

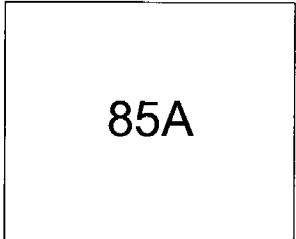
# ST083S SERIES

## INVERTER GRADE THYRISTORS

Stud Version

### Features

- All diffused design
- Center amplifying gate
- Guaranteed high dv/dt
- Guaranteed high di/dt
- High surge current capability
- Low thermal impedance
- High speed performance

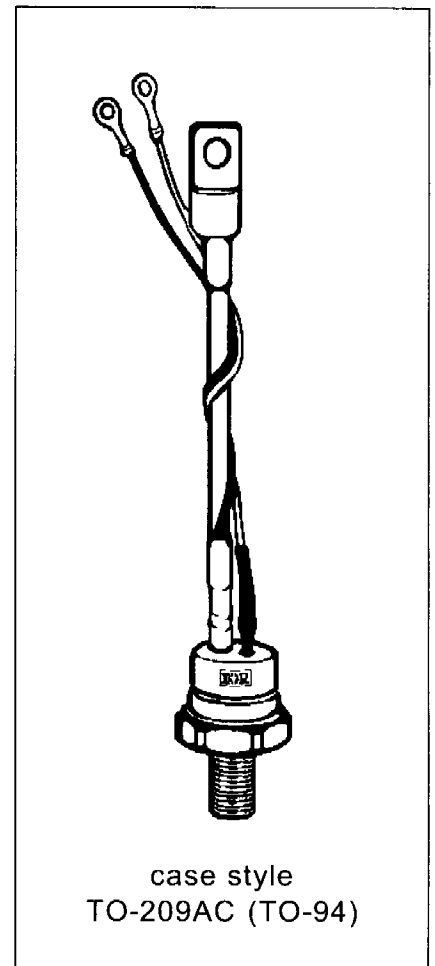


### Typical Applications

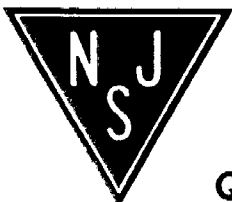
- Inverters
- Choppers
- Induction heating
- All types of force-commutated converters

### Major Ratings and Characteristics

Parameters	ST083S	Units
$I_{T(AV)}$	85	A
@ $T_C$	85	$^{\circ}C$
$I_{T(RMS)}$	135	A
$I_{TSM}$ @ 50Hz	2450	A
@ 60Hz	2560	A
$I^2t$ @ 50Hz	30	$KA^2s$
@ 60Hz	27	$KA^2s$
$V_{DRM}/V_{RRM}$	400 to 1200	V
$t_q$ range (*)	10 to 30	$\mu s$
$T_J$	- 40 to 125	$^{\circ}C$



(\*)  $t_q = 10$  to  $20\mu s$  for 400 to 800V devices  
 $t_q = 15$  to  $30\mu s$  for 1000 to 1200V devices



# ST083S Series

## ELECTRICAL SPECIFICATIONS

### Voltage Ratings

Type number	Voltage Code	$V_{DRM}/V_{RRM}$ , maximum repetitive peak voltage V	$V_{RSM}$ , maximum non-repetitive peak voltage V	$I_{DRM}/I_{RRM}$ max. @ $T_J = T_J$ max. mA
ST083S	04	400	500	30
	08	800	900	
	10	1000	1100	
	12	1200	1300	

### Current Carrying Capability

Frequency							Units
50Hz	210	120	330	270	2540	1930	A
400Hz	200	120	350	210	1190	810	
1000Hz	150	80	320	190	630	400	
2500Hz	70	25	220	85	250	100	
Recovery voltage Vr	50	50	50	50	50	50	V
Voltage before turn-on Vd	$V_{DRM}$		$V_{DRM}$		$V_{DRM}$		
Rise of on-state current di/dt	50	50	-	-	-	-	A/ $\mu$ s
Case temperature	60	85	60	85	60	85	$^{\circ}$ C
Equivalent values for RC circuit	22 $\Omega$ / 0.15 $\mu$ F		22 $\Omega$ / 0.15 $\mu$ F		22 $\Omega$ / 0.15 $\mu$ F		

### On-state Conduction

Parameter	ST083S	Units	Conditions		
$I_{T(AV)}$ Max. average on-state current @ Case temperature	85	A	180 $^{\circ}$ conduction, half sine wave		
	85	$^{\circ}$ C			
$I_{T(RMS)}$ Max. RMS on-state current	135	A	DC @ 77 $^{\circ}$ C case temperature		
$I_{TSM}$ Max. peak, one half cycle, non-repetitive surge current	2450		t = 10ms	No voltage reapplied	Sinusoidal half wave, Initial $T_J = T_J$ max
	2560		t = 8.3ms		
	2060		t = 10ms	100% $V_{RRM}$ reapplied	
	2160	t = 8.3ms			
$I^2t$ Maximum $I^2t$ for fusing	30	KA $^2$ s	t = 10ms	No voltage reapplied	
	27		t = 8.3ms		
	21		t = 10ms	100% $V_{RRM}$ reapplied	
	19		t = 8.3ms		
$I^2\sqrt{t}$ Maximum $I^2\sqrt{t}$ for fusing	300	KA $^2\sqrt{s}$	t = 0.1 to 10ms, no voltage reapplied		

## On-state Conduction

Parameter	ST083S	Units	Conditions
$V_{TM}$ Max. peak on-state voltage	2.15	V	$I_{TM} = 300A, T_J = T_J \text{ max}, t_p = 10\text{ms sine wave pulse}$
$V_{T(TO)1}$ Low level value of threshold voltage	1.46		$(16.7\% \times \pi \times I_{T(AV)} < I < \pi \times I_{T(AV)}), T_J = T_J \text{ max.}$
$V_{T(TO)2}$ High level value of threshold voltage	1.52		$(I > \pi \times I_{T(AV)}), T_J = T_J \text{ max.}$
$r_{t1}$ Low level value of forward slope resistance	2.32	m $\Omega$	$(16.7\% \times \pi \times I_{T(AV)} < I < \pi \times I_{T(AV)}), T_J = T_J \text{ max.}$
$r_{t2}$ High level value of forward slope resistance	2.34		$(I > \pi \times I_{T(AV)}), T_J = T_J \text{ max.}$
$I_H$ Maximum holding current	600	mA	$T_J = 25^\circ\text{C}, I_T > 30A$
$I_L$ Typical latching current	1000		$T_J = 25^\circ\text{C}, V_A = 12V, R_a = 6\Omega, I_G = 1A$

## Switching

Parameter	ST083S	Units	Conditions
di/dt Max. non-repetitive rate of rise of turned-on current	1000	A/ $\mu\text{s}$	$T_J = T_J \text{ max}, V_{DRM} = \text{rated } V_{DRM}$ $I_{TM} = 2 \times \text{di/dt}$
$t_d$ Typical delay time	0.80	$\mu\text{s}$	$T_J = 25^\circ\text{C}, V_{DM} = \text{rated } V_{DRM}, I_{TM} = 50A \text{ DC}, t_p = 1\mu\text{s}$ Resistive load, Gate pulse: 10V, 5 $\Omega$ source
$t_q$ Max. turn-off time (*)			Min 10

(\*)  $t_q = 10$  to  $20\mu\text{s}$  for 400 to 800V devices;  $t_q = 15$  to  $30\mu\text{s}$  for 1000 to 1200V devices.

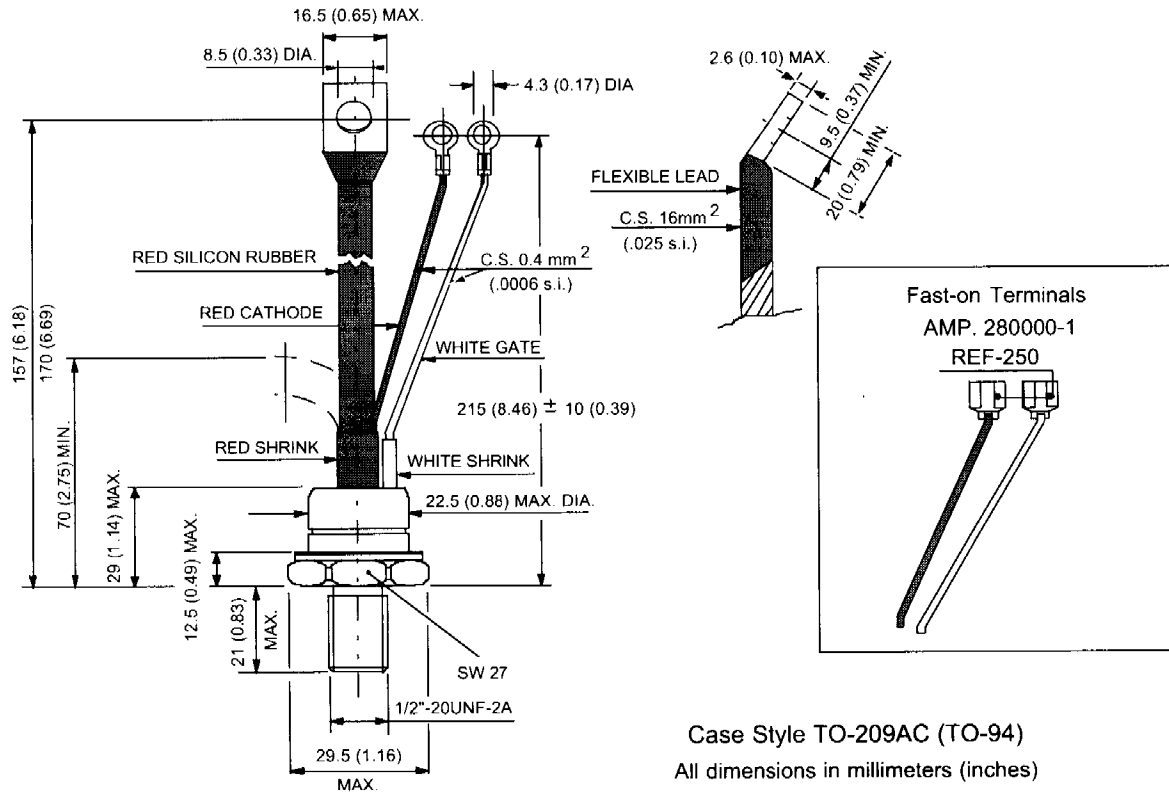
## Blocking

Parameter	ST083S	Units	Conditions
dv/dt Maximum critical rate of rise of off-state voltage	500	V/ $\mu\text{s}$	$T_J = T_J \text{ max.}, \text{linear to } 80\% V_{DRM}, \text{higher value available on request}$
$I_{RRM}$ $I_{DRM}$ Max. peak reverse and off-state leakage current	30	mA	$T_J = T_J \text{ max}, \text{rated } V_{DRM}/V_{RRM} \text{ applied}$

## Triggering

Parameter	ST083S	Units	Conditions
$P_{GM}$ Maximum peak gate power	40	W	$T_J = T_J \text{ max}, f = 50\text{Hz}, d\% = 50$
$P_{G(AV)}$ Maximum average gate power	5		
$I_{GM}$ Max. peak positive gate current	5	A	$T_J = T_J \text{ max}, t_p \leq 5\text{ms}$
$+V_{GM}$ Maximum peak positive gate voltage	20	V	$T_J = T_J \text{ max}, t_p \leq 5\text{ms}$
$-V_{GM}$ Maximum peak negative gate voltage	5		
$I_{GT}$ Max. DC gate current required to trigger	200	mA	$T_J = 25^\circ\text{C}, V_A = 12V, R_a = 6\Omega$
$V_{GT}$ Max. DC gate voltage required to trigger	3	V	
$I_{GD}$ Max. DC gate current not to trigger	20	mA	$T_J = T_J \text{ max}, \text{rated } V_{DRM} \text{ applied}$
$V_{GD}$ Max. DC gate voltage not to trigger	0.25	V	

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