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C158 – C159
SCR 1200Volts - 110A RMS

MAXIMUM ALLOWABLE RATINGS

Types	Repetitive Peak Off-State Voltage, V_{DRM}	Repetitive Peak Reverse Voltage, V_{RRM} (1)	Non-repetitive Peak Reverse Voltage, V_{RSM} (1)
	T_C = −40°C to +125°C	T_C = −40°C to +125°C	T_C = +125°C
C158E, C159E	500 Volts	500 Volts	600 Volts
C158M, C159M	600	600	720
C158S, C159S	700	700	840
C158N, C159N	800	800	960
C158T, C159T	900	900	1080
C158P, C159P	1000	1000	1200
C158PA, C159PA	1100	1100	1300
C158PB, C159PB	1200	1200	1400

(1) Half sine wave voltage pulse, 10 millisecond maximum duration.

RMS On-State Current, $I_{T(RMS)}$ ..... 110 Amperes
Average On-State Current, $I_{T(AV)}$ ..... (see Charts)
Peak One Cycle Surge (non-rep) On-State Current, I_{TSM} ..... 1600 Amperes
I^2t (for fusing) for times ≧ 1.5 milliseconds ..... 5200 Ampere^2 seconds
I^2t (for fusing) for times ≧ 8.3 milliseconds ..... 10,500 Ampere^2 seconds
Critical Rate-of-Rise of On-State Current, di/dt,
During Turn-On Interval ..... 800 Amperes per microsecond†
Long Term DI/DT (refer to fig. 18, note 4) ..... 500 A/μ sec*
Peak Gate Power Dissipation, P_{GM}... (Pulse Width = 10μsec) ..... 400 Watts
Average Gate Power Dissipation, $P_{G(AV)}$ ..... 2 Watts
Peak Negative Gate Voltage, V_{GM} ..... 20 Volts
Storage Temperature, T_{STG} ..... −40°C to +125°C
Operating Temperature, T_J ..... −40°C to +125°C
Stud Torque ..... 150 Lb-in (Max), 125 Lb-in (Min)
175 Kg-cm (Max), 150 Kg-cm (Min)

†Required trigger source – 20 volts, 20 ohms; maximum switching voltage – 1200 volts; short-circuit gate supply current risetime -0.5μ sec (This short-circuit current may be measured with a TEKTRONICS current probe.).

di/dt rating is established in accordance with EIA-NEMA Suggested Standard RS-397 Section 5.1.2.4. Immediatey after each current pulse, off-state (blocking) voltage capability may be temporarily lost for durations less than the period of the applied pulse repetition rate. The pulse repetition rate for this test is 400 Hz; The duration of the di/dt test condition is 5.0 seconds (minimum).

*This rating established by long term life tests on similar devices.

CHARACTERISTICS

TEST	SYMBOL	MIN.	TYP.	MAX.	UNITS	TEST CONDITION
Peak Reverse and Off-State Current	I_{DRM} and I_{RRM}				mA	T_C = +25°C
C158E, C159E		—	3	10		$V_{DRM} = V_{RRM}$ = 500 Volts peak
C158M, C159M		—	3	10		600 Volts peak
C158S, C159S		—	3	10		700 Volts peak
C158N, C159N		—	3	10		800 Volts peak
C158T, C159T		—	3	9		900 Volts peak
C158P, C159P		—	3	7		1000 Volts peak
C158PA, C159PA		—	3	7		1100 Volts peak
C158PB, C159PB		—	3	7		1200 Volts peak

CHARACTERISTICS

TEST	SYMBOL	MIN.	TYP.	MAX.	UNITS	TEST CONDITION
Peak Reverse and Off-State Current	I_{DRM} and I_{RRM}				mA	T_C = 125°C
C158E, C159E		—	12	15		$V_{DRM} = V_{RRM}$ = 500 Volts peak
C158M, C159M		—	12	15		600 Volts peak
C158S, C159S		—	12	15		700 Volts peak
C158N, C159N		—	12	15		800 Volts peak
C158T, C159T		—	12	15		900 Volts peak
C158P, C159P		—	12	15		1000 Volts peak
C158PA, C159PA		—	12	17		1100 Volts peak
C158PB, C159PB		—	12	18		1200 Volts peak
Effective Thermal Resistance	$R_{\theta JC}$	—	.2	.3	°C/watt	Junction to case (DC)
Critical Exponential Rate of Rise of Forward Blocking Voltage (Higher values may cause device switching)	dv/dt	200 *	500	—	V/μsec	V_{DRM}, T_C = +125°C, Gate open.
Holding Current	I_H	—	100		mAdc	T_C = +25°C, Anode supply = 24Vdc. Initial forward current = 2 amps.
DC Gate Trigger Current	I_{GT}	—	80	150	mAdc	T_C = +25°C, V_D = 6Vdc, R_L = 3 ohms.
		—	150	300	mAdc	T_C = −40°C, V_D = 6Vdc, R_L = 3 ohms.
		—	30	125	mAdc	T_C = +125°C, V_D = 6 Vdc, R_L = 3 ohms.
DC Gate Trigger Voltage	V_{GT}	—	3	5	Vdc	T_C = −40°C to 0°C, V_D = 6 Vdc, R_L = 3 ohms.
		—	1.25	3.0	Vdc	T_C = 0°C to +125°C, V_D = 6 Vdc, R_L = 3 ohms.
		0.15	—	—	Vdc	T_C = 125°C, V_{DRM}, R_L = 1000 ohms.
Peak On-State Voltage	V_{TM}	—	2.8	3.5	Volts	T_C = +25°C, I_{TM} = 500A peak. Duty cycle ≦ .01%.
Turn-On Time (Delay Time + Rise Time)	t_{GT}	—	2	—	μsec	T_C = +25°C, I_T = 50 Adc, V_{DRM}. Gate supply: 10 volt open circuit, 20 ohm, 0.1 μsec max. rise time. †††
Delay Time	t_d	—	0.5	- -	μsec	T_C = +25°C, I_T = 50 Adc, V_{DRM}, Gate supply: 10 volt open circuit, 20 ohm, 1.0 μsec max. rise time. ††, †††
Conventional Circuit Commutated Turn-Off-Time (with Reverse Voltage)	t_q	—	20	30	μsec	(1) T_C = +125°C, (2) I_T = 150A. (3) V_R = 50 volts min., (4) V_{DRM} (reapplied), (5) Rate of rise of reapplied forward blocking voltage = 20 V/μsec (linear). (6) Commutation di/dt = 5 Amps/μsec. (7) Repetition rate = 1 pps. (8) Gate bias during turn-off interval = 0 volts, 100 ohms.
		—	25	40	μsec	(1) T_C = +125°C, (2) I_T = 150A, (3) V_R = 50 volts min., (4) V_{DRM} (reapplied), (5) Rate of rise of reapplied forward blocking voltage = 200 V/μsec (linear). (6) Commutation di/dt = 5 Amps/μsec. (7) Repetition rate = 1 pps. (8) Gate bias during turn-off interval = 0 volts, 100 ohms.
Conventional Circuit Commutated Turn-off-Time (with Feedback Diode)	$t_{q\ (diode)}$	—	40	—†	μsec	(1) T_C = +125°C, (2) I_T = 150A, (3) V_R = 1 volt (Forward drop of GE A96 rectifier diode at I_T = 150A), (4) V_{DRM}, (5) Rate of rise of reapplied forward blocking voltage = 200 V/μsec (linear). (6) Commutation di/dt = 5 Amps/μsec. (7) Repetition rate = 1 pps. (8) Gate bias during turn-off interval = 0 volts, 100 ohms.
Pulse Circuit Commutated Turn-Off-Time (with Reverse Voltage)	$t_{q\ (pulse)}$	—	25	- - -	μsec	(1) T_C = +125°C, V_{DRM} (reapplied), (2) Rate of rise of reapplied forward blocking voltage = 200 V/μsec (linear), (3) Rep. rate = 400 Hz., (4) Gate supply = 20 volts, 80 ohms, 1.0 μsec max. rise time. (5) I_T = 500 A peak, t_p = 3 μsec (half sine wave), (6) V_R = 50 volts min.
Pulse Circuit Commutated Turn-Off-Time (with Feedback Diode)	$t_{q\ (pulse)\ (diode)}$	—	40	—†	μsec	(1) T_C = +125°C, V_{DRM} (reapplied), (2) Rate of rise of reapplied forward blocking voltage = 200 V/μsec (linear), (3) Rep. Rate = 400 Hz.. (4) Gate supply = 20 volts, 80 ohms, 1.0 μsec max. rise time, (5) I_T = 500 A peak, t_p = 3 μsec (half sine wave), (6) V_R = 1 volt (Forward drop of GE A96 rectifier diode at I_T = 150A).

†Consult Factory for specified maximum Turn-Off Time.
††Delay Time may increase significantly as the gate drive approaches the I_{GT} of the Device Under Test (D.U.T.).
†††Current risetime as measured with a current probe, or voltage risetime across a non-inductive resister.