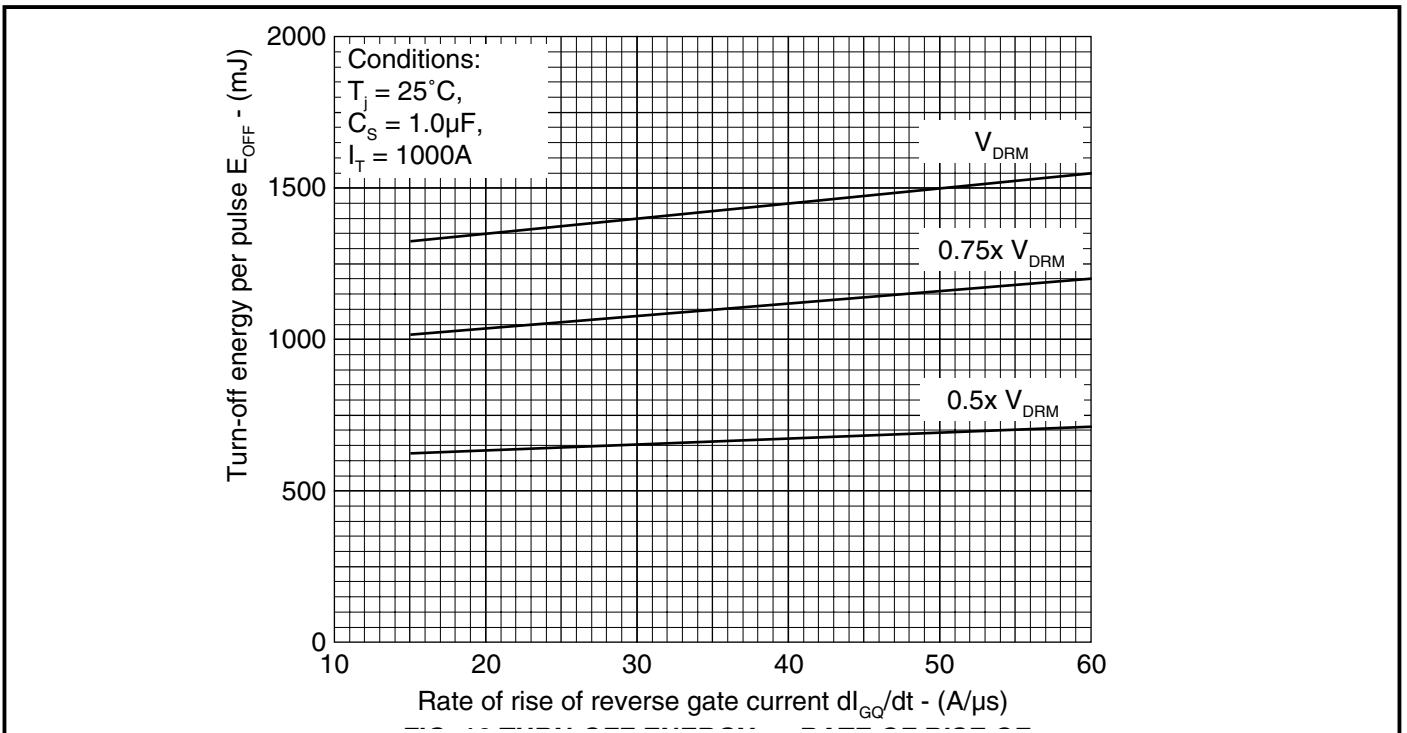


Fig.16 Turn-off energy vs rate of rise of reverse gate current

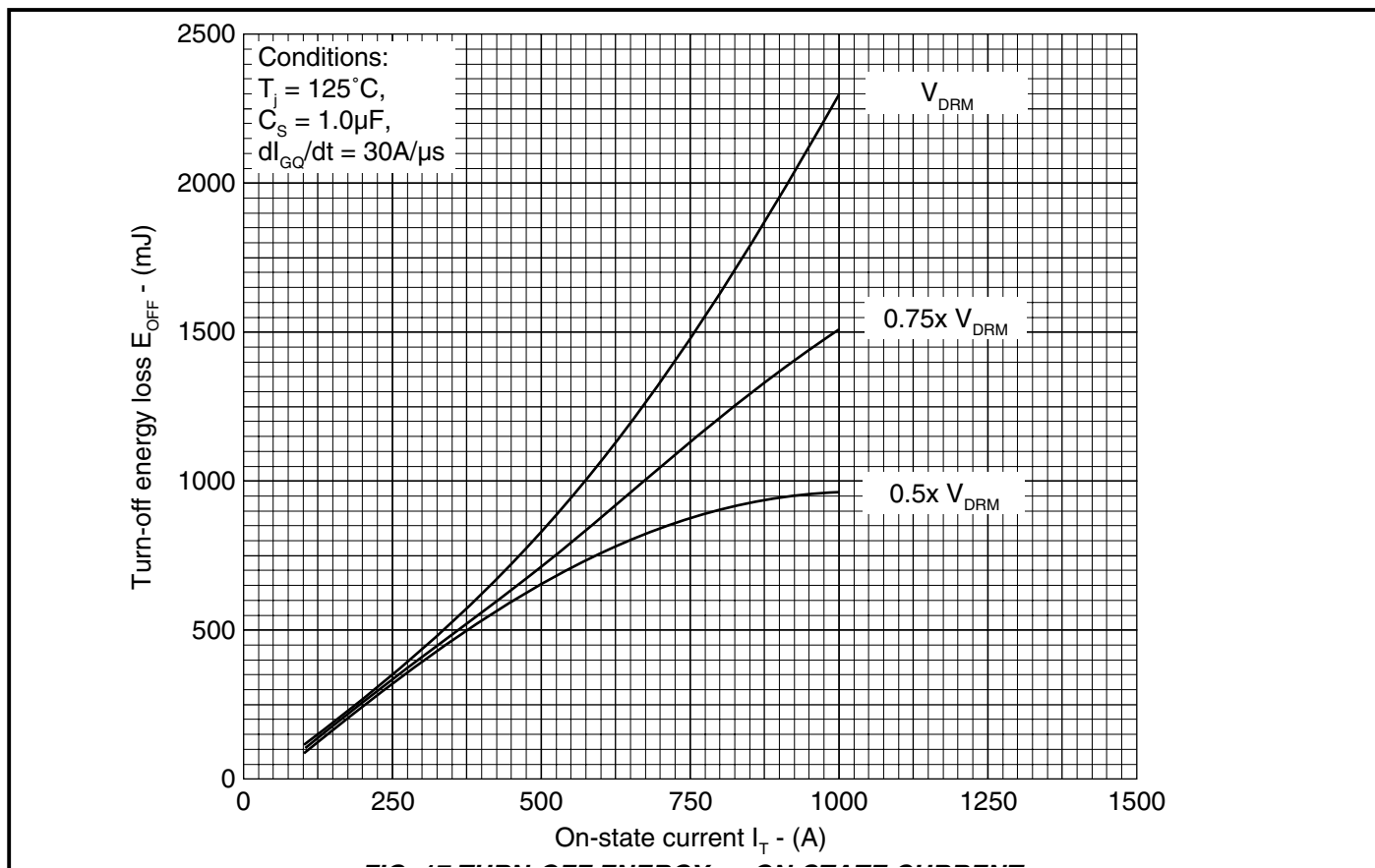


Fig.17 Turn-off energy vs on-state current

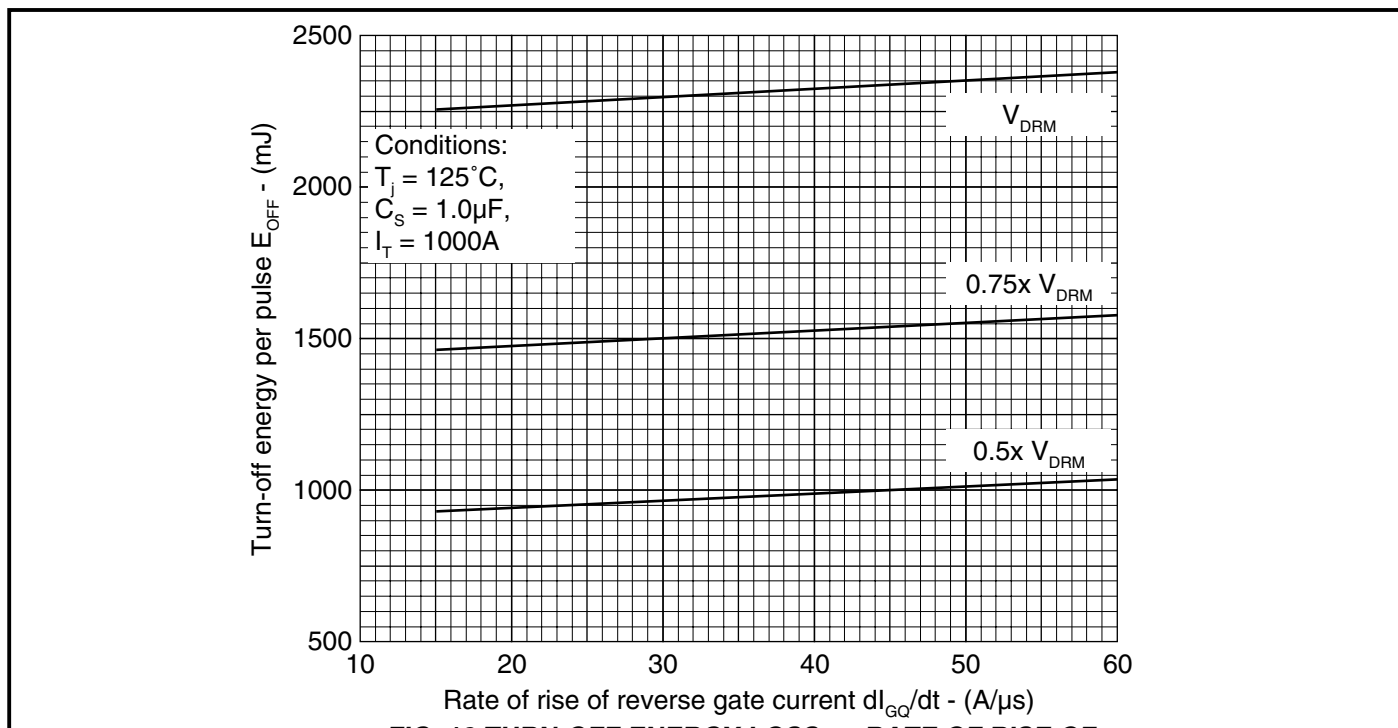


Fig.18 Turn-off energy loss vs rate of rise of reverse gate current

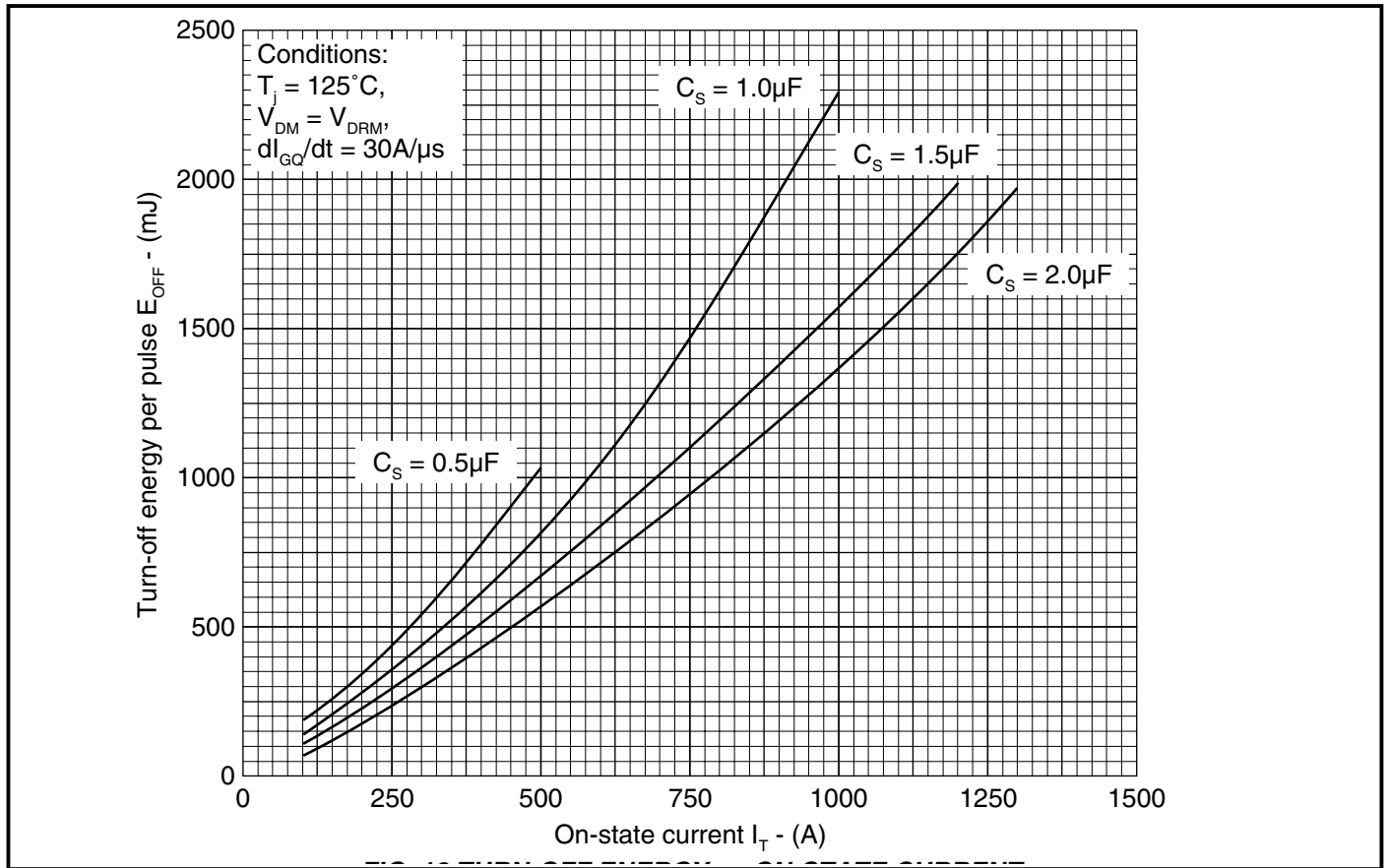


Fig.19 Turn-off energy vs on-state current

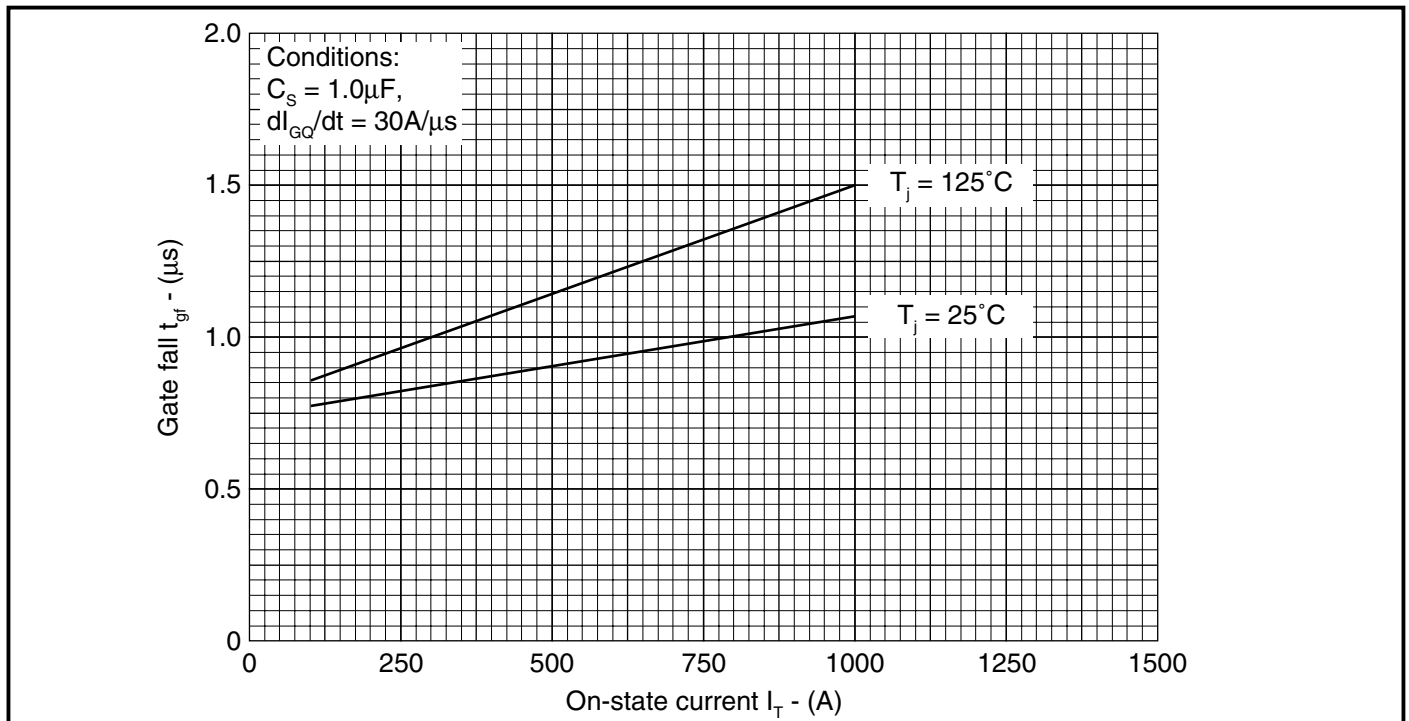


Fig.20 Gate fall time vs on-state current

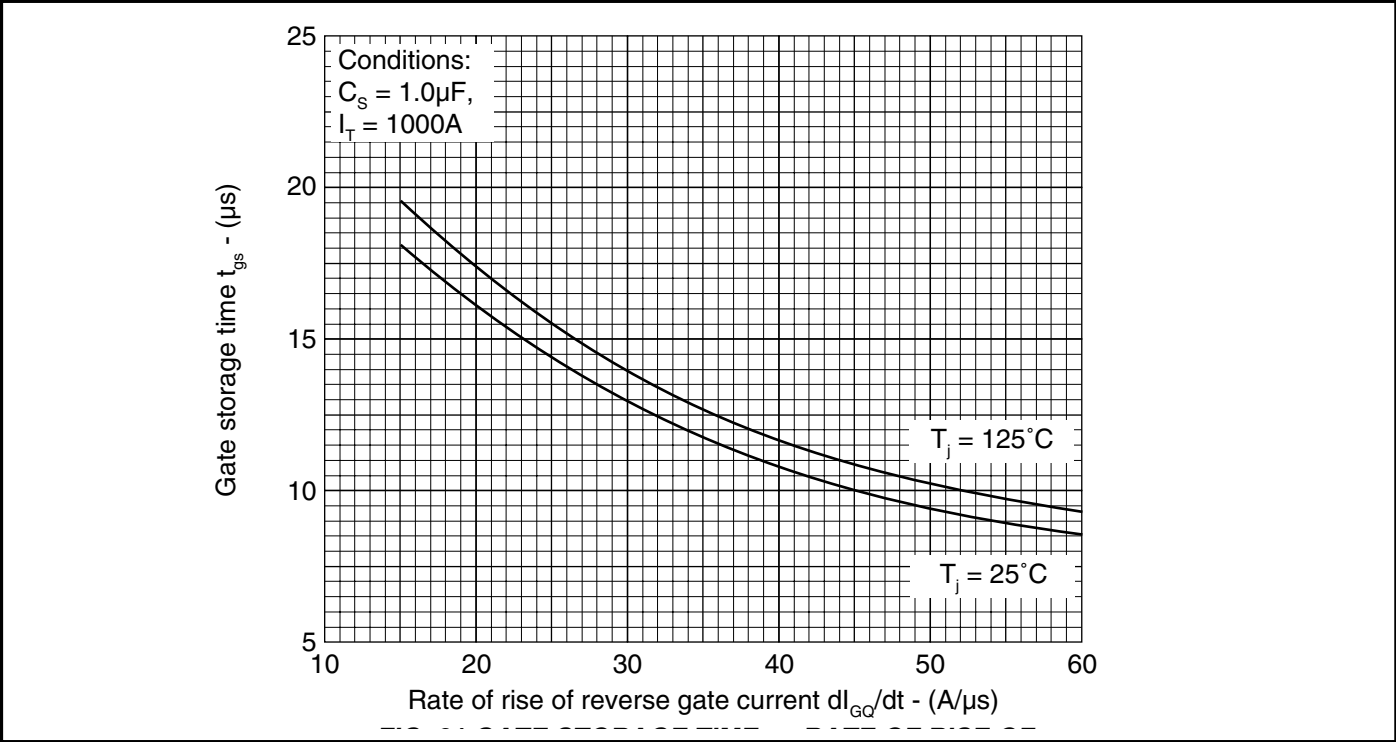


Fig.21 Gate storage time vs rate of rise of reverse gate current

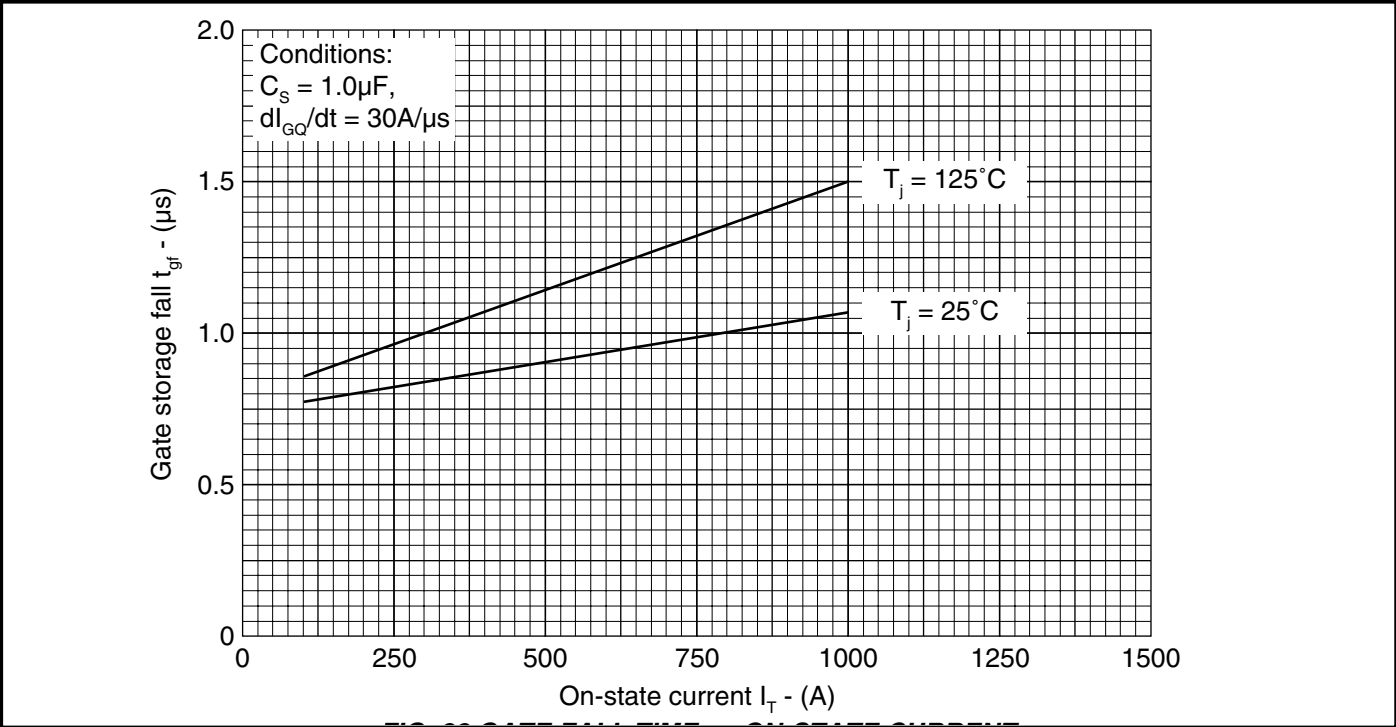


Fig.22 Gate fall time vs on-state current

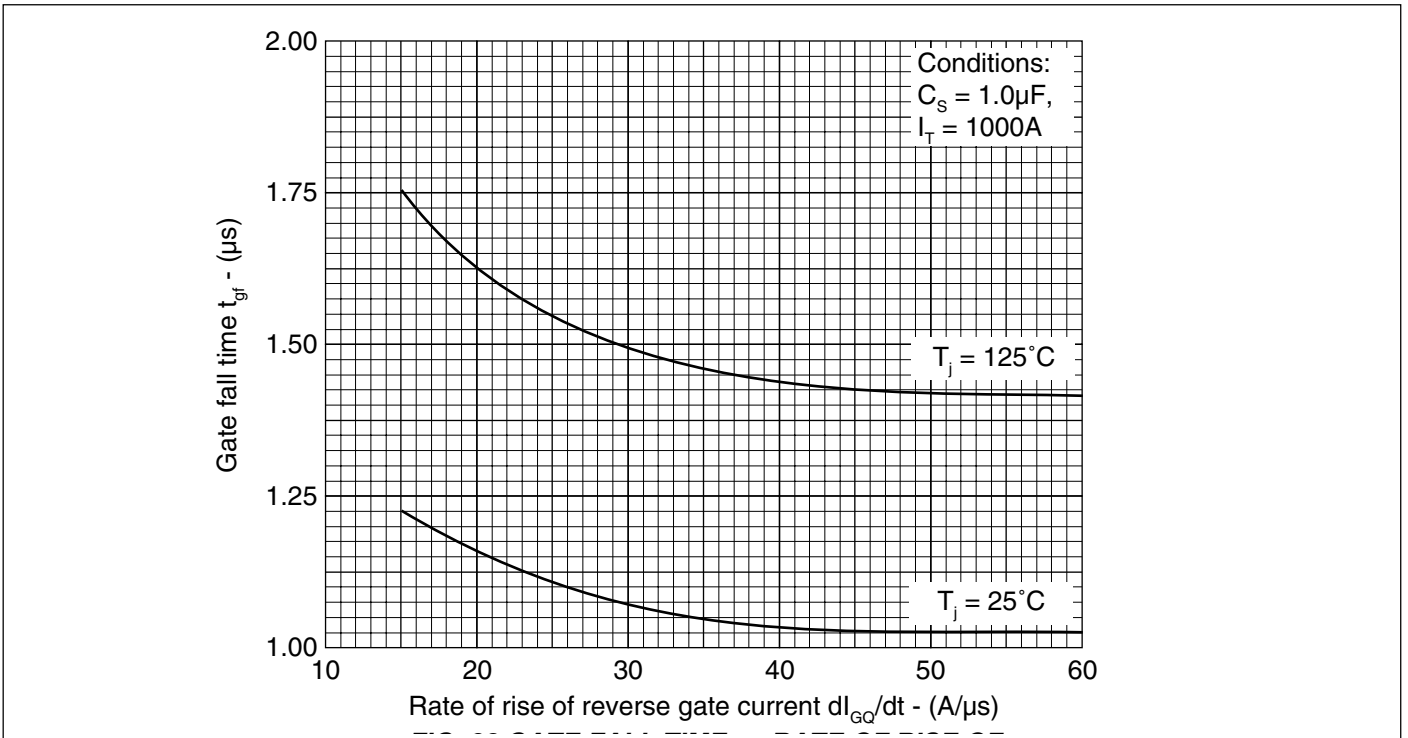


Fig.23 Gate fall time vs rate of rise of reverse gate current

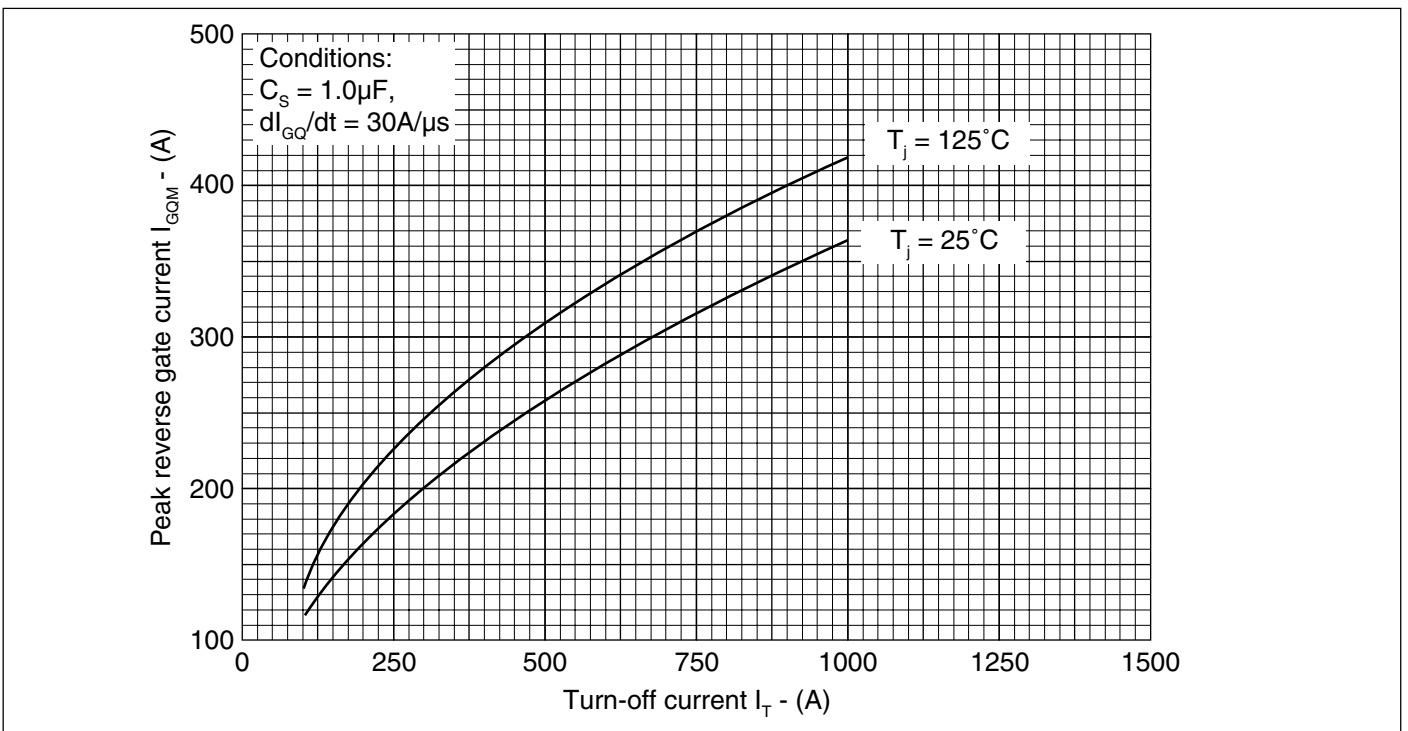


Fig.24 Peak reverse gate current vs turn-off current

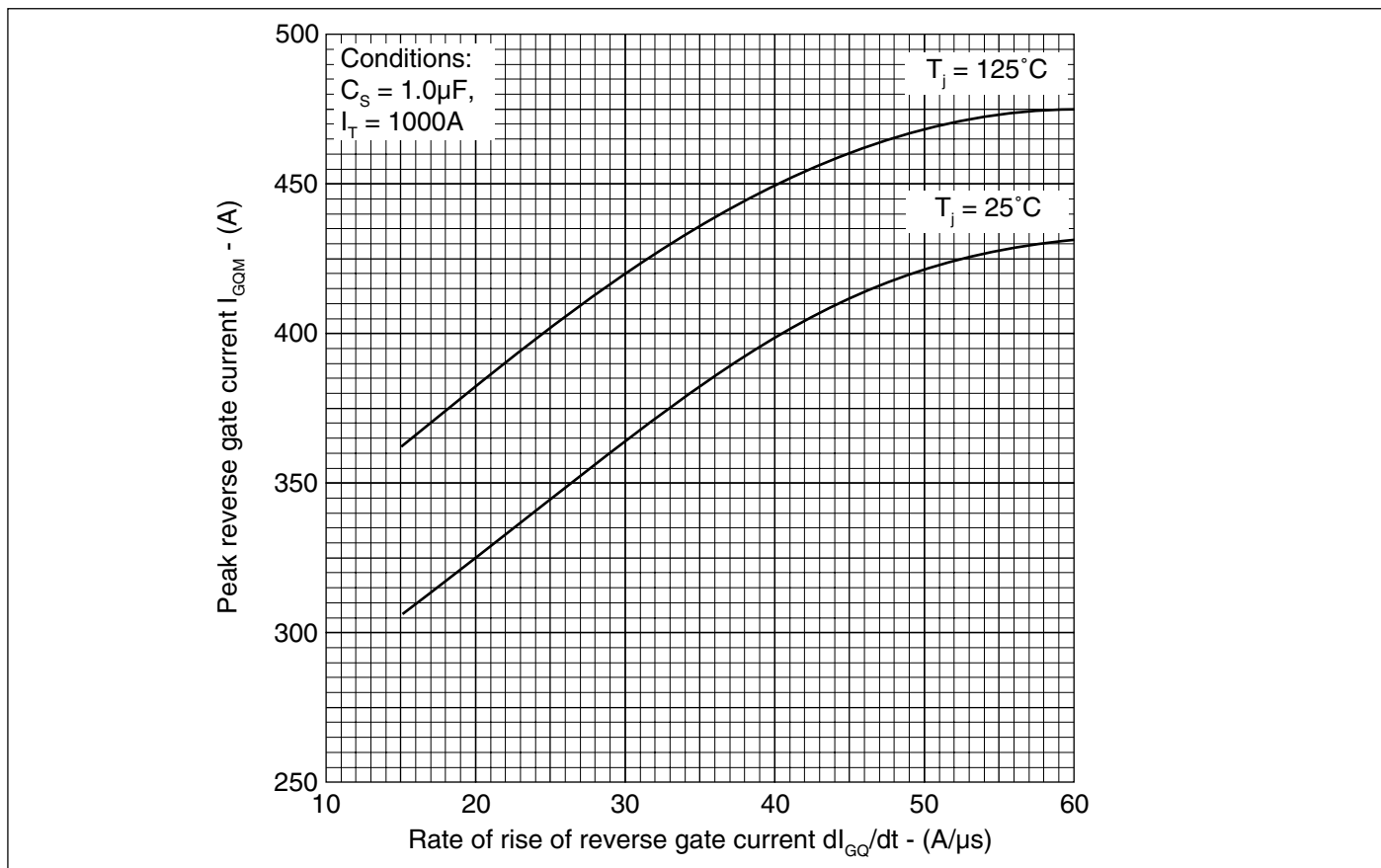


Fig.25 Peak reverse gate current vs rate of rise of reverse gate current

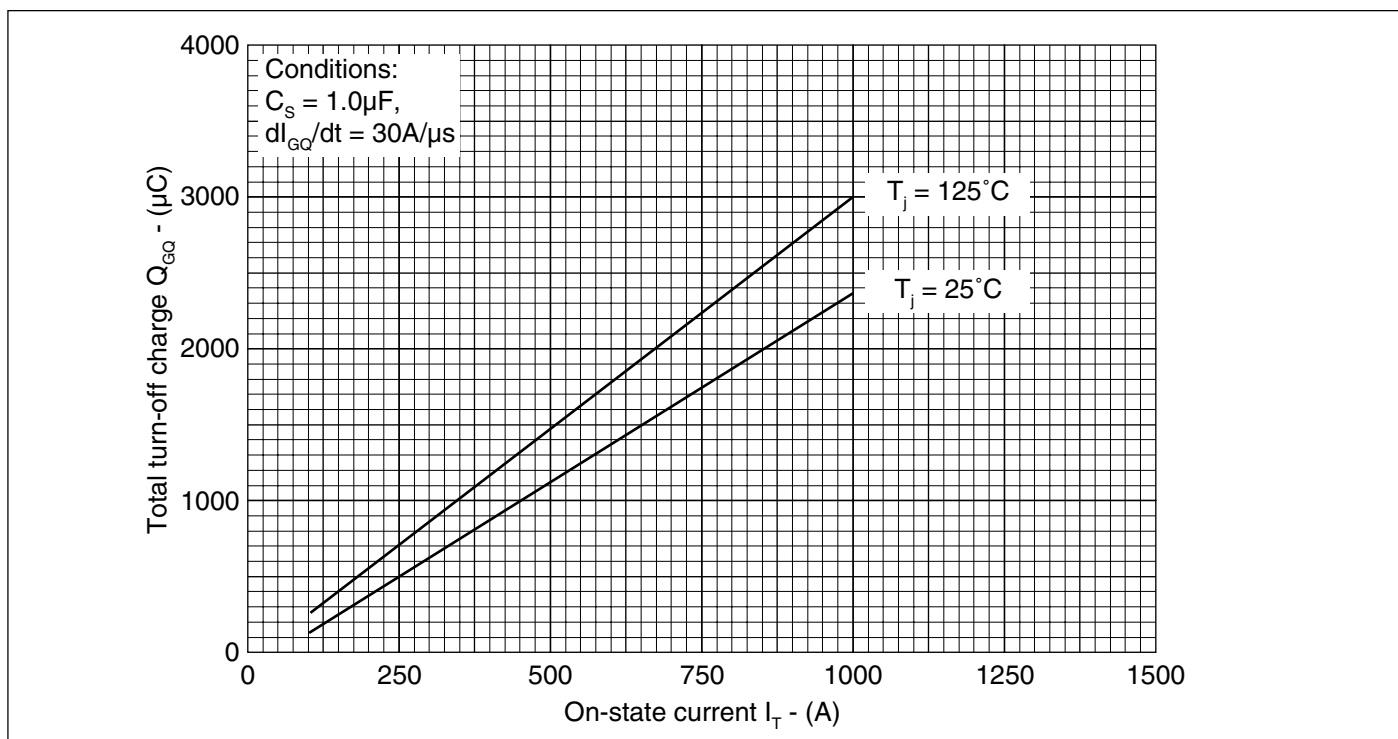


Fig.26 Turn-off gate charge vs on-state current

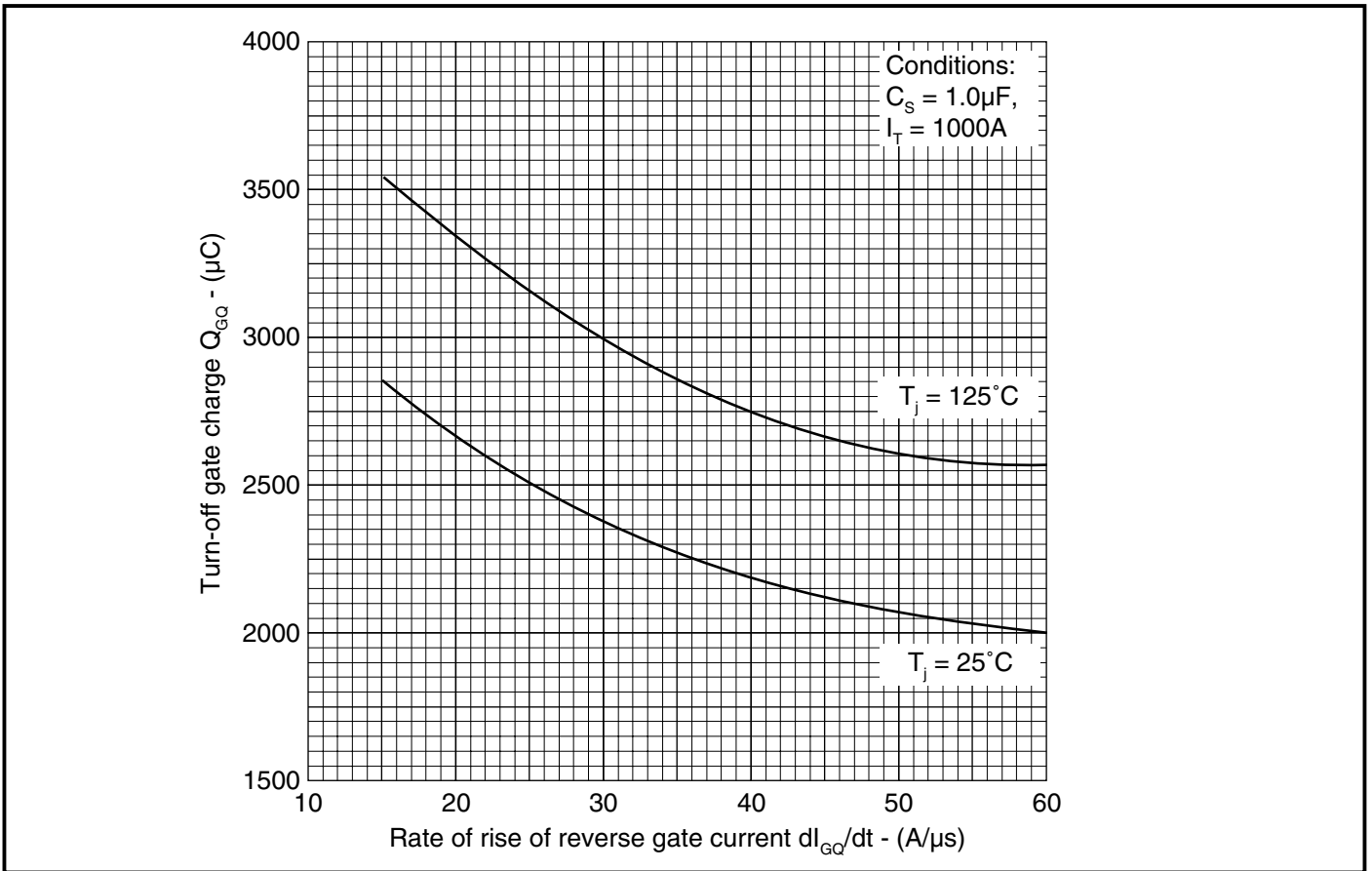


Fig.27 Turn-off gate charge vs rate of rise of reverse gate current

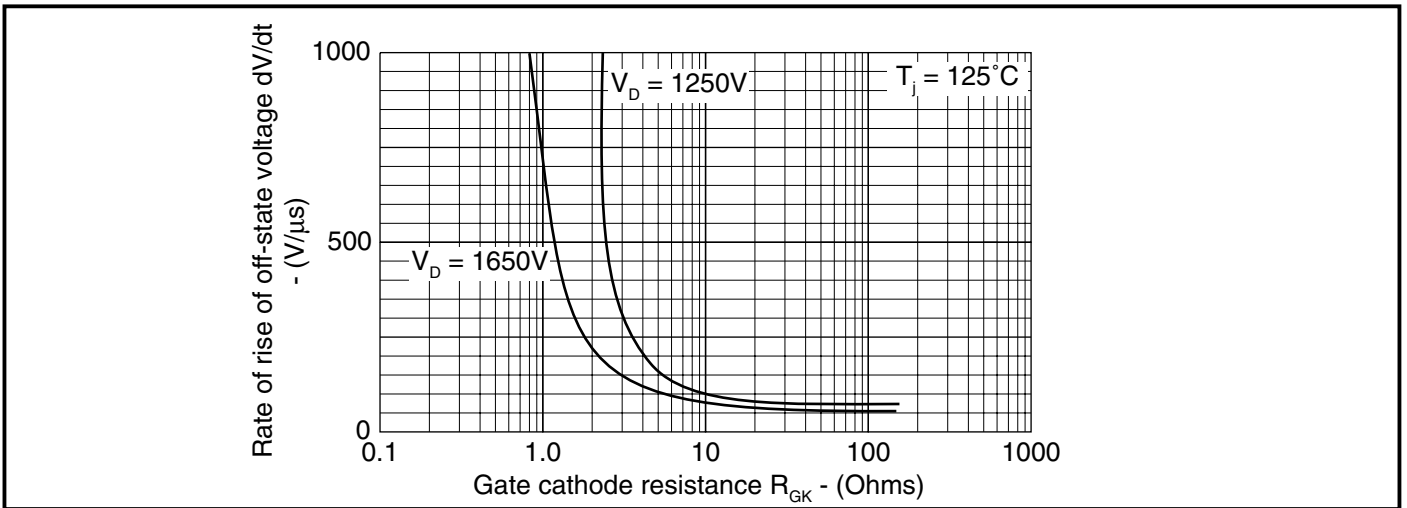
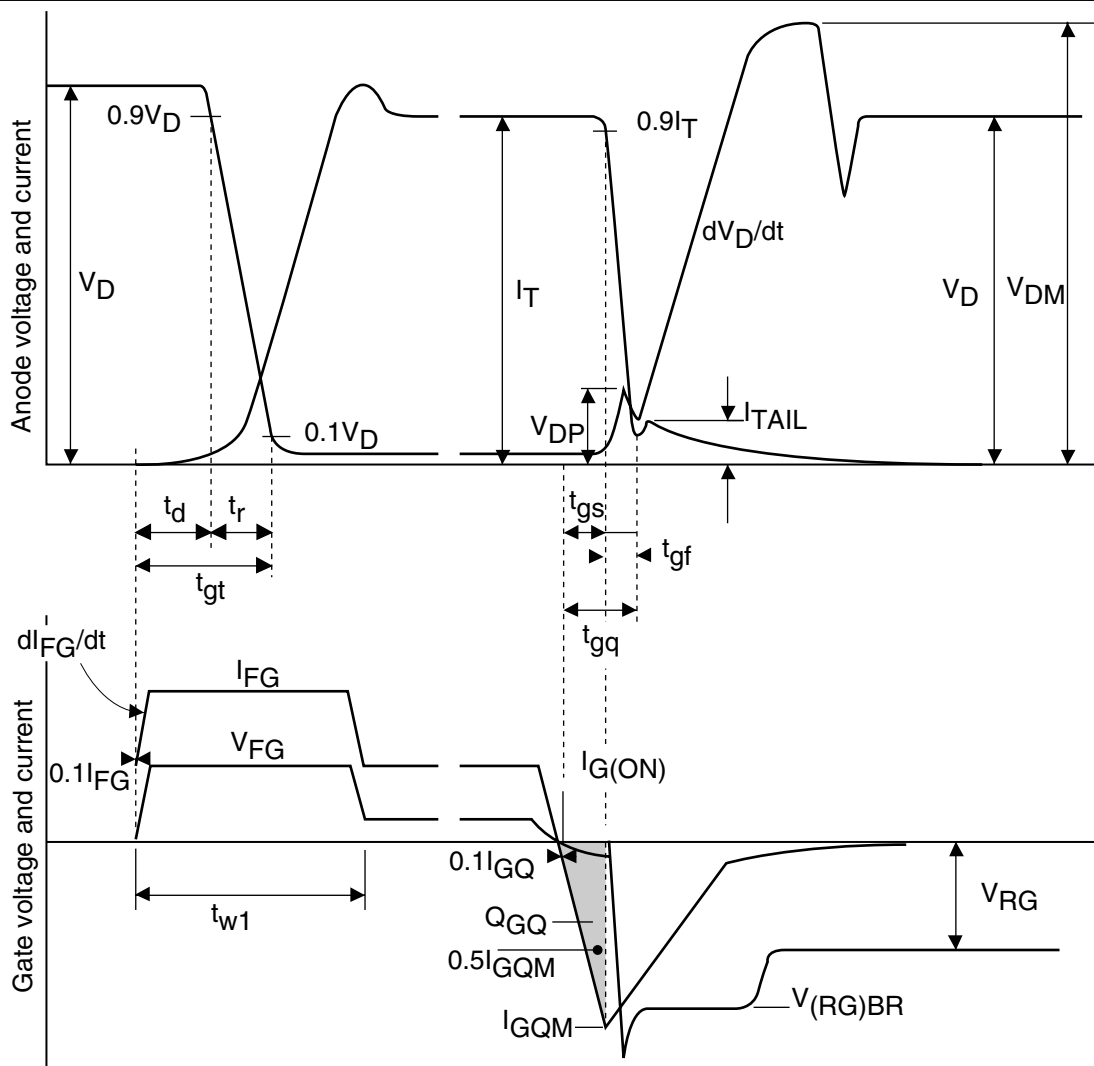


Fig.28 Rate of rise of off-state voltage vs gate cathode resistance



Recommended gate conditions:

- $I_{TCM} = 1000A$
- $I_{FG} = 30A$
- $I_{G(ON)} = 4A$ d.c.
- $t_{w1(min)} = 10\mu s$
- $I_{GQM} = 420A$
- $di_{GQ}/dt = 30A/\mu s$
- $Q_{GQ} = 3000\mu C$
- $V_{RG(min)} = 2V$
- $V_{RG(max)} = 16V$

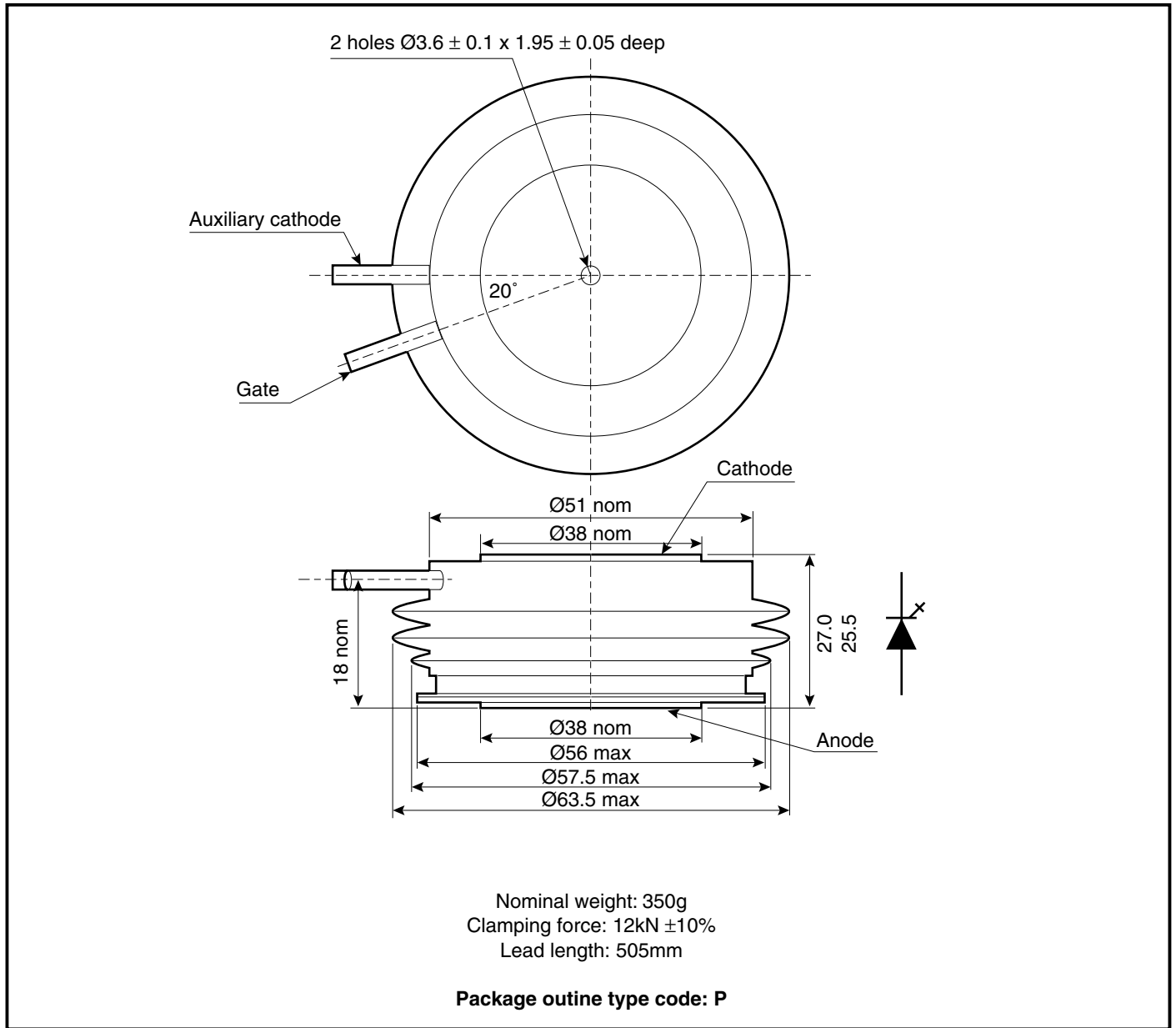
These are recommended Dynex Semiconductor conditions. Other conditions are permitted according to users gate drive specifications.

Fig.29 General switching waveforms

DG406BP25

PACKAGE DETAILS

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





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