ACR44U

Fast Turn-off Asymmetric Thyristor

Replaces March 1998 version, DS4222-3.4

DS4222-4.0 January 2000

APPLICATIONS

- High Frequency Applications
- Regulated Power Supplies
- Capacitor Discharge
- Ultrasonic Generators
- Induction Heating

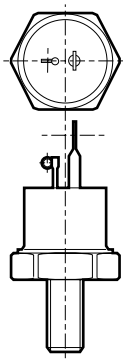
KEY PARAMETERS

V_{DRM}	1600V
$I_{T(AV)}$	44A
I_{TSM}	550A
dVdt*	600V/µs
dI/dt	2000A/µs
t_q	6.0µs

*dV/dt Available to 1000V/µs

FEATURES

- The ACR44U is a glass passivated asymmetric thyristor which has exceptionally fast turn-off capabilities combined with good turn-on characteristics.



Outline type code: SO28.
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
ACR44U 16LE	1600	2
ACR44U 14LE	1400	2
ACR44U 12LE	1200	2
ACR44U 10LE	1000	2
ACR44U 08LE	800	2

Lower voltage grades available.

CURRENT RATINGS

Symbol	Parameter	Conditions	Max.	Units
$I_{T(AV)}$	Mean on-state current	Half wave resistive load, T_{case} = 80°C	44	A
$I_{T(RMS)}$	RMS value	T_{case} = 70°C	69	A
I_T	Continuous (direct) on-state current	T_{case} = 85°C	57	A

SURGE RATINGS

Symbol	Parameter	Conditions	Max.	Units
I_{TSM}	Surge (non-repetitive) forward current	10ms half sine; T_{case} = 125°C	550	A
I^2t	I^2t for fusing		1500	A^2s

THERMAL AND MECHANICAL DATA

Symbol	Parameter	Conditions	Min.	Max.	Units
$R_{th(j-c)}$	Thermal resistance - junction to case	d.c.	-	0.35	°C/W
$R_{th(c-h)}$	Thermal resistance - case to heatsink	Mounting torque 3.5Nm with mounting compound	-	0.25	°C/W
T_{vj}	Virtual junction temperature	On-state (conducting)	-	125	°C
T_{stg}	Storage temperature range		-55	125	°C
-	Mounting torque		3.5	4.0	Nm

DYNAMIC CHARACTERISTICS

T_{case} = 125°C unless otherwise stated.

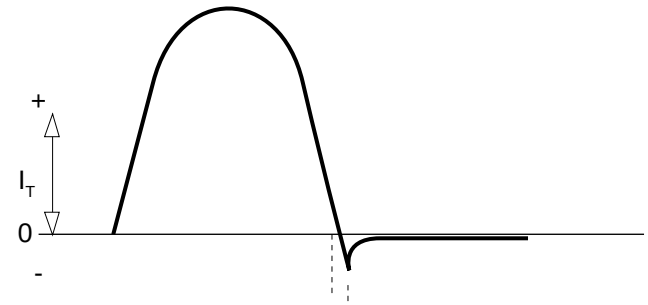
Symbol	Parameter	Conditions	Typ.	Max.	Units
V_{TM}	Maximum on-state voltage	At 100A peak, T_{case} = 25°C	-	2.7	V
I_{RRM}/I_{DRM}	Peak reverse and off-state current	At V_{RRM}/V_{DRM}, T_{case} = 125°C	-	20/10	mA
dV/dt	Maximum linear rate of rise of off-state voltage	To V_{DRM} T_j = 125°C, gate open circuit	-	600*	V/µs
dI/dt	Rate of rise of on-state current	From V_{DRM} to 125A. Gate source 15V, 15Ω t_r = 50ns	-	2000	A/µs
$V_{T(TO)}$	Threshold voltage	-	-	1.5	V
r_T	On-state slope resistance	-	-	13.3	mΩ
I_L	Latching current	-	120	-	mA
I_H	Holding current	-	25	-	mA
t_d	Delay time	V_D = 300V, gate source = 15V, 15Ω	-	250	ns
t_q	Turn-off time (with antiparallel diode)	I_T = 50A, square wave t_p = 50µs, T_j = 120°C, dI_R/dt = 50A/µs, dV/dt = 600V/µs to V_{DRM}, gate voltage at turn-off 3.5-4.5V. V_R = -1V.	-	6.0	µs

** Available to 1000V/µs.*

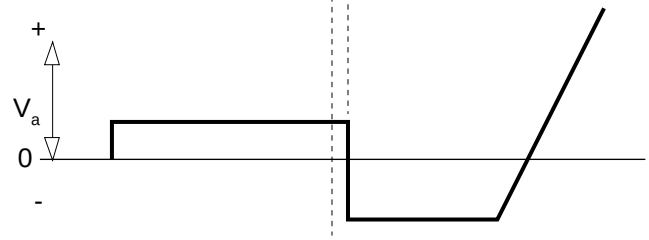
GATE TRIGGER CHARACTERISTICS AND RATINGS

Symbol	Parameter	Conditions		Typ.	Max.	Units
V_{GT}	Gate trigger voltage	V_{DWM} = 12V, R_L = 30Ω, T_{case} = 25°C		0.9	3.0	V
I_{GT}	Gate trigger current	V_{DWM} = 12V, R_L = 30Ω, T_{case} = 25°C		60	200	mA
V_{FGM}	Peak forward gate voltage	-		-	40	V
V_{RGM}	Peak reverse gate voltage	-		-	10	V
I_{FGM}	Peak forward gate current	-		-	10	A
P_{GM}	Peak gate power	-		-	40	W
$P_{G(AV)}$	Average gate power	Average time 10ms max	Forward	-	10	W
			Reverse	-	6	W

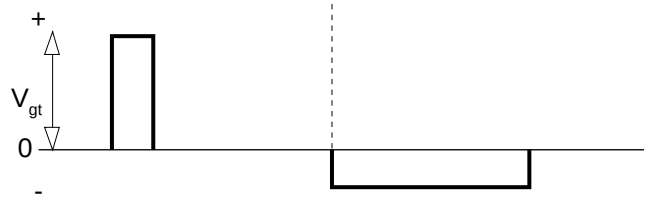
WAVEFORM OF GATE VOLTAGE AT TURN-OFF



a) Anode current waveform



b) Anode voltage waveform



c) Gate voltage waveform

CURVES

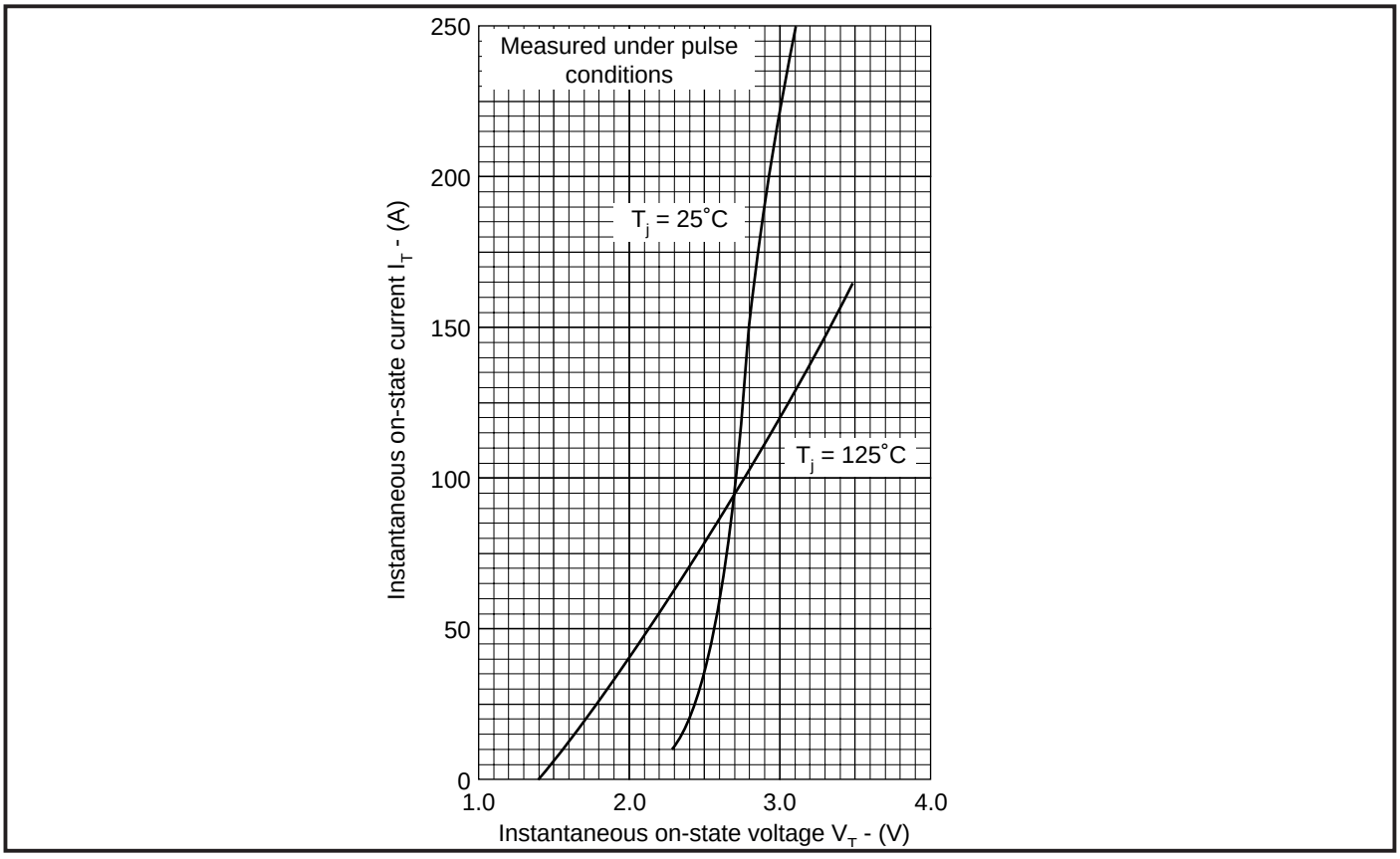


Fig.1 Maximum (limit) on-state characteristics

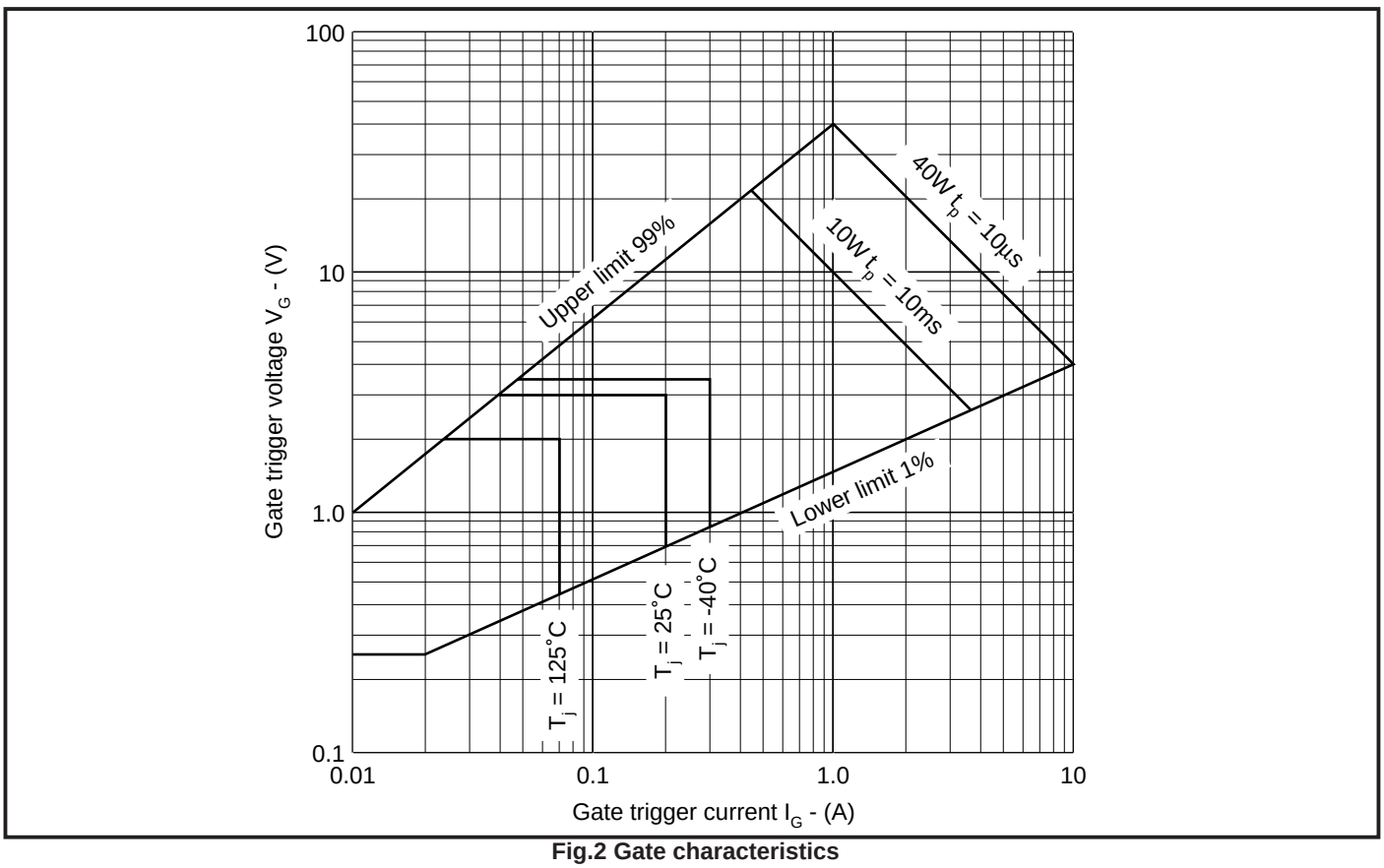


Fig.2 Gate characteristics

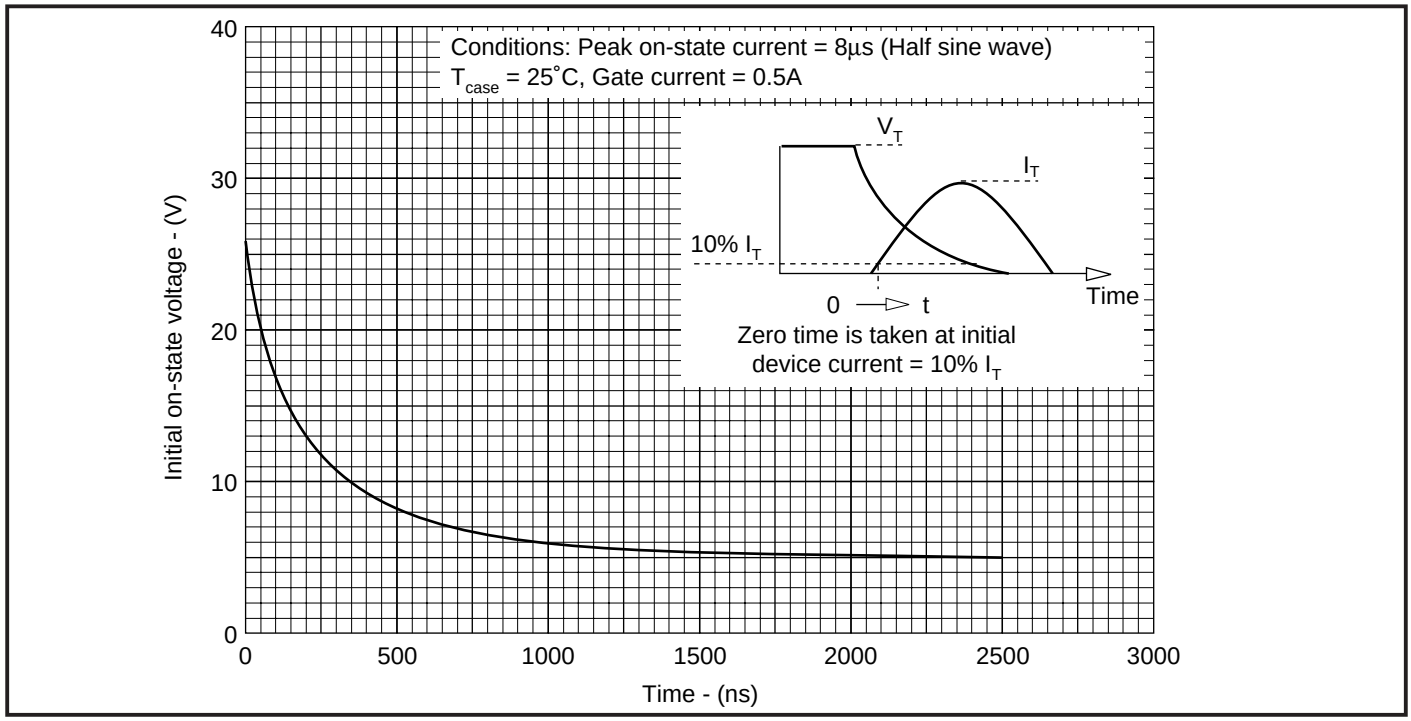


Fig.3 Typical initial on-state voltage vs time

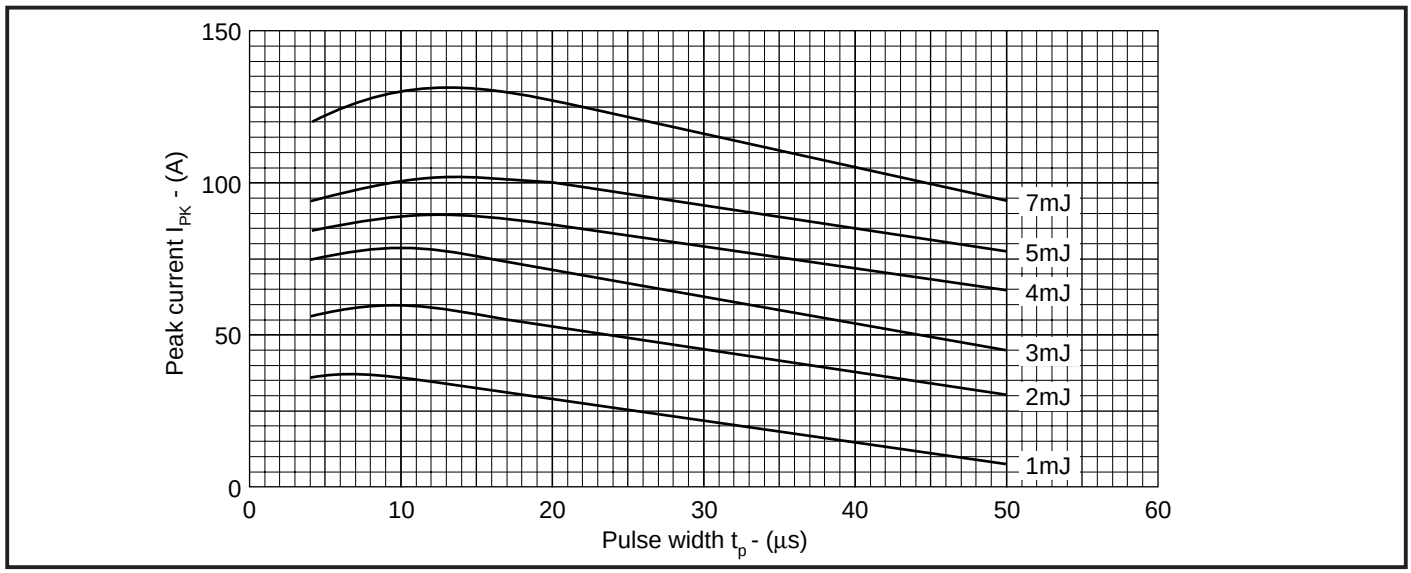


Fig.4 Maximum energy loss per pulse when switching a half sinusoidal pulse from 600V

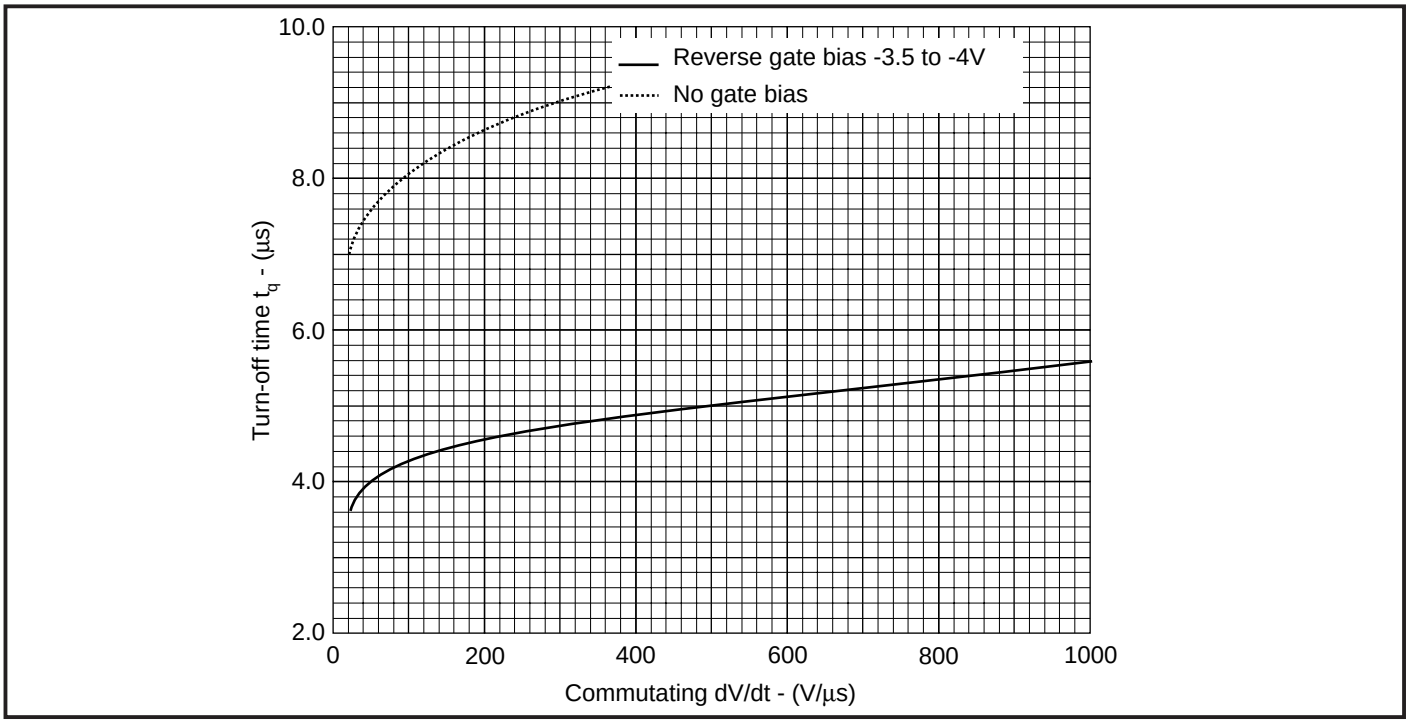


Fig.5 Variation of turn-off time with commutating dV/dt

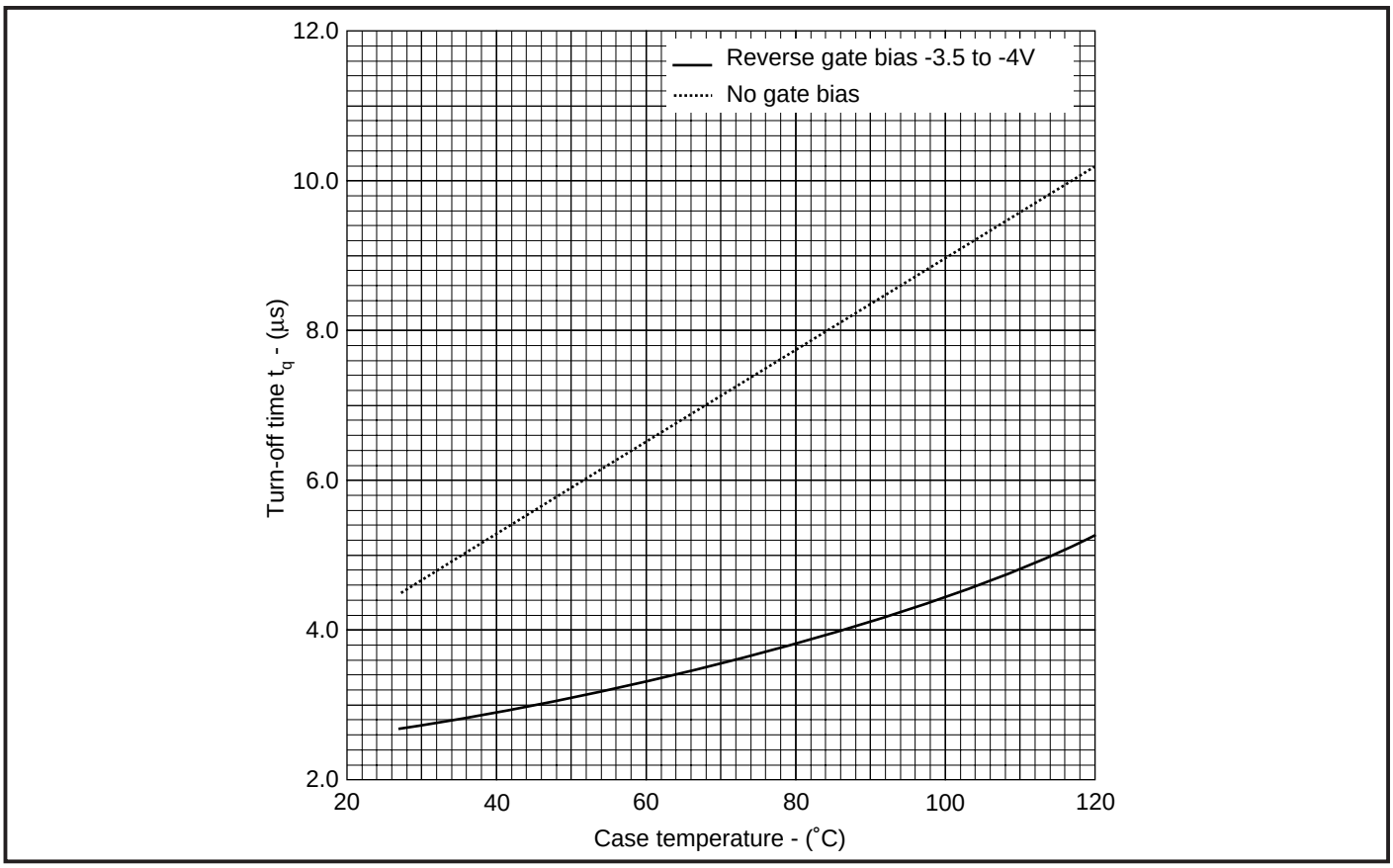
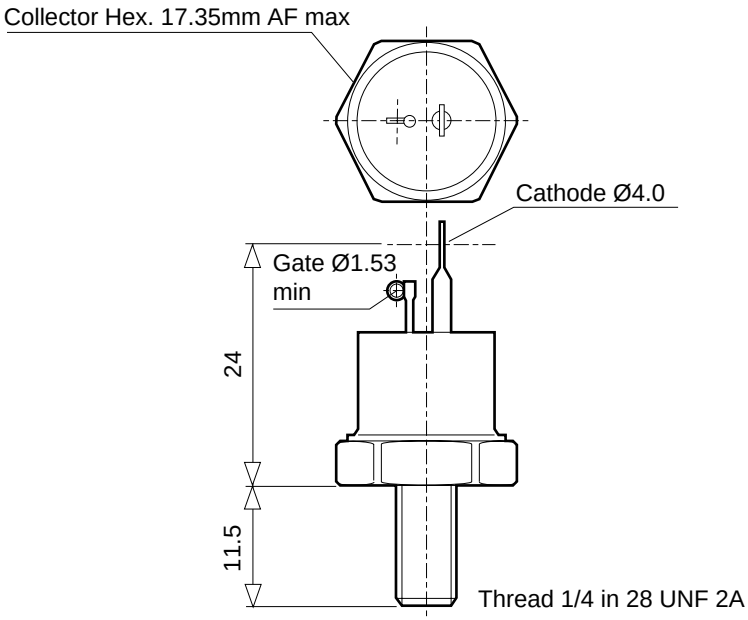


Fig.6 Variation of turn-off time with case temperature

PACKAGE DETAILS

For further package information, please contact your local Customer Service Centre. All dimensions in mm, unless stated otherwise. DO NOT SCALE.



Nominal weight: 16.5g

Package outline type code: SO28

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Target Information: This is the most tentative form of information and represents a very preliminary specification. No actual design work on the product has been started.

Preliminary Information: The product is in design and development. The datasheet represents the product as it is understood but details may change.

Advance Information: The product design is complete and final characterisation for volume production is well in hand.

No Annotation: The product parameters are fixed and the product is available to datasheet specification.