

363-431

Fast Turn-Off Asymmetric Thyristor

Issue 2.0 November 1993

Applications

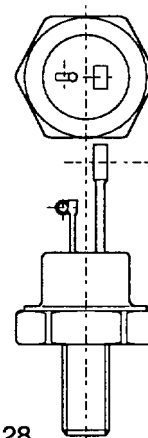
- High frequency applications
- Regulated power supplies
- Capacitor discharge
- Ultrasonic generators
- Induction heating
- Electronic welding

Features

- The ACR 25U is a glass passivated asymmetric thyristor which has exceptionally fast turn-off capabilities combined with good turn-on characteristics.

Key Parameters

V_{DRM}	800V
$I_{T(AV)}$	25A
I_{TSM}	300A
di/dt	2000A/ μ s
dV/dt	500V/ μ s
t_q	4.0 μ s

Package Outline

Outline type No: SO 28.
 For further outline information turn to page 7.

Voltage Ratings

Type Number	Repetitive Peak Off-state Voltage V_{DRM}	Repetitive Peak Reverse Voltage V_{RRM}
ACR 25U 08LG	800	10
ACR 25U 06LG	600	10
ACR 25U 04LG	400	10

Current Ratings

Symbol	Parameter	Conditions	Max.	Units
$I_{T(AV)}$	Mean on-state current	Halfwave, resistive load, $T_{case} = 70^{\circ}C$	25	A
$I_{T(RMS)}$	RMS value	$T_{case} = 90^{\circ}C$	25	A
I_T	Continuous (direct) on-state current	$T_{case} = 70^{\circ}C$	40	A

Fast Turn-Off Asymmetric Thyristor

Surge Ratings					
Symbol	Parameter	Conditions	Max.	Units	
I_{TSM}	Surge (non-repetitive) on-state current	$T_J = 125^\circ\text{C}$	300	A	
I^2t	I^2t for fusing	10ms half sine	450	A^2s	
di/dt	Rate of rise of on-state current	From V_{DRM} to 125A, Gate source 15V, 15Ω Rise time 50ns	2000	$\text{A}/\mu\text{s}$	
dV/dt	Min. linear rate of rise of off-state voltage	Gate open circuit $T_{case} = 125^\circ\text{C}$. To V_{DRM}	500†	$\text{V}/\mu\text{s}$	

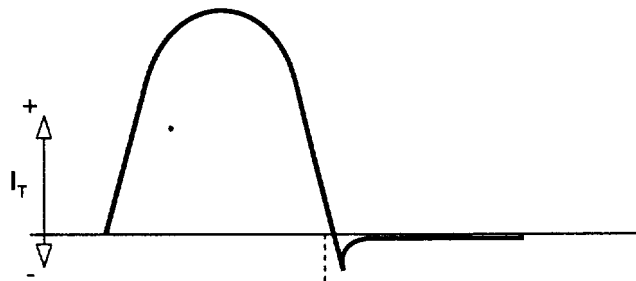
† Available to 1000V/ μs

Thermal Ratings and Mechanical Data					
Symbol	Parameter	Conditions	Min.	Max.	Units
$R_{th(j-c)}$	Thermal resistance - junction to case	d.c.	-	0.75	$^\circ\text{C}/\text{W}$
$R_{th(c-h)}$	Thermal resistance - case to heatsink	Mounting torque 3.5Nm with mounting compound	-	0.3	$^\circ\text{C}/\text{W}$
T_{vj}	Virtual junction temperature	On-state (conducting)	-	125	$^\circ\text{C}$
T_{sto}	Storage temperature range		-55	125	$^\circ\text{C}$
-	Mounting torque		3.5	4.0	Nm

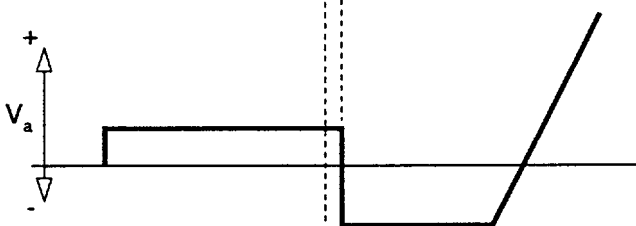
Characteristics					
$T_{case} = 25^\circ\text{C}$ unless stated otherwise					
Symbol	Parameter	Conditions	Typ.	Max.	Units
V_{TM}	On-state voltage	$I_T = 100\text{ A}$	-	2.2	V
I_{RM}/I_{DRM}	Peak reverse and off-state current	At V_{RRM}/V_{DRM} , $T_{case} = 125^\circ\text{C}$	-	10/10	mA
I_L	Latching current		90	-	mA
I_H	Holding current		45	-	mA
t_d	Delay time	$V_D = 300\text{V}$, Gate source = 15V, 15Ω	-	250	ns
t_q	Circuit commutated turn-off time	$I_T = 50\text{A}$, sq. wave 50 μs pulse, $T_{case} = 120^\circ\text{C}$, $di_R/dt = 50\text{A}/\mu\text{s}$ $dV/dt = 600\text{V}/\mu\text{s}$ to V_{DRM} Gate voltage at turn-off $< -1\text{V}$	-	4.0	μs
$V_{T(TO)}$	Threshold voltage	At T_{vj}	-	1.0	V
r_T	On-state slope resistance	At T_{vj}	-	12	$\text{m}\Omega$

Gate Trigger Characteristics and Ratings
 $T_{case} = 25^{\circ}C$ unless otherwise stated

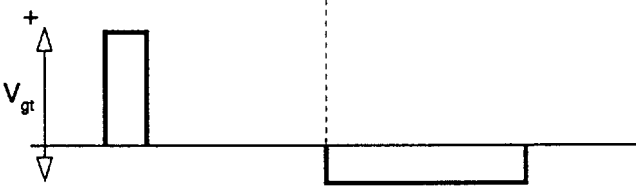
Symbol	Parameter	Conditions	Typ.	Max.	Units
V_{GT}	Gate trigger voltage	$V_{DWM} = 12V, R_L = 30\Omega$	0.9	3	V
I_{GT}	Gate trigger current	$V_{DWM} = 12V, R_L = 30\Omega$	60	200	mA
V_{FGM}	Peak forward gate voltage		-	40	V
V_{RGN}	Peak reverse gate voltage		-	10	V
I_{FGM}	Peak forward gate current		-	10	A
P_{GM}	Peak gate power		-	40	W
$P_{G(AV)}$	Mean gate power	Averaging 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

This device can be produced with exceptionally fast-turn on performance for use in circuits which require the switching of very short ($<1\mu s$) high current pulses. Please contact us for further information.

Curves

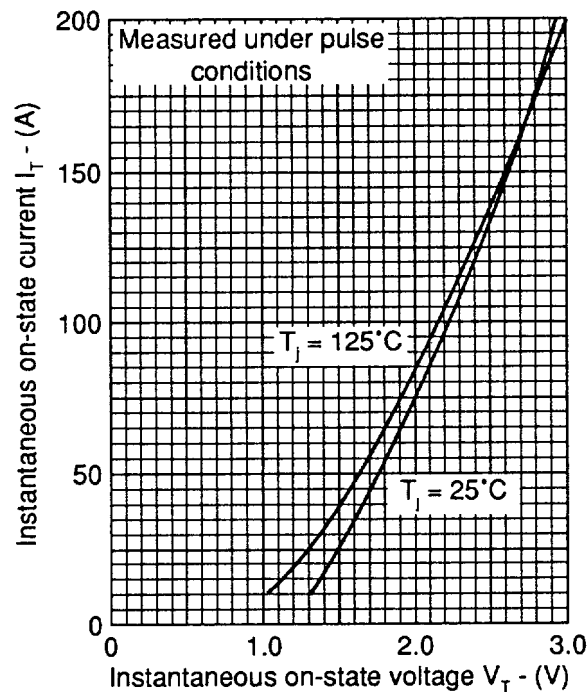


FIG. 1 MAXIMUM (LIMIT) ON-STATE CHARACTERISTICS

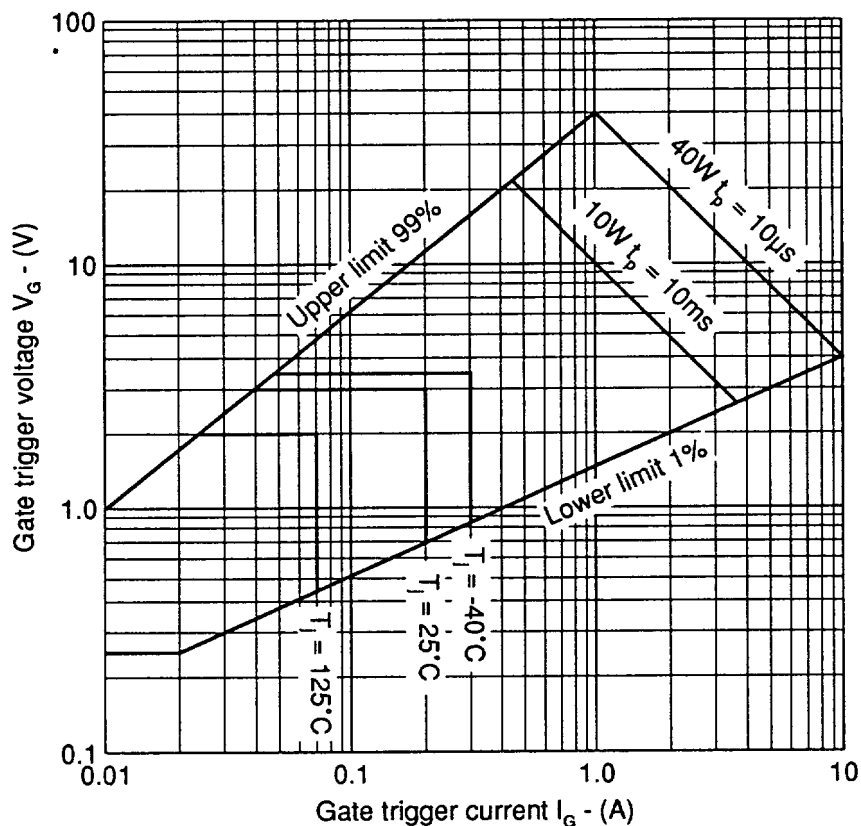


FIG. 2 GATE CHARACTERISTICS

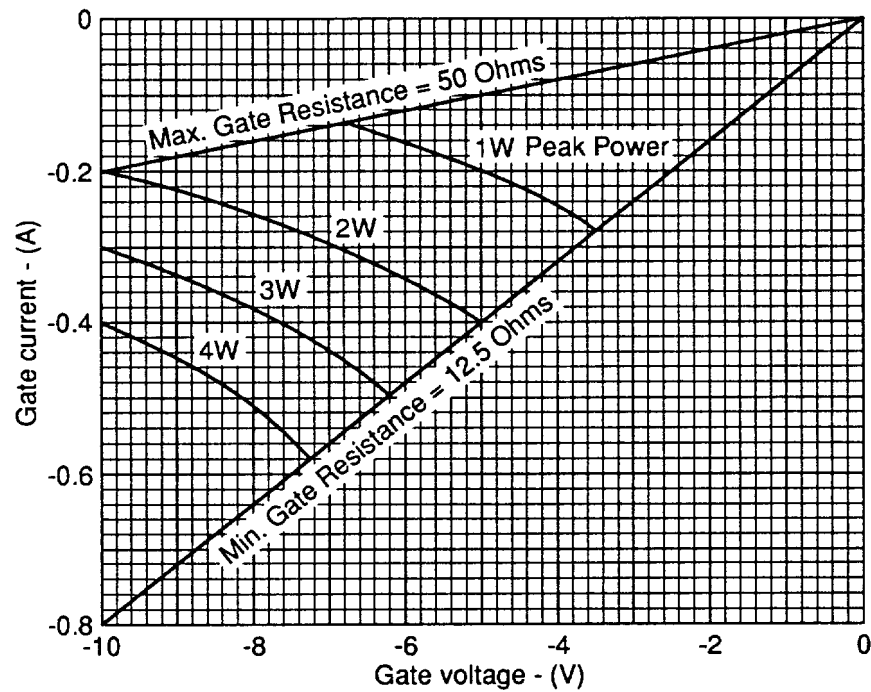


FIG. 3 REVERSE GATE CHARACTERISTICS

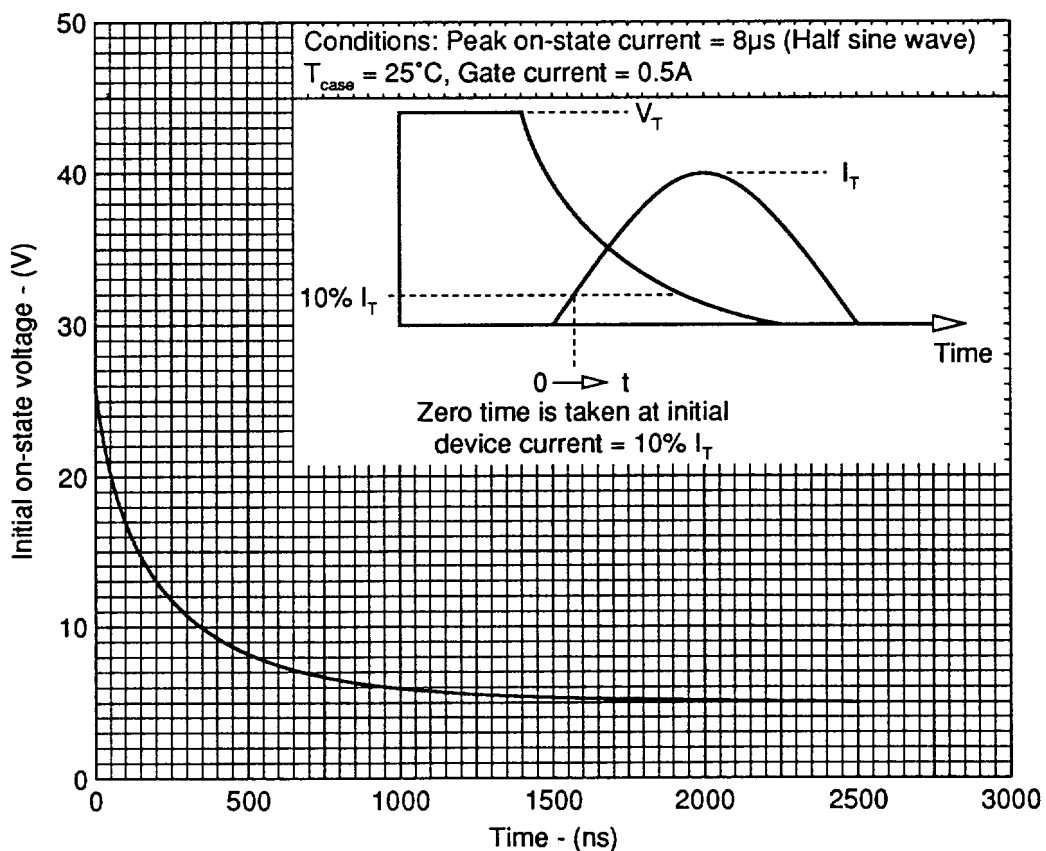


FIG. 4 TYPICAL INITIAL ON-STATE VOLTAGE vs TIME

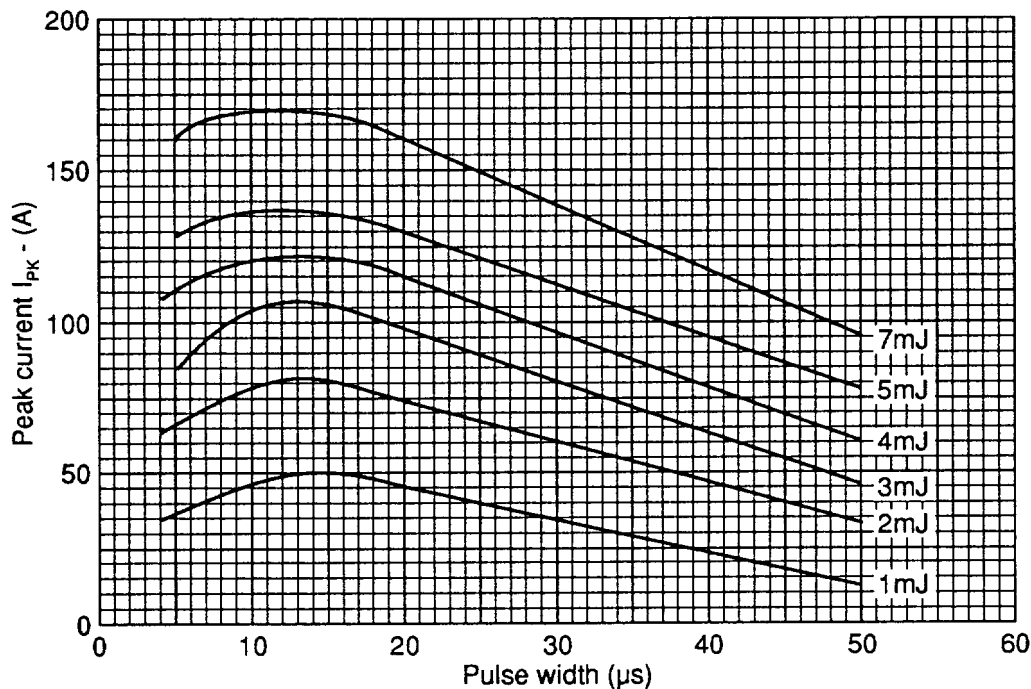


FIG. 5 MAXIMUM ENERGY LOSS PER PULSE WHEN SWITCHING A HALF SINUSOIDAL PULSE FROM 600V.

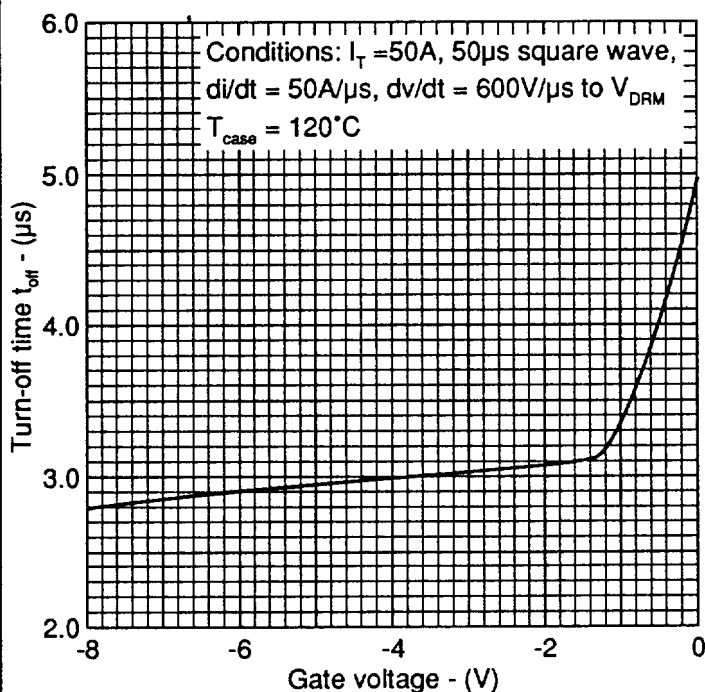


FIG. 6 TYPICAL CIRCUIT COMMUTATED TURN-OFF TIME vs GATE VOLTAGE AT TURN-OFF

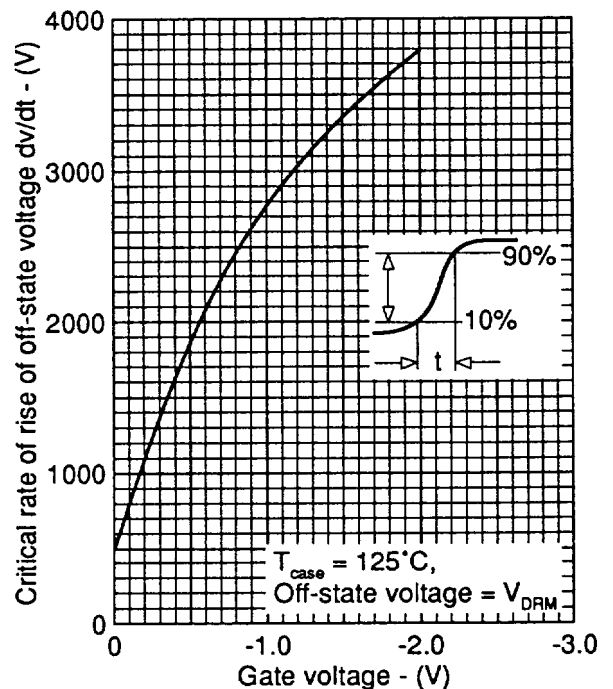
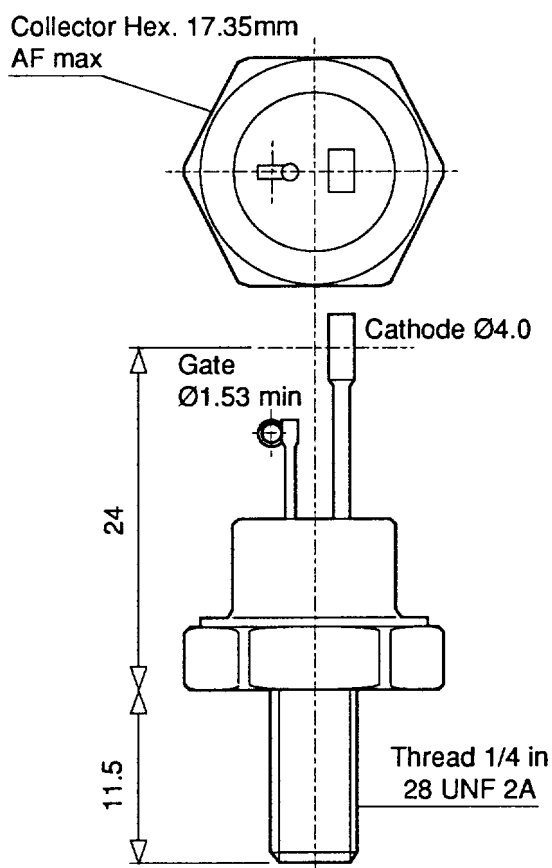


FIG. 7 MINIMUM LINEAR CRITICAL RATE OF RISE OF OFF-STATE VOLTAGE vs GATE VOLTAGE

Outline * SO 28

For full engineering drawing please consult factory.
DO NOT SCALE.
Conforms to SO 28.
All dimensions in mm
(Unless stated otherwise)



Weight: 10.5g

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