

# LCR1635

## 35A Thyristor High Voltage, Phase Control SCR

$I_{T(AV)}$	35 A
$V_{DRM}/V_{RRM}$	1600 V
$I_{GT}$	20-60 mA
$T_J$	-40°C to +125°C

### Features

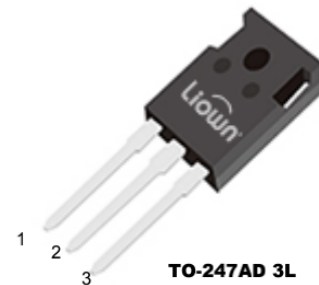
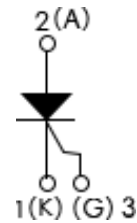
- Flexible solution for reliable AC power rectification
- Easy control peak current at charger power up to reduce passive / electromechanical components

### Applications

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

### Description

LCR1635 high voltage series of silicon controlled rectifiers are specifically designed for medium power switching and phase control applications.



MAJOR RATINGS AND CHARACTERISTICS			
PARAMETER	TEST CONDITIONS	VALUES	UNITS
$I_{T(AV)}$	Sinusoidal waveform	35	A
$I_{RMS}$		55	
$V_{RRM}/V_{DRM}$		1600	V
$I_{TSM}$		550	A
$V_T$	40 A, $T_J = 25^\circ\text{C}$	1.4	V
dv/dt		1000	V/ $\mu\text{s}$
di/dt		100	A/ $\mu\text{s}$
$T_J$		-40 to +125	$^\circ\text{C}$

ABSOLUTE MAXIMUM RATINGS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum average on-state current	$I_{T(AV)}$	$T_C = 79\text{ }^\circ\text{C}$ , 180° conduction half sine wave		35	A
Maximum continuous RMS on-state current as AC switch	$I_{T(RMS)}$			55	
Maximum peak, one-cycle non-repetitive surge current	$I_{TSM}$	10 ms sine pulse, rated $V_{RRM}$ applied	Initial $T_J = T_J$ max.	550	
		10 ms sine pulse, no voltage reapplied		500	
Maximum $I^2t$ for fusing	$I^2t$	10 ms sine pulse, rated $V_{RRM}$ applied		880	A <sup>2</sup> s
		10 ms sine pulse, no voltage reapplied		1250	
Maximum $I^2\sqrt{t}$ for fusing	$I^2\sqrt{t}$	$t = 0.1\text{ ms to }10\text{ ms}$ , no voltage reapplied		12 500	A <sup>2</sup> √s
Low level value of threshold voltage	$V_{T(TO)1}$	$T_J = 125\text{ }^\circ\text{C}$		1.02	V
High level value of threshold voltage	$V_{T(TO)2}$			1.23	
Low level value of on-state slope resistance	$r_{\theta 1}$			9.74	mΩ
High level value of on-state slope resistance	$r_{\theta 2}$			7.50	
Maximum peak on-state voltage	$V_{TM}$	110 A, $T_J = 25\text{ }^\circ\text{C}$		1.4	V
		90 A, $T_J = 25\text{ }^\circ\text{C}$		1.82	
Maximum rate of rise of turned-on current	$di/dt$	$T_J = 25\text{ }^\circ\text{C}$		100	A/μs
Maximum holding current	$I_H$	Anode supply = 6 V, resistive load, initial $T_J = 1\text{ A}$ , $I_T = 25\text{ }^\circ\text{C}$		300	mA
Maximum latching current	$I_L$	Anode supply = 6 V, resistive load, $T_J = 25\text{ }^\circ\text{C}$		350	
Maximum reverse and direct leakage current	$I_{RRM}/I_{DRM}$	$T_J = 25\text{ }^\circ\text{C}$	$V_R = \text{rated } V_{RRM}/V_{DRM}$	0.5	
		$T_J = 125\text{ }^\circ\text{C}$		10	
Maximum rate of rise of off-state voltage	$dv/dt$	$T_J = T_J$ maximum, linear to 80 % $V_{DRM}$ , $R_g - k =$ open		1000	V/μs

TRIGGERING					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum peak gate power	$P_{GM}$			10	W
Maximum average gate power	$P_{G(AV)}$			2.5	
Maximum peak gate current	$I_{GM}$			2.5	A
Maximum peak negative gate voltage	$-V_{GM}$			10	V
Maximum required DC gate voltage to trigger	$V_{GT}$	$T_J = -40\text{ }^\circ\text{C}$	Anode supply = 6 V resistive load	4.0	V
		$T_J = 25\text{ }^\circ\text{C}$		2.5	
		$T_J = 125\text{ }^\circ\text{C}$		1.7	
Maximum required DC gate current to trigger	$I_{GT}$	$T_J = -40\text{ }^\circ\text{C}$	Anode supply = 6 V resistive load	60	mA
		$T_J = 25\text{ }^\circ\text{C}$		50	
		$T_J = 125\text{ }^\circ\text{C}$		20	
Maximum DC gate voltage not to trigger	$V_{GD}$	$T_J = 125\text{ }^\circ\text{C}$ , $V_{DRM} = \text{rated value}$		0.25	V
Maximum DC gate current not to trigger	$I_{GD}$			6	mA

THERMAL AND MECHANICAL SPECIFICATIONS					
PARAMETER		SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum junction and storage temperature range		$T_J, T_{Stg}$		-40 to +125	$^{\circ}\text{C}$
Maximum thermal resistance, junction to case		$R_{thJC}$	DC operation	0.6	$^{\circ}\text{C}/\text{W}$
Maximum thermal resistance, junction to ambient		$R_{thJA}$		40	
Maximum thermal resistance, case to heat sink		$R_{thCS}$		0.25	
Approximate weight				6	g
				0.21	oz.
Mounting torque	minimum			6 (5)	kgf · cm (lbf · in)
	maximum				
Marking device			Case style TO-247AD 3L	40TPS16L	

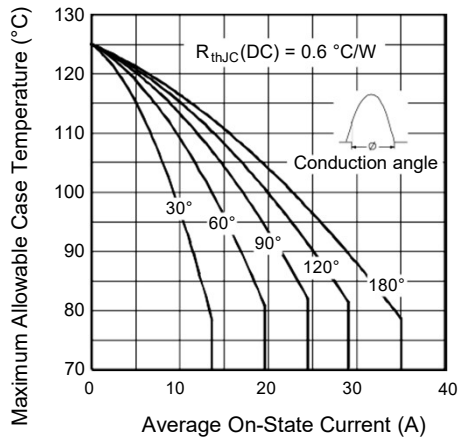


Fig. 1 - Current Rating Characteristics

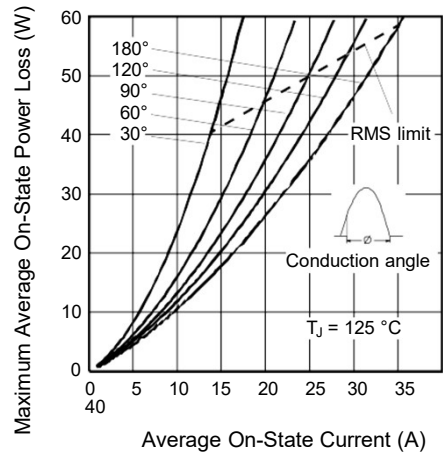


Fig. 3 - On-State Power Loss Characteristics

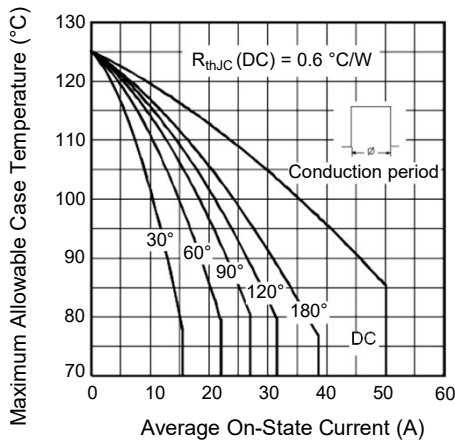


Fig. 2 - Current Rating Characteristics

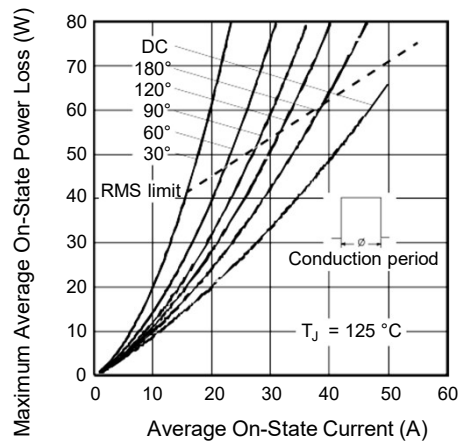


Fig. 4 - On-State Power Loss Characteristics

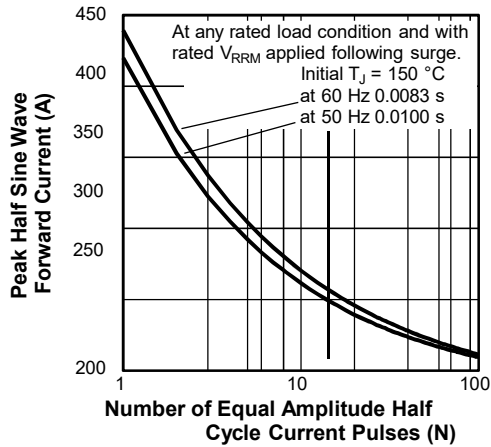


Fig. 5 - Maximum Non-Repetitive Surge Current

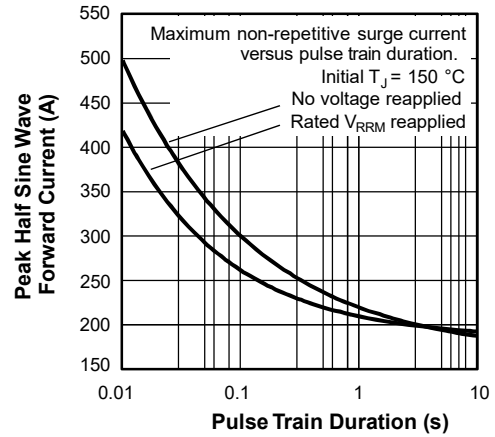


Fig. 6 - Maximum Non-Repetitive Surge Current

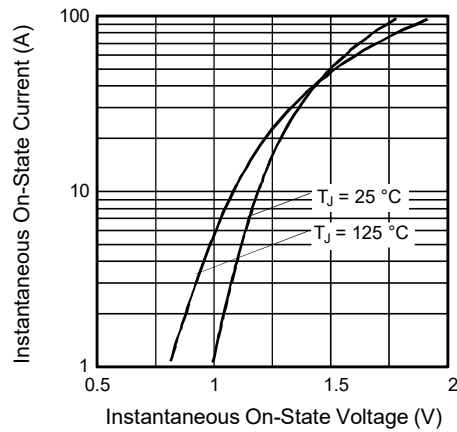


Fig. 7 - On-State Voltage Drop Characteristics

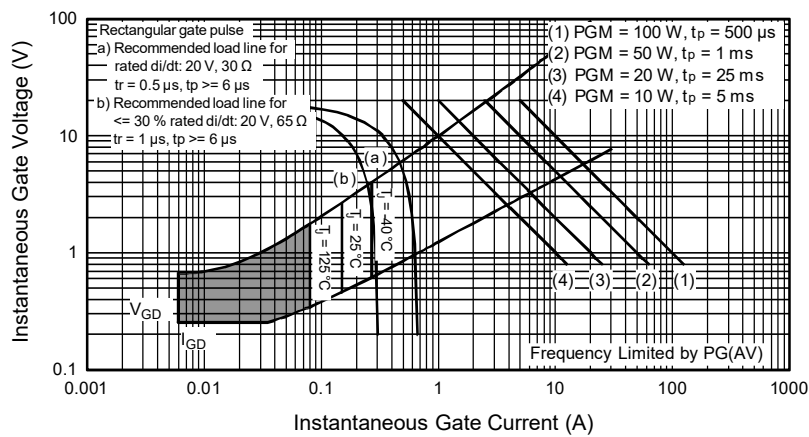
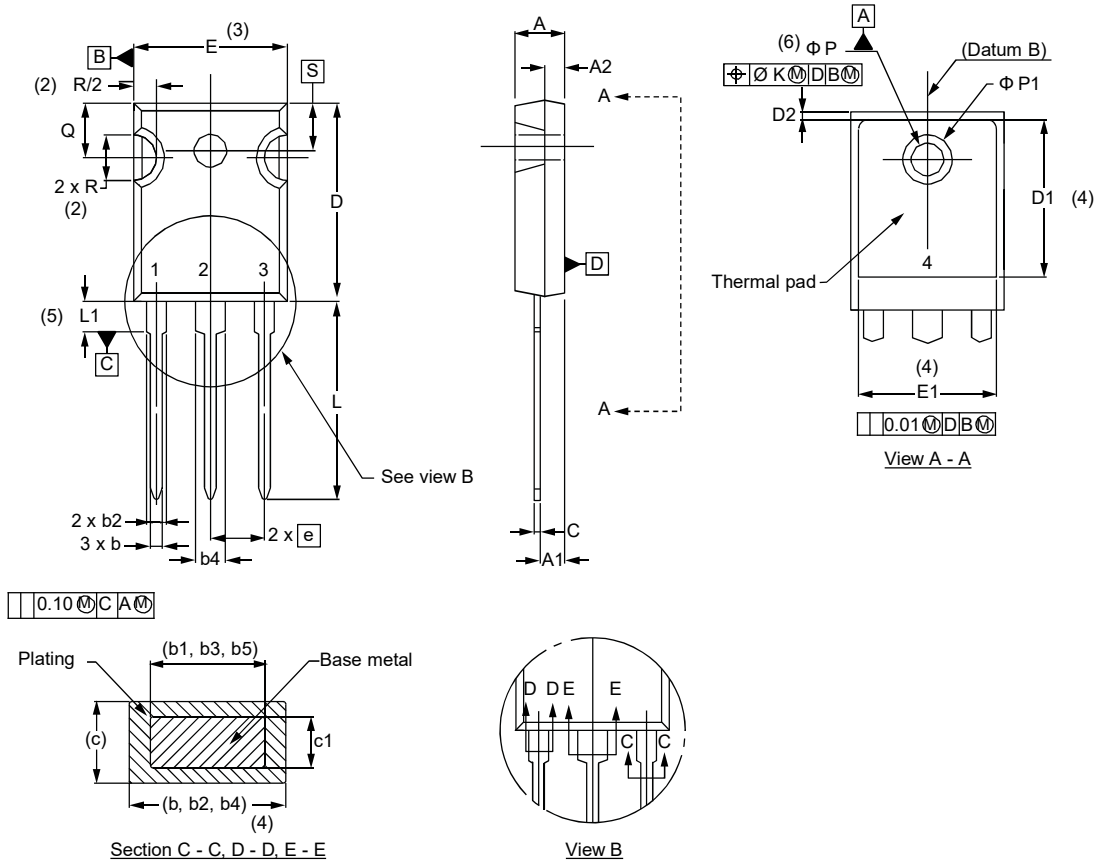


Fig. 8 - Gate Characteristics

# 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		