

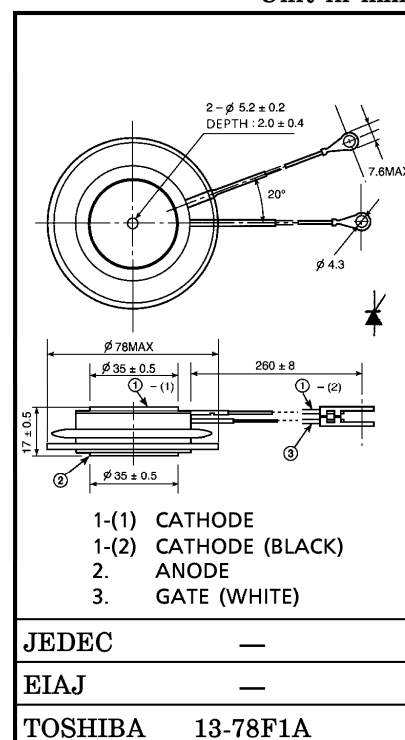
TOSHIBA ALLOY-FREE THYRISTOR

# SF500EX33

HIGH POWER CONTROL APPLICATIONS

Unit in mm

- Repetitive Peak Off-State Voltage :  $V_{DRM}$
- Repetitive Peak Reverse Voltage :  $V_{RRM}$
- Average On-State Current :  $I_T(AV) = 500A$
- Turn-Off Time :  $t_q = 400\mu s$  (Max.)
- Critical Rate of Rise of On-State Current :  $di/dt = 200A/\mu s$
- Critical Rate of Rise of Off-State Voltage :  $dv/dt = 500V/\mu s$
- Weight : 250g
- Flat Package



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## MAXIMUM RATINGS

CHARACTERISTIC	SYMBOL	RATING	UNIT
Repetitive Peak Off-State Voltage and Repetitive Peak Reverse Voltage	$V_{\text{DRM}}$ $V_{\text{RRM}}$	2500	V
Non-Repetitive Peak Reverse Voltage (Non-Repetitive < 5ms, $T_j = 0 \sim 125^\circ\text{C}$ )	$V_{\text{RSM}}$	2750	V
R.M.S On-State Current	$I_{\text{T}}(\text{RMS})$	785	A
Average On-State Current	$I_{\text{T}}(\text{AV})$	500	A
Peak One Cycle Surge On-State Current (Non-Repetitive)	$I_{\text{TSM}}$	8000 (50Hz) 8800 (60Hz)	A
$I^2t$ Limit Value	$I^2t$	$3.2 \times 10^5$	$\text{A}^2\text{s}$
Critical Rate of Rise of On-State Current (Note)	$di/dt$	200	$\text{A} / \mu\text{s}$
Peak Gate Power Dissipation	$P_{\text{GM}}$	20	W
Average Gate Power Dissipation	$P_{\text{G}}(\text{AV})$	4	W
Peak Forward Gate Current	$I_{\text{GM}}$	4	A
Peak Forward Gate Voltage	$V_{\text{FGM}}$	20	V
Peak Reverse Gate Voltage	$V_{\text{RGM}}$	5	V
Junction Temperature	$T_j$	$-40 \sim 125$	$^\circ\text{C}$
Storage Temperature Range	$T_{\text{stg}}$	$-40 \sim 125$	$^\circ\text{C}$
Mounting Force	—	$14.7 \pm 1.5$	kN

Note :  $V_{\text{D}} = 1250\text{V}$ ,  $f = 50\text{Hz}$ ,  $T_j = 120^\circ\text{C}$ , Gate Supply ( $V_{\text{G}} = 15\text{V}$ ,  $R_{\text{G}} = 8\Omega$ ,  $t_r \leq 1\mu\text{s}$ )

## ELECTRICAL CHARACTERISTICS

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	MAX.	UNIT
Repetitive Peak Off-State Current and Repetitive Peak Reverse Current	$I_{DRM}$ $I_{RRM}$	$V_{DRM} = V_{RRM} = 2500V$ $T_j = 125^\circ C$	—	50	mA
Peak On-State Voltage	$V_{TM}$	$I_{TM} = 1600A$ , $T_j = 25^\circ C$	—	2.16	V
Gate Trigger Voltage	$V_{GT}$	$V_D = 6V$ , $R_L = 6\Omega$	$T_j = -40^\circ C$	—	4.5
			$T_j = 25^\circ C$	0.6	2.5
Gate Trigger Current	$I_{GT}$		$T_j = -40^\circ C$	—	400
			$T_j = 25^\circ C$	15	250
Gate Non-Trigger Voltage	$V_{GD}$	$V_D = 1250V$ , $T_j = 115^\circ C$	0.2	—	V
Gate Non-Trigger Current	$I_{GD}$		5	—	mA
Delay Time	$t_d$	$V_D = 1250V$ , $T_j = 25^\circ C$ Gate Supply	—	4	$\mu s$
Gate Turn-On Time	$t_{gt}$	$(V_G = 15V, R_G = 8\Omega, t_r \leq 1\mu s)$	—	6	$\mu s$
Turn-Off Time	$t_q$	$I_T = 800A$ , $V_R \geq 50V$ $dv/dt = 20V/\mu s$ , $T_j = 120^\circ C$ $V_{DRM} = 1250V$	—	400	$\mu s$
Holding Current	$I_H$	$T_j = 25^\circ C$ , $R_L = 6\Omega$	—	300	mA
Critical Rate of Rise of Off-State Voltage	$dv/dt$	$V_{DRM} = 1670V$ , $T_j = 125^\circ C$ Gate Open, Exponential Rise	500	—	$V/\mu s$
Thermal Resistance (Junction to Case)	$R_{th(j-f)}$	DC	—	0.04	$^\circ C/W$

