

LCR840

40A Thyristor High Voltage, Phase Control SCR

$I_{T(AV)}$	40 A
V_{DRM}/V_{RRM}	800 V
I_{GT}	25 mA
T_J	-40°C to +125°C

Features

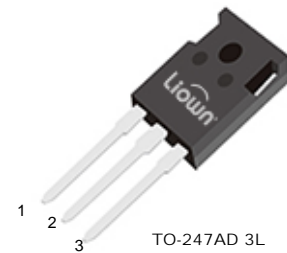
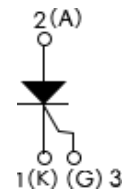
- 150 °C maximum operating junction temperature
- Material categorization:
for definitions of compliance please see

Applications

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

Description

The LCR840 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.



MAJOR RATINGS AND CHARACTERISTICS			
PARAMETER	TEST CONDITIONS	VALUES	UNITS
V_{RRM}/V_{DRM}		800	V
V_T	50 A, $T_J = 125\text{ °C}$	1.1	
$I_{T(AV)}$		40	A
I_{RMS}		60	
I_{TSM}		600	
dV/dt		1000	V/μs
T_J, T_{Stg}		-40 to +125	°C

ABSOLUTE MAXIMUM RATINGS						
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES		UNITS
				TYP.	MAX.	
Maximum average on-state current	$I_{T(AV)}$	$T_C = 112\text{ }^\circ\text{C}$, 180° conduction half sine wave		-	40	A
Maximum continuous RMS on-state current as AC switch	$I_{T(RMS)}$			-	60	
Peak, one-cycle non-repetitive surge current	I_{TSM}	10 ms sine pulse, rated V_{RRM} applied	Initial $T_J = T_J$ maximum	-	600	
		10 ms sine pulse, no voltage reapplied		-	630	
I^2t for fusing	I^2t	10 ms sine pulse, rated V_{RRM} applied		-	1405	A^2s
		10 ms sine pulse, no voltage reapplied		-	1986	
$I^2\sqrt{t}$ for fusing	$I^2\sqrt{t}$	$t = 0.1\text{ ms to }10\text{ ms}$, no voltage reapplied, $T_J = 125\text{ }^\circ\text{C}$		-	19 850	$A^2\sqrt{s}$
Low level value of threshold voltage	$V_{T(TO)1}$	$T_J = 125\text{ }^\circ\text{C}$		-	0.89	V
High level value of threshold voltage	$V_{T(TO)2}$			-	0.97	
Low level value of on-state slope resistance	r_{t1}			-	6.77	$m\Omega$
High level value of on-state slope resistance	r_{t2}			-	6.32	
On-state voltage	V_T	50 A, $T_J = 25\text{ }^\circ\text{C}$		1.2	1.35	V
		100 A, $T_J = 25\text{ }^\circ\text{C}$		1.4	1.6	
Rate of rise of turned-on current	di/dt	$T_J = 25\text{ }^\circ\text{C}$		-	150	$A/\mu s$
Holding current	I_H	Anode supply = 6 V, resistive load, $T_J = 25\text{ }^\circ\text{C}$		-	300	mA
Latching current	I_L			-	350	
Reverse and direct leakage current	I_{RRM}/I_{DRM}	$T_J = 25\text{ }^\circ\text{C}$		-	0.05	
		$T_J = 125\text{ }^\circ\text{C}$		-	10	
Rate of rise of off-state voltage	dV/dt	$T_J = T_J$ maximum, linear to 80 % V_{DRM} , $R_g-k = \infty\ \Omega$		-	1000	$V/\mu s$

TRIGGERING						
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES		UNITS
				TYP.	MAX.	
Peak gate power	P_{GM}	10 ms sine pulse, no voltage reapplied		-	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}	$T_J = -40\text{ }^\circ\text{C}$	Anode supply = 6 V resistive load	-	1.6	
		$T_J = 25\text{ }^\circ\text{C}$		-	1.5	
		$T_J = 150\text{ }^\circ\text{C}$		-	1	
Required DC gate to trigger	I_{GT}	$T_J = -40\text{ }^\circ\text{C}$	Anode supply = 6 V resistive load	-	160	mA
		$T_J = 25\text{ }^\circ\text{C}$		25	100	
		$T_J = 150\text{ }^\circ\text{C}$		-	60	
DC gate voltage not to trigger	V_{GD}	$T_J = 150\text{ }^\circ\text{C}$, $V_{DRM} = \text{rated value}$		-	0.2	V
DC gate current not to trigger	I_{GD}			-	3	mA

SWITCHING				
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Turn-on time	t_{gt}	$I_T = 50\text{ A}$, $V_D = 50\% V_{DRM}$, $I_{gt} = 300\text{ mA}$, $T_J = 25\text{ }^\circ\text{C}$	1.5	μs
Turn-off time	t_q	$I_T = 50\text{ A}$, $V_D = 80\% V_{DRM}$, $dV/dt = 20\text{ V}/\mu s$, $t_p = 200\ \mu s$, $I_{gt} = 100\text{ mA}$, $di/dt = 10\text{ A}/\mu s$, $V_R = 100\text{ V}$, $T_J = 150\text{ }^\circ\text{C}$	92	

THERMAL AND MECHANICAL SPECIFICATIONS					
PARAMETER	SYMBOL	TEST CONDITIONS	TYP.	MAX.	UNITS
Maximum junction and storage temperature range	T_J, T_{Stg}		-40	125	°C
Maximum thermal resistance, junction to case	R_{thJC}		-	0.35	°C/W
Maximum thermal resistance, junction to ambient	R_{thJA}		-	40	
Typical thermal resistance, case to heatsink	R_{thCS}	Mounting surface, smooth, and greased	0.2	-	
Mounting torque	minimum		6 (5)		kgf · cm (lbf · in)
	maximum		12 (10)		
Marking device		Case style Super TO-247AD 3L	50TPS12L		

ΔR_{thJ-HS} CONDUCTION PER JUNCTION											
DEVICE	SINE HALF-WAVE CONDUCTION					RECTANGULAR WAVE CONDUCTION					UNITS
	180°	120°	90°	60°	30°	180°	120°	90°	60°	30°	
VS-50TPS12L-M3	0.143	0.166	0.208	0.299	0.490	0.099	0.168	0.223	0.311	0.494	°C/W

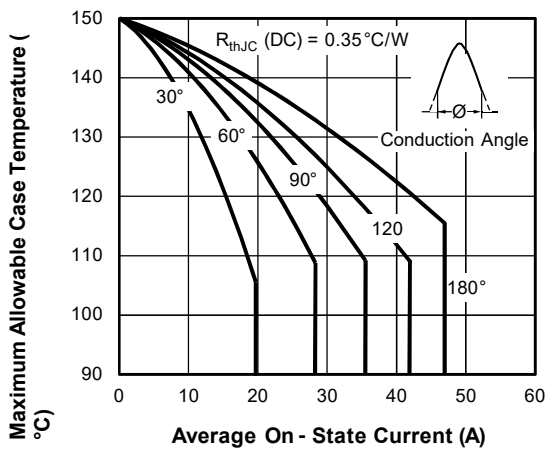


Fig. 1 - Current Rating Characteristics

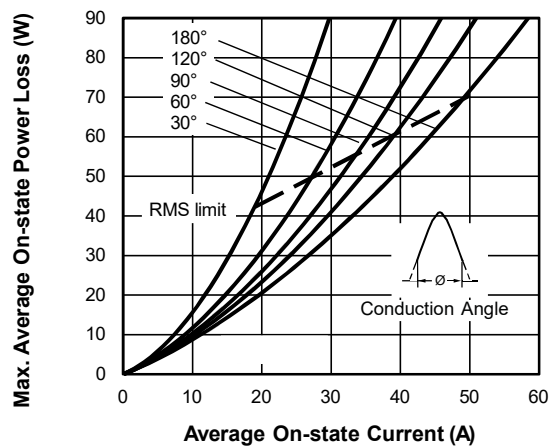


Fig. 3 - On-State Power Loss Characteristics

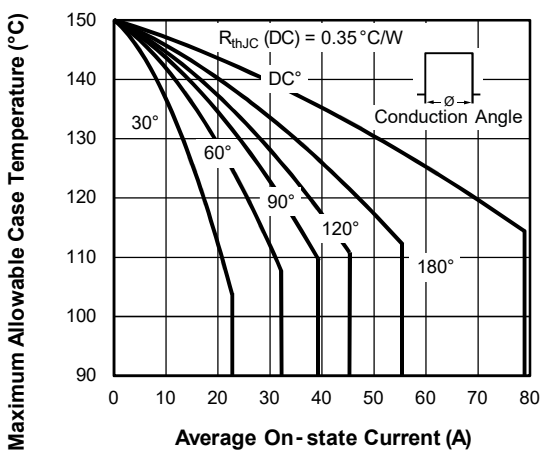


Fig. 2 - Current Rating Characteristics

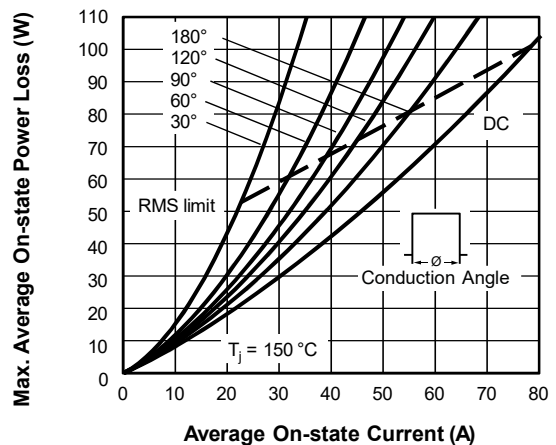


Fig. 4 - On-State Power Loss Characteristics

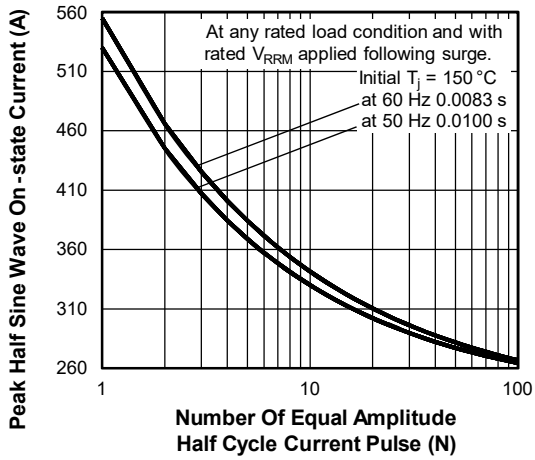


Fig. 5 - Maximum Non-Repetitive Surge Current

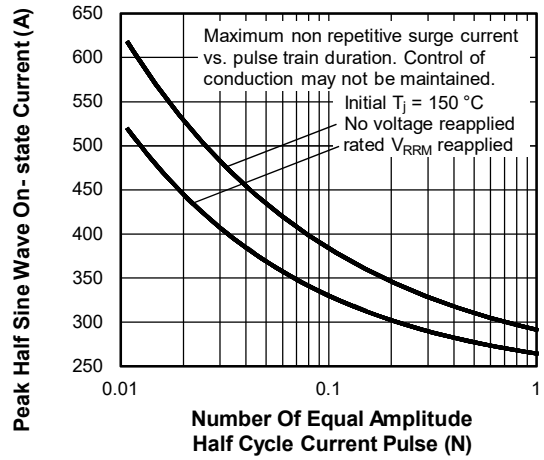


Fig. 6 - Maximum Non-Repetitive Surge Current

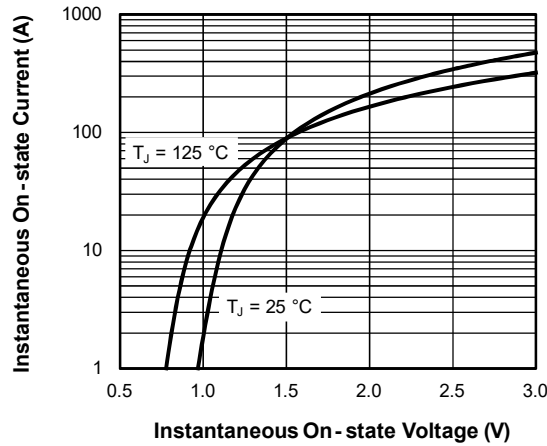


Fig. 7 - On-State Voltage Drop Characteristics

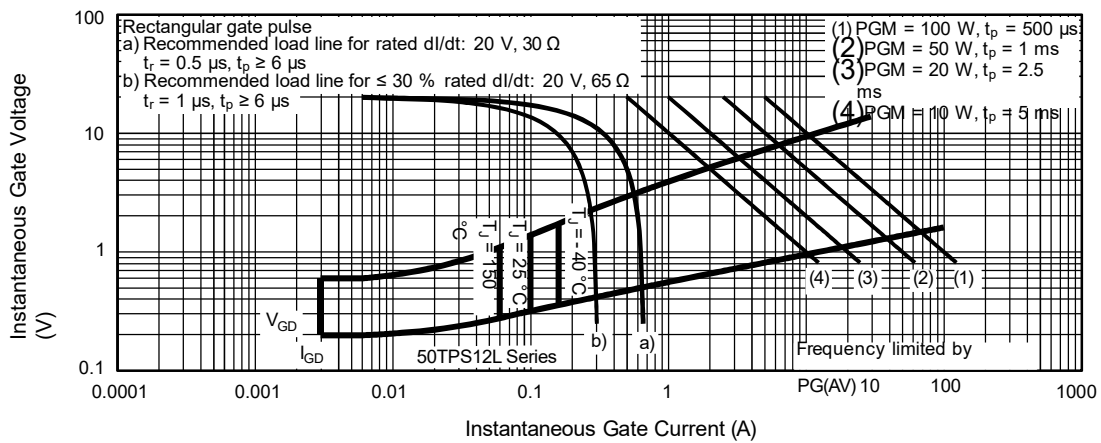
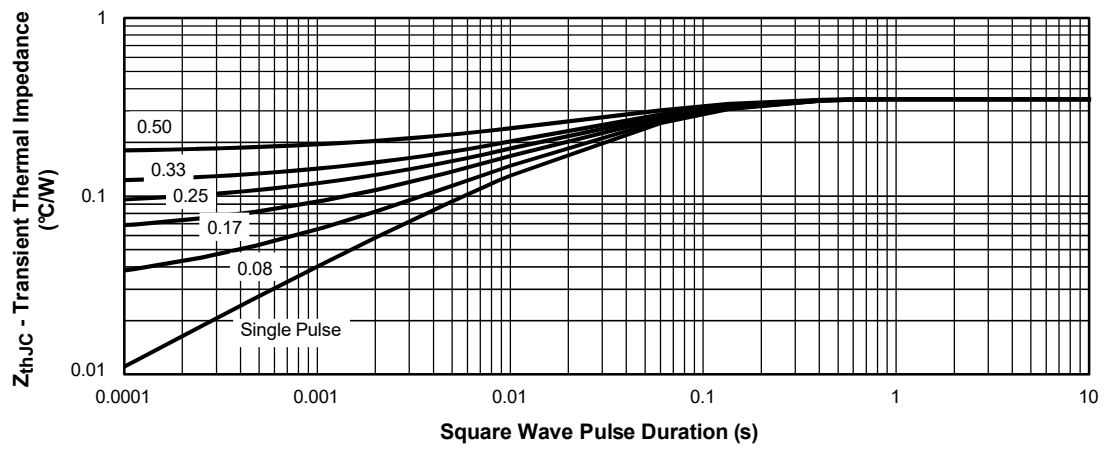
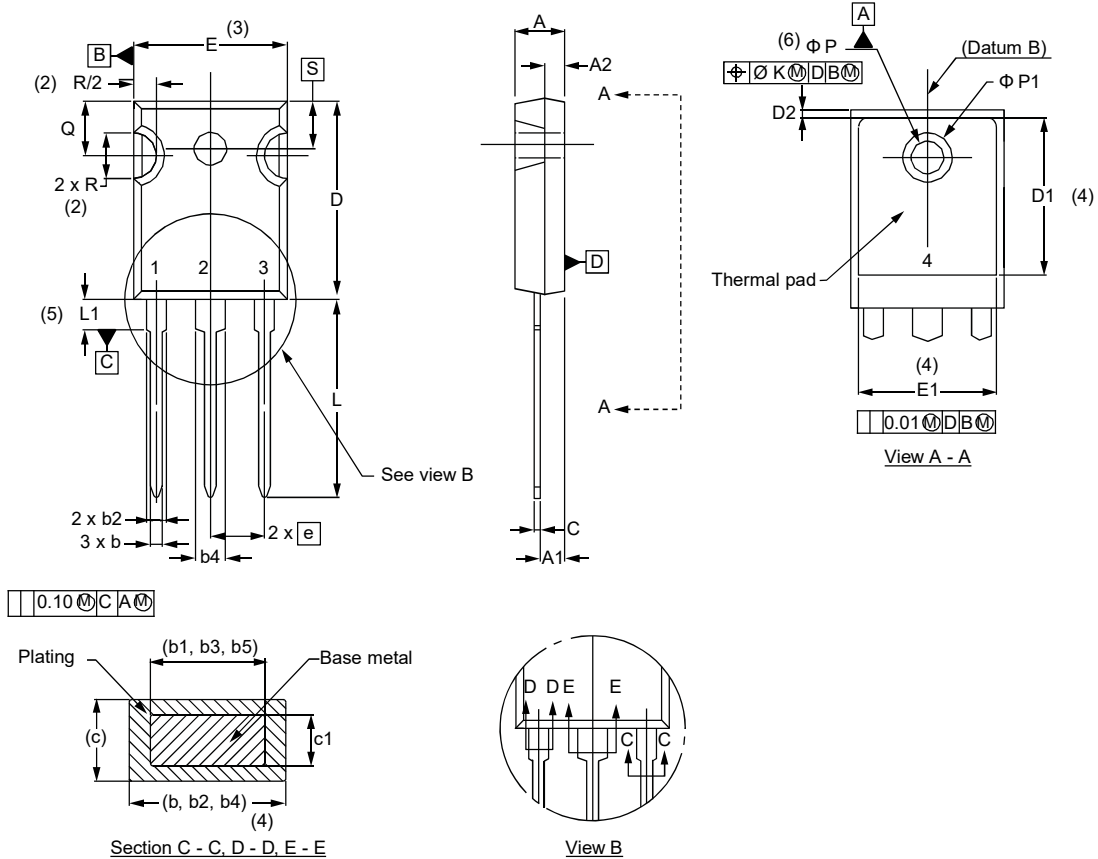


Fig. 8 - Gate Characteristics



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	
Q	5.31	5.69	0.209	0.224	
R	4.52	5.49	0.178	0.216	
S	5.51 BSC		0.217 BSC		