

LCR880

80A Thyristor High Voltage, Phase Control SCR

Features

- 150 °C maximum operating junction temperature

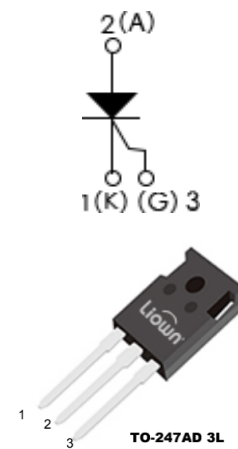
Applications

Typical usage is in input rectification crowbar (soft start) and AC switch motor control, UPS, welding, and battery charge.

Description

The LCR880 high voltage series of silicon controlled rectifiers are specifically designed for medium power switching, and phase control applications. The glass passivation technology used, has reliable operation up to 150 °C junction temperature.

$I_{T(AV)}$	80 A
V_{DRM}/V_{RRM}	800 V
I_{GT}	15-50 mA
T_J	-40°C to +125°C



MAJOR RATINGS AND CHARACTERISTICS				
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Peak repetitive reverse voltage	V_{RRM}/V_{DRM}		800	V
On-state voltage	V_T	80 A, $T_J = 125\text{ }^\circ\text{C}$, typical	1.35	
Average rectified forward current	$I_{T(AV)}$		80	A
Maximum continuous RMS on-state current	I_{RMS}		120	
Non-repetitive peak surge current	I_{TSM}		1200	
Maximum rate of rise	dV/dt		1000	V/ μs
Maximum operating junction and storage temperature range	T_J, T_{Stg}		-40 to +125	$^\circ\text{C}$

ABSOLUTE MAXIMUM RATINGS						
PARAMETER	SYMBOL	TEST CONDITIONS		TYP.	MAX.	UNITS
Maximum average on-state current	$I_{T(AV)}$	$T_C = 113\text{ }^\circ\text{C}$, 180° conduction half sine wave		-	80	A
Maximum continuous RMS on-state current as AC switch	$I_{T(RMS)}$			-	120	
Peak, one-cycle non-repetitive surge current	I_{TSM}	10 ms sine pulse, rated V_{RRM} applied	Initial $T_J = T_J$ maximum	-	1200	
		10 ms sine pulse, no voltage reappplied		-	1000	
I^2t for fusing	I^2t	10 ms sine pulse, rated V_{RRM} applied		-	3536	A^2s
		10 ms sine pulse, no voltage reappplied		-	5000	
$I^2\sqrt{t}$ for fusing	$I^2\sqrt{t}$	$t = 0.1\text{ ms to }10\text{ ms}$, no voltage reappplied, $T_J = 125\text{ }^\circ\text{C}$		-	50 000	$A^2\sqrt{s}$
On-state voltage	V_T	80 A, $T_J = 25\text{ }^\circ\text{C}$		1.22	1.35	V
		160 A, $T_J = 25\text{ }^\circ\text{C}$		1.48	1.66	
		80 A, $T_J = 125\text{ }^\circ\text{C}$		1.16	1.24	
		160 A, $T_J = 125\text{ }^\circ\text{C}$		1.49	1.62	
Low level value of threshold voltage	V_{T01}	$T_J = 150\text{ }^\circ\text{C}$		-	0.80	V
High level value of threshold voltage	V_{T02}			-	0.89	
Low level value of on-state slope resistance	r_{t1}	$T_J = 150\text{ }^\circ\text{C}$		-	4.82	$m\Omega$
High level value of on-state slope resistance	r_{t2}			-	4.51	
Rate of rise of turned-on current	di/dt	$T_J = 125\text{ }^\circ\text{C}$, $V_R = 1000\text{ V}$, $I_T = 100\text{ A}$, $I_{gt} = 450\text{ mA}$, $V_{GT} = 2.5\text{ V}$		-	500	$A/\mu s$
Holding current	I_H	Anode supply = 6 V, resistive load, $T_J = 25\text{ }^\circ\text{C}$		-	200	mA
Latching current	I_L			-	400	
Reverse and direct leakage current	I_{RRM}/I_{DRM}	$T_J = 25\text{ }^\circ\text{C}$		50	200	μA
		$T_J = 125\text{ }^\circ\text{C}$		10	60	mA
Rate of rise of off-state voltage	dV/dt	$T_J = T_J$ maximum, linear to 80 % V_{DRM} , $R_g-k = \text{open}$		-	1000	$V/\mu s$

TRIGGERING						
PARAMETER	SYMBOL	TEST CONDITIONS		TYP.	MAX.	UNITS
Peak gate power	P_{GM}	10 ms sine pulse, no voltage reappplied		-	10	W
Average gate power	$P_{G(AV)}$			-	2.5	
Peak gate current	I_{GM}			-	2.5	A
Peak negative gate voltage	$-V_{GM}$			-	10	V
Required DC gate voltage to trigger	V_{GT}	$T_J = 25\text{ }^\circ\text{C}$	Anode supply = 6 V resistive load	-	1.5	
Required DC gate to trigger	I_{GT}	$T_J = 25\text{ }^\circ\text{C}$	Anode supply = 6 V resistive load	15	50	mA
DC gate voltage not to trigger	V_{GD}	$T_J = 125\text{ }^\circ\text{C}$, $V_{DRM} = 80\%$ rated value		-	0.20	V
DC gate current not to trigger	I_{GD}			-	5	mA

SWITCHING						
PARAMETER	SYMBOL	TEST CONDITIONS		TYP.	MAX.	UNITS
Turn-on time	t_{gt}	$I_T = 80\text{ A}$, $V_D = 50\%$ V_{DRM} , $I_{gt} = 300\text{ mA}$, $T_J = 25\text{ }^\circ\text{C}$		2	-	μs
Turn-off time	t_q	$I_T = 80\text{ A}$, $V_D = 80\%$ V_{DRM} , $dV/dt = 20\text{ V}/\mu s$, $t_p = 200\text{ }\mu s$, $I_{gt} = 100\text{ mA}$, $di/dt = 10\text{ A}/\mu s$, $V_R = 100\text{ V}$, $T_J = 150\text{ }^\circ\text{C}$		150	-	

THERMAL AND MECHANICAL SPECIFICATIONS						
PARAMETER		SYMBOL	TEST CONDITIONS	MIN.	MAX.	UNITS
Maximum operating junction and storage temperature range		T_J, T_{Stg}		-40	125	°C
Maximum thermal resistance, junction to case		R_{thJC}		-	0.23	°C/W
Maximum thermal resistance, junction to ambient		R_{thJA}		-	40	
Typical thermal resistance, case to heatsink		R_{thCS}	Mounting surface, smooth, and greased	0.20		
Approximate weight				6 (0.21)		g (oz.)
Mounting torque	minimum			6 (5)		kgf · cm (lbf · in)
	maximum			12 (10)		
Marking device			Case style TO-247AD 3L	80TPS16L		

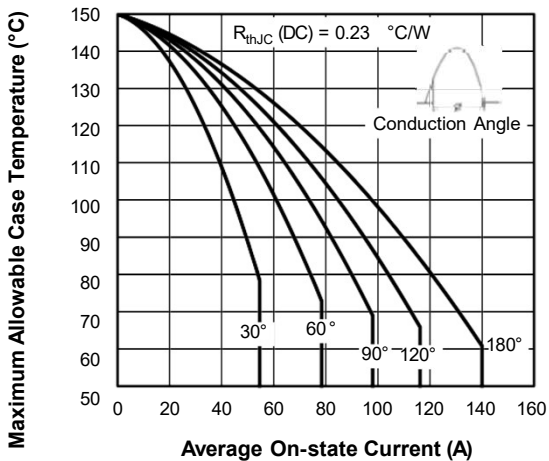


Fig. 1 - Current Rating Characteristics

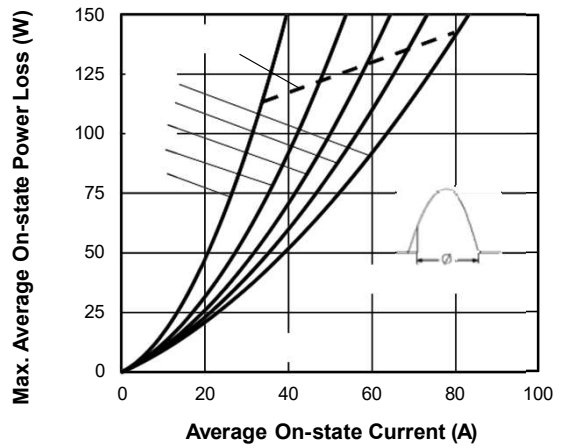


Fig. 3 - On-State Power Loss Characteristics

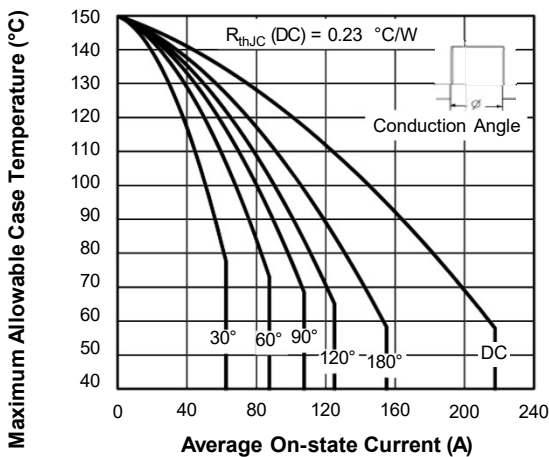


Fig. 2 - Current Rating Characteristics

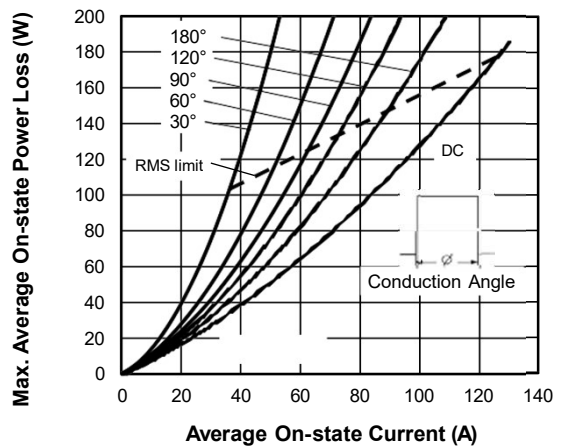


Fig. 4 - On-State Power Loss Characteristics

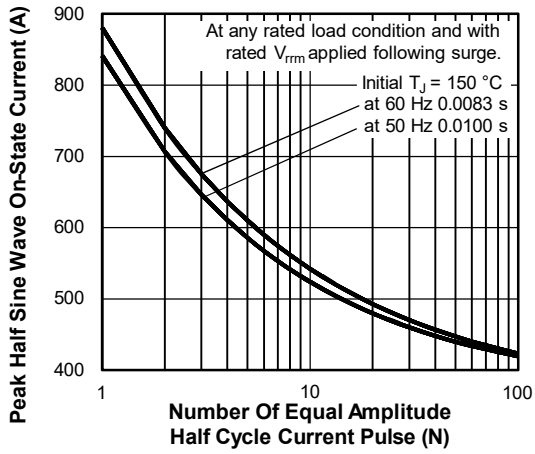


Fig. 5 - Maximum Non-Repetitive Surge Current

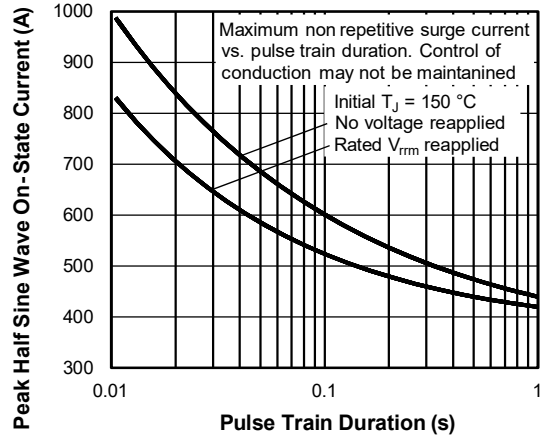


Fig. 6 - Maximum Non-Repetitive Surge Current

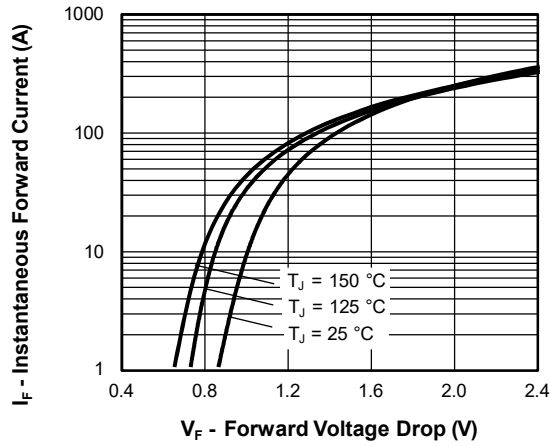


Fig. 7 - On-State Voltage Drop Characteristics

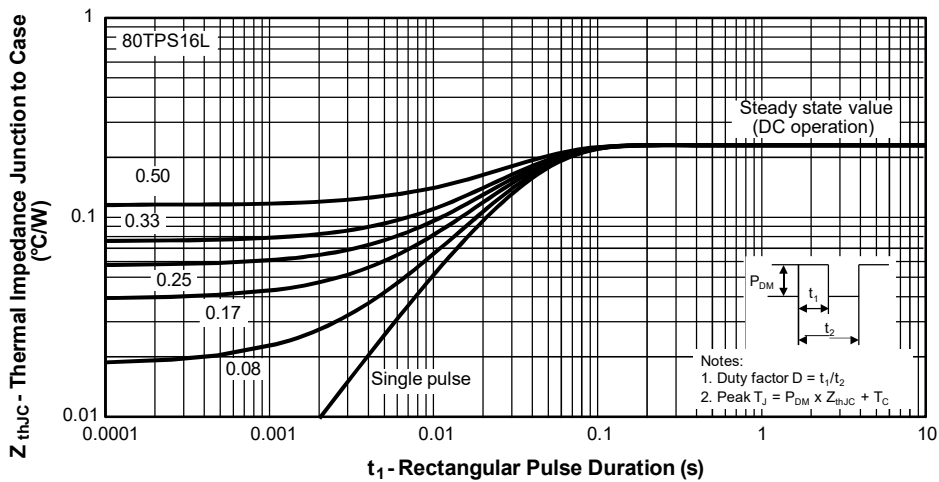
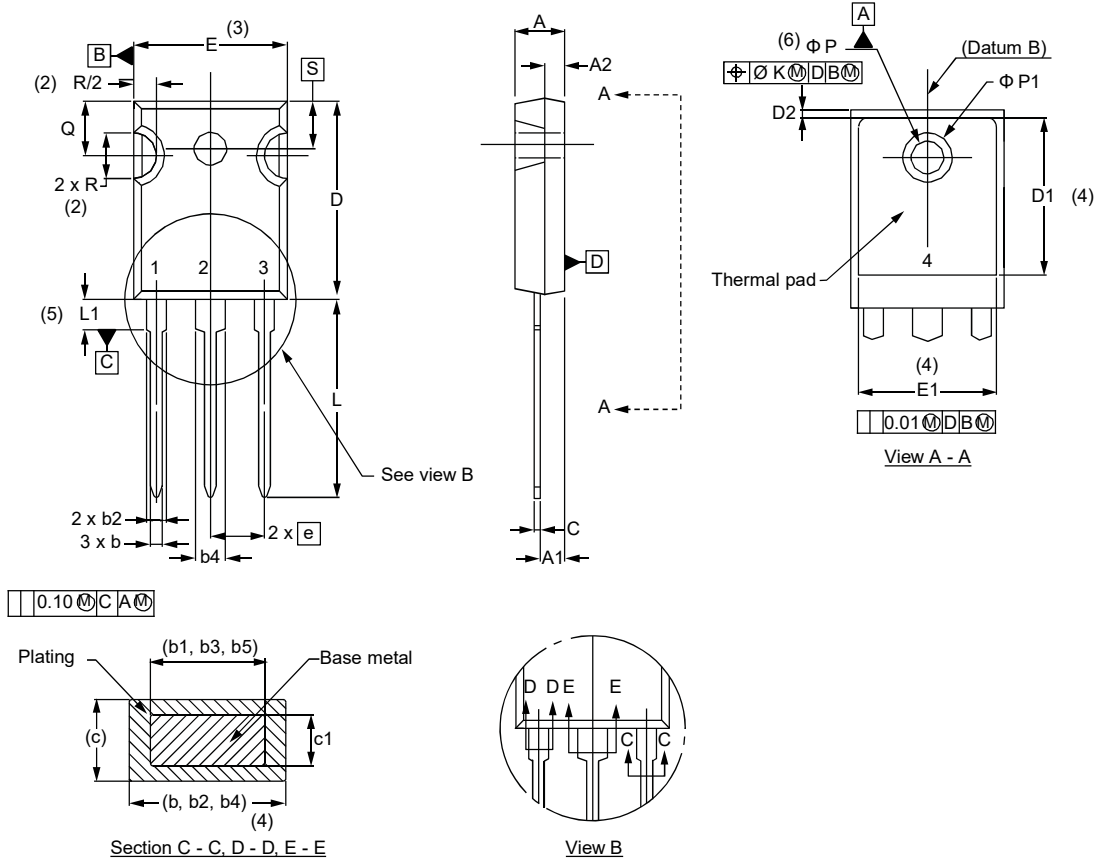


Fig. 8 - Maximum Thermal Impedance Z_{thJC} Characteristics

TO-247AD 3L

DIMENSIONS in millimeters and inches



SYMBOL	MILLIMETERS		INCHES		NOTES
	MIN.	MAX.	MIN.	MAX.	
A	4.65	5.31	0.183	0.209	
A1	2.21	2.59	0.087	0.102	
A2	1.50	2.49	0.059	0.098	
b	0.99	1.40	0.039	0.055	
b1	0.99	1.35	0.039	0.053	
b2	1.65	2.39	0.065	0.094	
b3	1.65	2.34	0.065	0.092	
b4	2.59	3.43	0.102	0.135	
b5	2.59	3.38	0.102	0.133	
c	0.38	0.89	0.015	0.035	
c1	0.38	0.84	0.015	0.033	
D	19.71	20.70	0.776	0.815	3
D1	13.08	-	0.515	-	4

SYMBOL	MILLIMETERS		INCHES		NOTES
	MIN.	MAX.	MIN.	MAX.	
D2	0.51	1.30	0.020	0.051	
E	15.29	15.87	0.602	0.625	3
E1	13.46	-	0.53	-	
e	5.46 BSC		0.215 BSC		
Ø K	2.54		0.010		
L	19.81	20.32	0.780	0.800	
L1	3.71	4.29	0.146	0.169	
Ø P	3.56	3.66	0.14	0.144	
Ø P1	-	6.98	-	0.275	
R	4.52	5.49	0.178	0.216	
S	5.51 BSC		0.217 BSC		