



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
dV/dt^*	600V/ μ s
dI/dt	2000A/ μ s
t_q	6.0 μ s
*dV/dt Available to 1000V/ μ s	

FEATURES

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

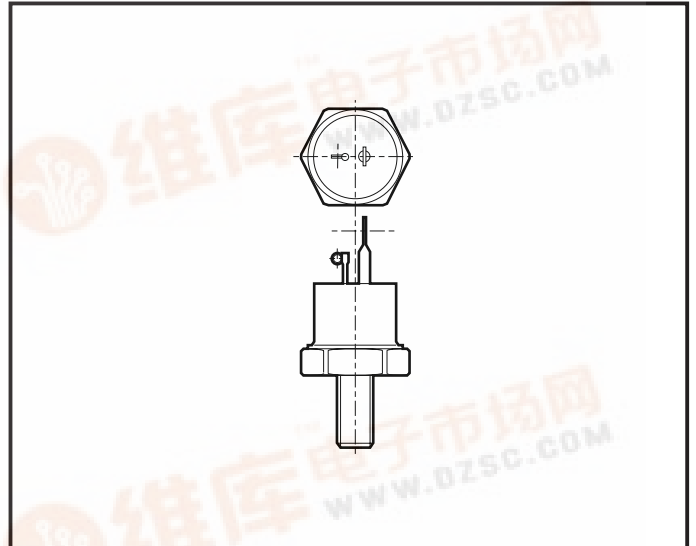
VOLTAGE RATINGS

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, $T_{case} = 80^\circ\text{C}$	44	A
$I_{T(RMS)}$	RMS value	$T_{case} = 70^\circ\text{C}$	69	A
I_T	Continuous (direct) on-state current	$T_{case} = 85^\circ\text{C}$	57	A



Outline type code: SO28.

See Package Details for further information.

ACR44U

SURGE RATINGS

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

THERMAL AND MECHANICAL DATA

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

DYNAMIC CHARACTERISTICS

$T_{case} = 125^{\circ}C$ unless otherwise stated.

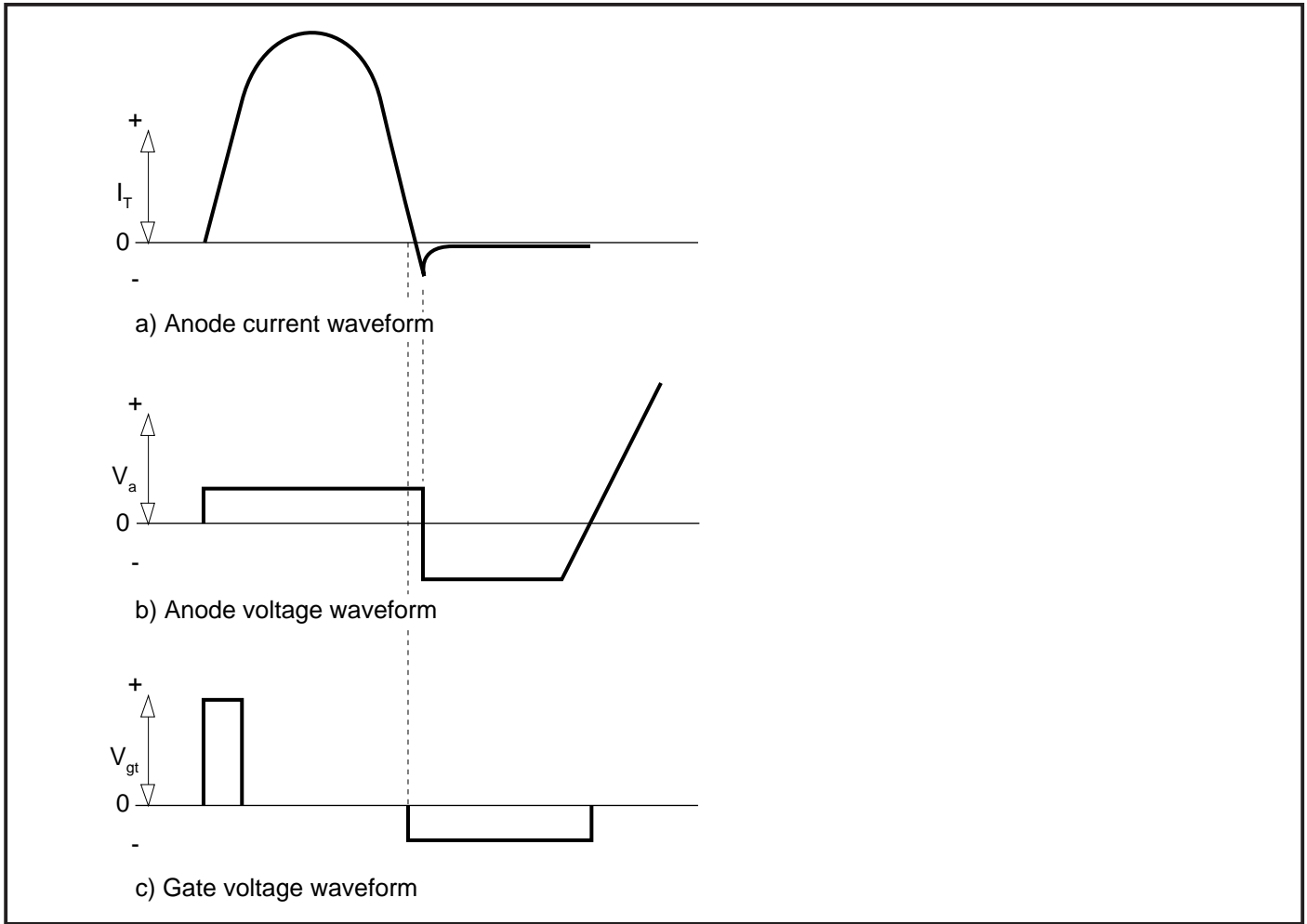
Symbol	Parameter	Conditions	Typ.	Max.	Units
V_{TM}	Maximum on-state voltage	At 100A peak, $T_{case} = 25^{\circ}C$	-	2.7	V
I_{RRM}/I_{DRM}	Peak reverse and off-state current	At V_{RRM}/V_{DRM} , $T_{case} = 125^{\circ}C$	-	20/10	mA
dV/dt	Maximum linear rate of rise of off-state voltage	To V_{DRM} $T_j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

* Available to 1000V/ μ s.

GATE TRIGGER CHARACTERISTICS AND RATINGS

Symbol	Parameter	Conditions		Typ.	Max.	Units
V_{GT}	Gate trigger voltage	$V_{DWM} = 12V, R_L = 30\Omega, T_{case} = 25^\circ C$		0.9	3.0	V
I_{GT}	Gate trigger current	$V_{DWM} = 12V, R_L = 30\Omega, T_{case} = 25^\circ C$		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



ACR44U

CURVES

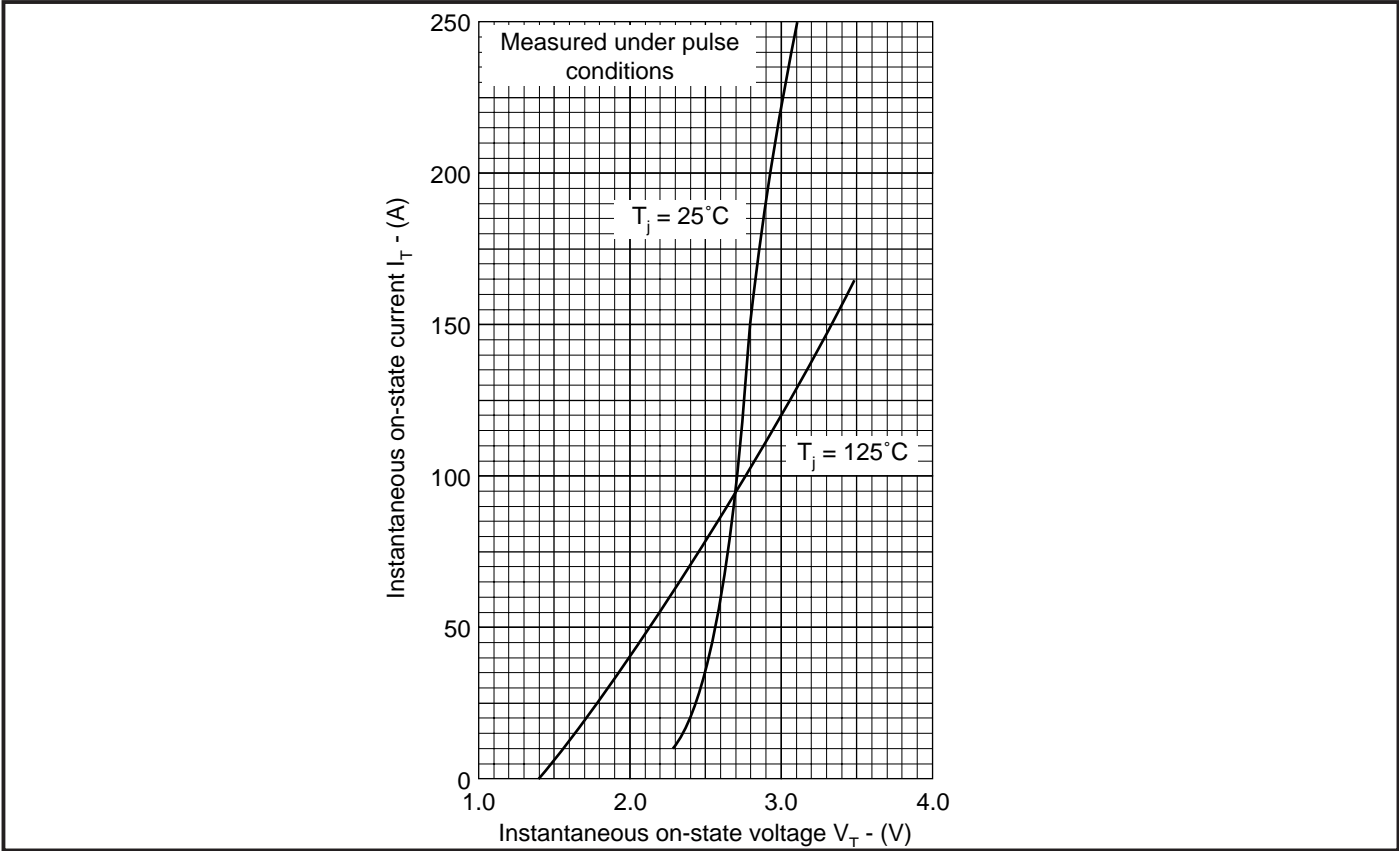


Fig.1 Maximum (limit) on-state characteristics

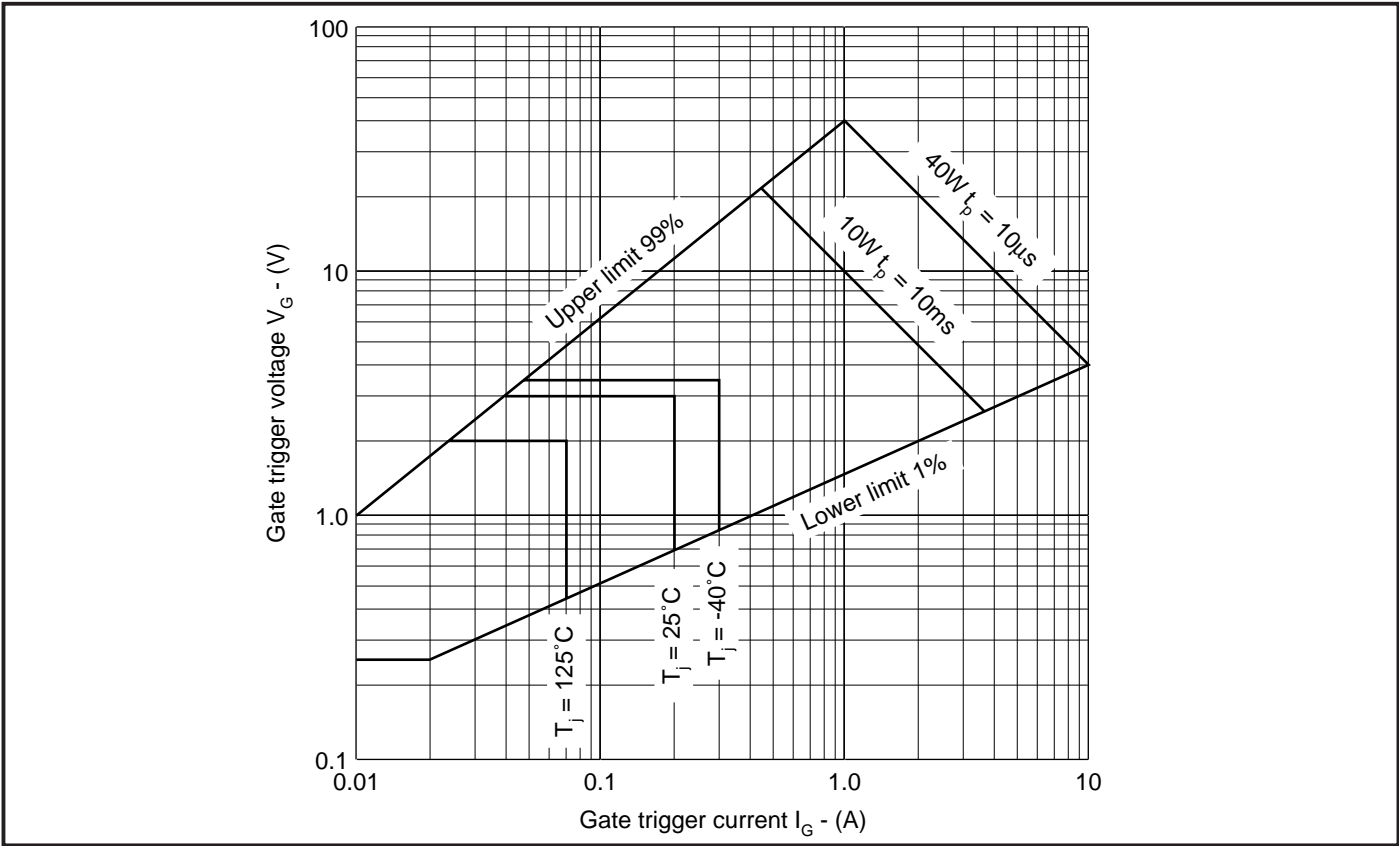


Fig.2 Gate characteristics

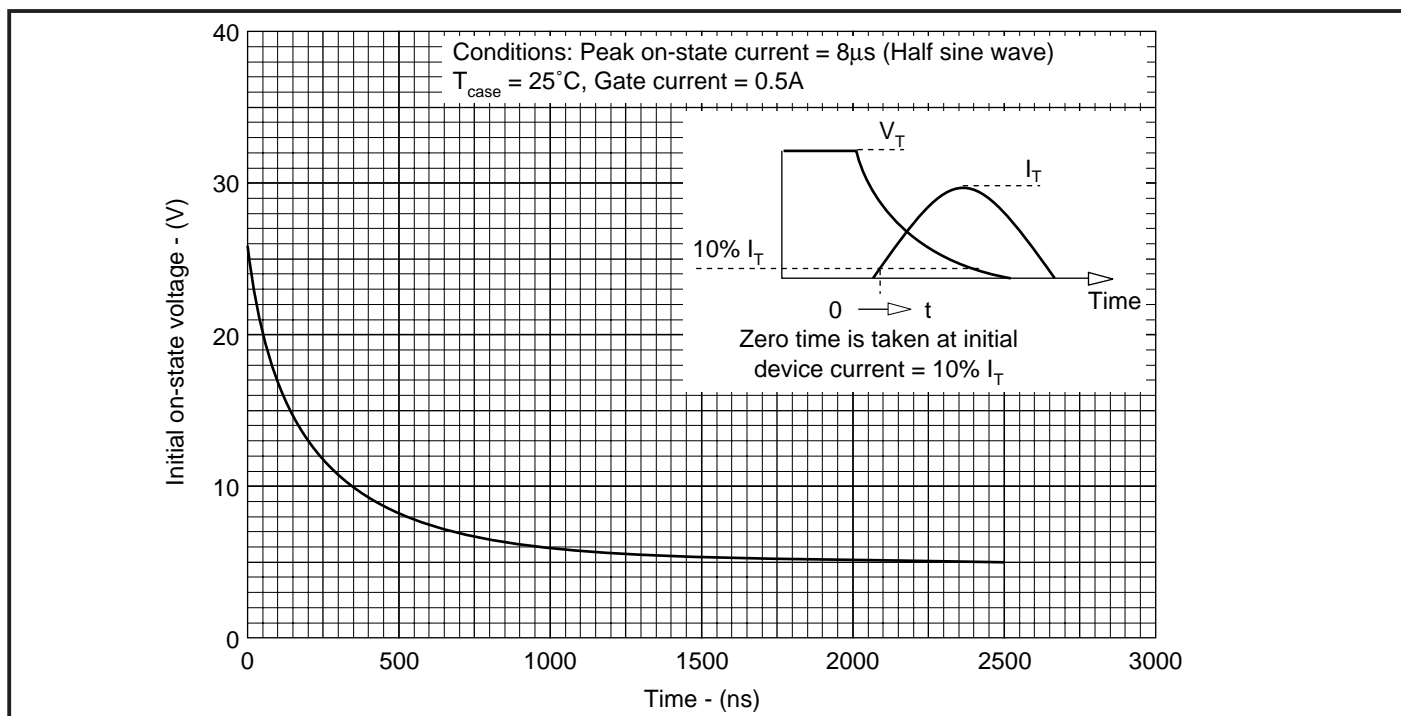


Fig.3 Typical initial on-state voltage vs time

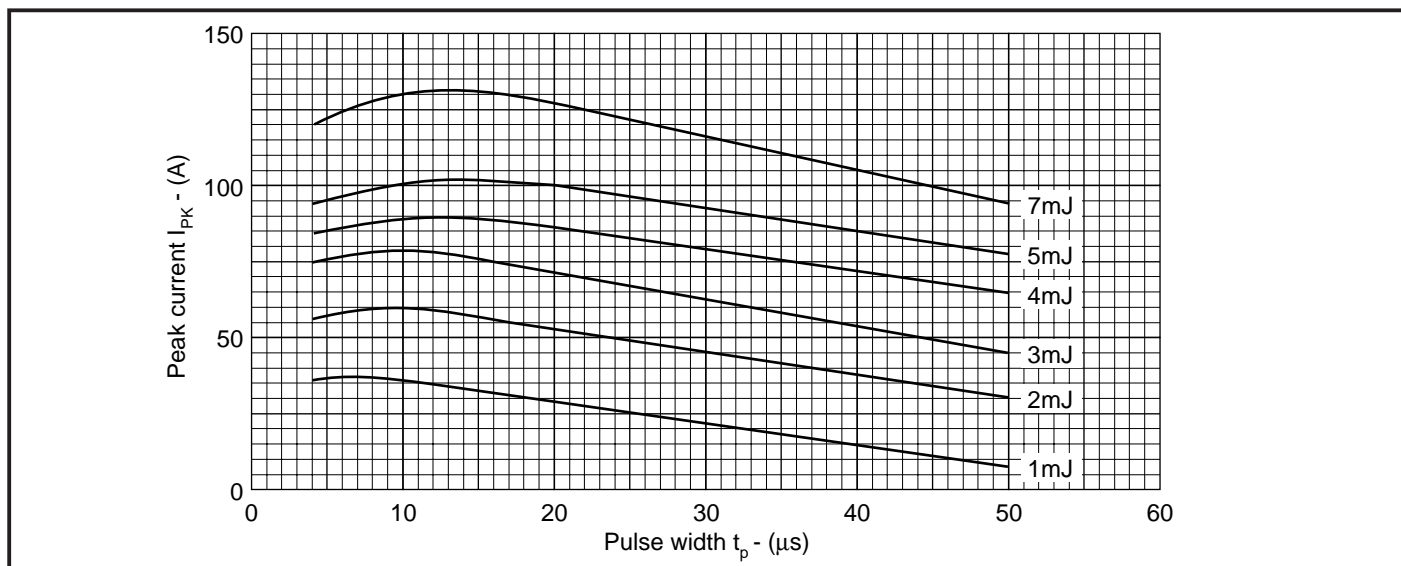


Fig.4 Maximum energy loss per pulse when switching a half sinusoidal pulse from 600V

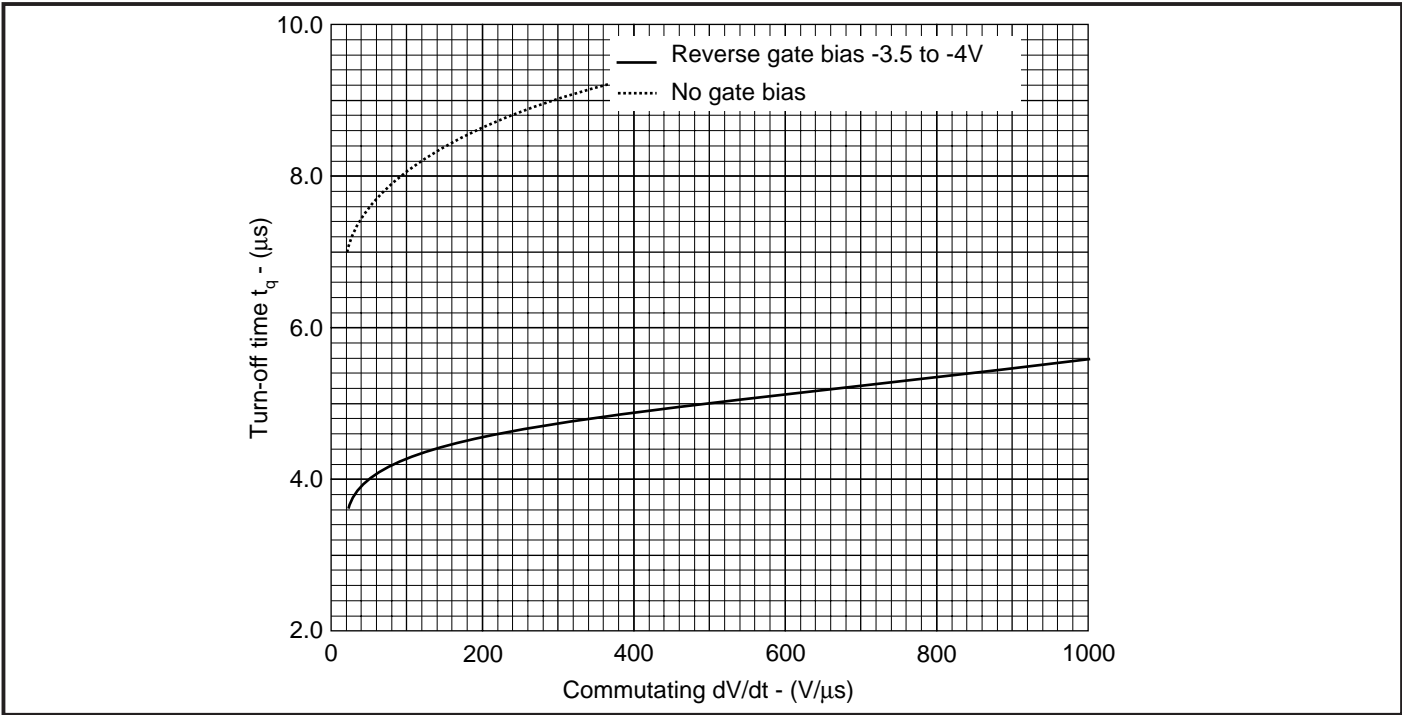


Fig.5 Variation of turn-off time with commutating dV/dt

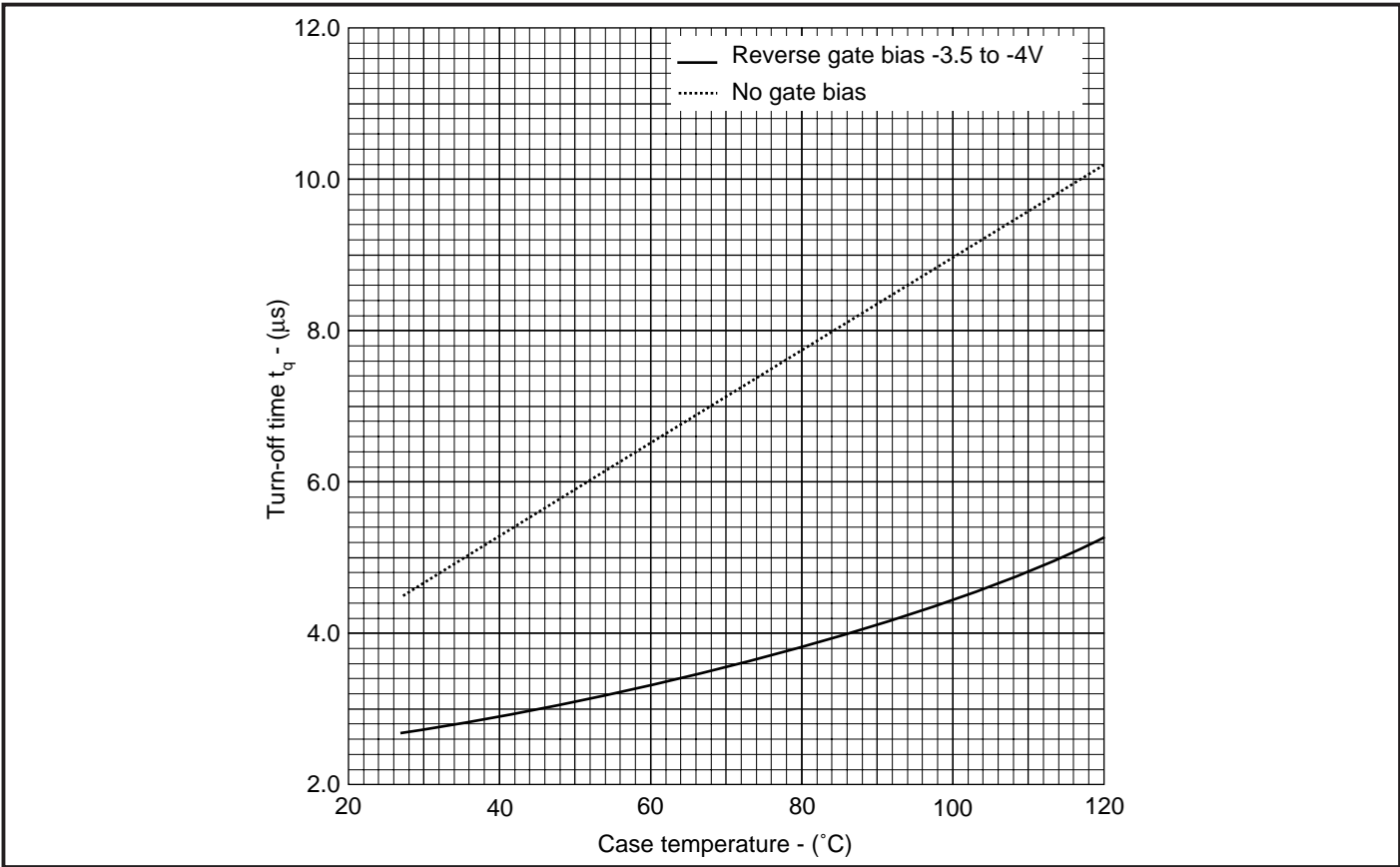
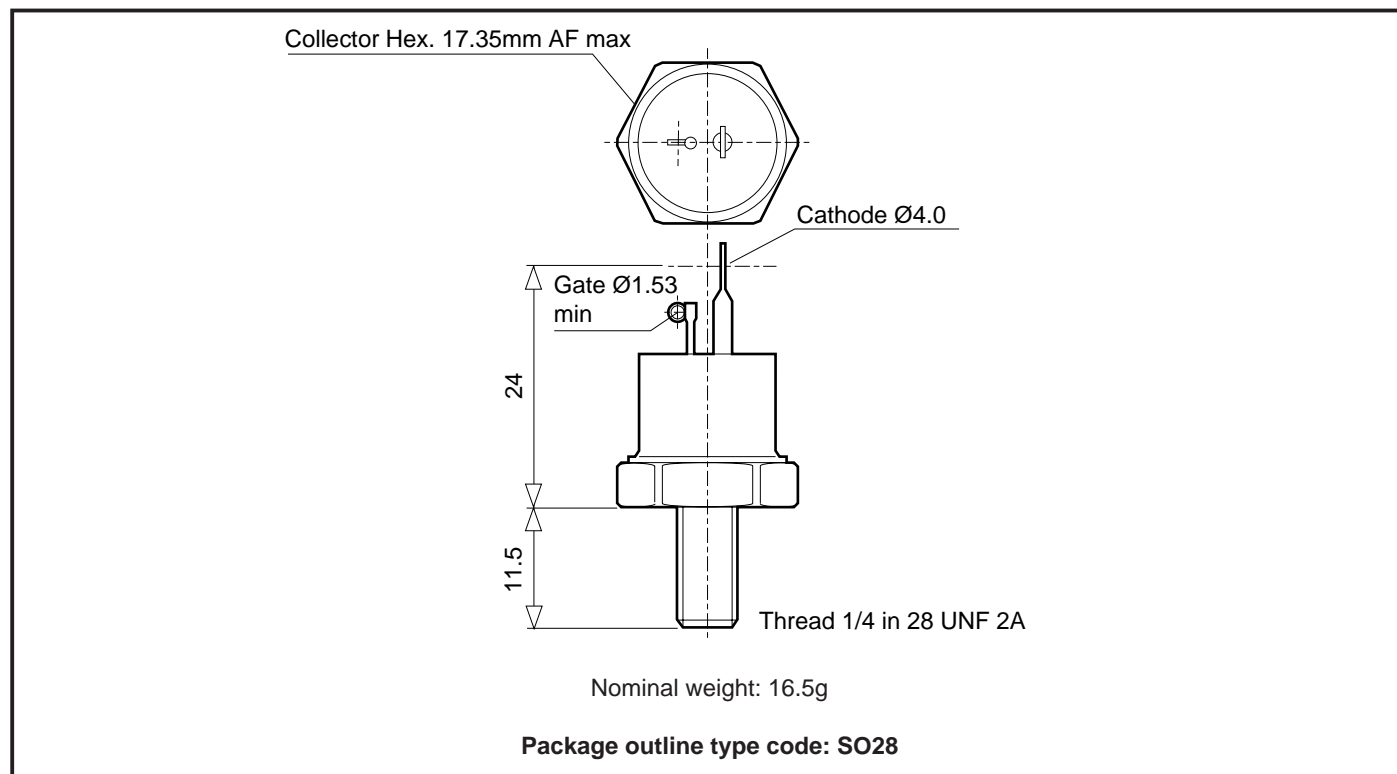


Fig.6 Variation of turn-off time with case temperature

PACKAGE DETAILS

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



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

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