Absolute Maximum Ratings

Symbol	Parameter		Value					Unit
			Qxx04LT	Qxx06LT / Qxx06LTH	Qxx08LT / Qxx08LTH	Qxx10LT / Qxx10LTH	Qxx15LT / Qxx15LTH	
$I_{T(RMS)}$	RMS forward current	Qxx04LT: T_C = 95°C Qxx06LT/Qxx08LT/Qxx10LT: T_C = 90°C Qxx15LT: T_C = 80°C	4	6	8	10	15	A
I_{TSM}	Peak non-repetitive surge current	single half cycle; f = 50Hz; T_J (initial) = 25°C	46	65	83	100	167	A
		single half cycle; f = 60Hz; T_J (initial) = 25°C	55	80	100	120	200	
I^2t	I^2t value for fusing	t_p = 8.3ms	12.5	26.5	41	60	166	A^2s
di/dt	Critical rate-of-rise of on-state current	f = 60Hz; T_J =125°C	50	70			100	A/μs
I_{GM}	Peak gate current	T_J = 125°C	1.5					A
T_{stg}	Storage temperature range		-40 to 150					°C
T_J	Operating junction temperature range		-40 to 125					°C

Note: xx = voltage

Electrical Characteristics (T_J = 25°C, unless otherwise specified) – Standard Quadrac

Symbol	Test Conditions			Value					Unit
				Qxx04LT	Qxx06LT	Qxx08LT	Qxx10LT	Qxx15LT	
I_H	I_T = 200mA (initial)	MAX.		40	50	60	60	70	mA
dv/dt	$V_D = V_{DRM}$; gate open; T_J=100°C	MIN.	400V	75	150	175	200	300	V/μs
			600V	50	125	150	175	200	
	$V_D = V_{DRM}$; gate open; T_J=125°C	MIN.	400V	50	100	120	150	200	
			600V	50	85	100	120	150	
dv/dt(c)	di/dt(c) = 0.54 x $I_{T(rms)}$ / ms; T_J = 125°C	MIN.		3	4				V/μs
t_{gt}	(note 1)	TYP.		3					μs

(1) Reference test circuit in figure 10 and waveform in figure 11; C_T = 0.1μF with 0.1μs rise time.
Note: xx = voltage

Electrical Characteristics (T_J = 25°C, unless otherwise specified) – Alternistor Quadrac

Symbol	Test Conditions			Value				Unit
				Qxx06LTH	Qxx08LTH	Qxx10LTH	Qxx15LTH	
I_H	I_T = 20mA (initial)	MAX.		50	50	60	70	mA
dv/dt	$V_D = V_{DRM}$; gate open; T_J=100°C	MIN.	400V	575		925		V/μs
			600V	425		775		
	$V_D = V_{DRM}$; gate open; T_J=125°C	MIN.	400V	450		700		
			600V	350		600		
dv/dt(c)	di/dt(c) = 0.54 x $I_{T(rms)}$ / ms; T_J = 125°C	MIN.		25		30		V/μs
t_{gt}	(note 1)	TYP.		3				μs

(1) Reference test circuit in figure 10 and waveform in figure 11; C_T = 0.1μF with 0.1μs rise time.
Note: xx = voltage

Trigger DIAC Specifications

Symbol	Test Conditions		Value	Unit
ΔV_{BO}	Breakover Voltage Symmetry	MAX.	3	V
V_{BO}	Breakover Voltage, forward and reverse	MIN.	33	V
		MAX.	43	
$[\Delta V\pm]$	Dynamic Breakback Voltage, forward and reverse (note 1)	MIN.	5	V
I_{BO}	Peak Breakover Current	MAX.	25	uA
C_T	Trigger Firing Capacitance	MAX.	0.1	µF

(1) Reference test circuit in figure 10 and waveform in figure 11.

Static Characteristics

Symbol	Test Conditions			Value	Unit
V_{TM}	$I_T = 1.41 \times I_{T(rms)}$ A; $t_p = 380µs$		MAX.	1.6	V
I_{DRM} / I_{RRM}	V_{DRM} / V_{RRM}	$T_J = 25°C$	MAX.	10	µA
		$T_J = 100°C$		500	
		$T_J = 125°C$		2000	

Thermal Resistances

Symbol	Parameter		Value	Unit
$R_{\theta(J-C)}$	Junction to case (AC)	Qxx04LT	3.6	°C/W
		Qxx06LT / Qxx06LTH	3.3	
		Qxx08LT / Qxx08LTH	2.8	
		Qxx10LT / Qxx10LTH	2.6	
		Qxx15LT / Qxx15LTH	2.1	
$R_{\theta(J-A)}$	Junction to ambient		50	°C/W

Note : xx = voltage

Figure 1: Normalized DC Holding Current vs. Junction Temperature

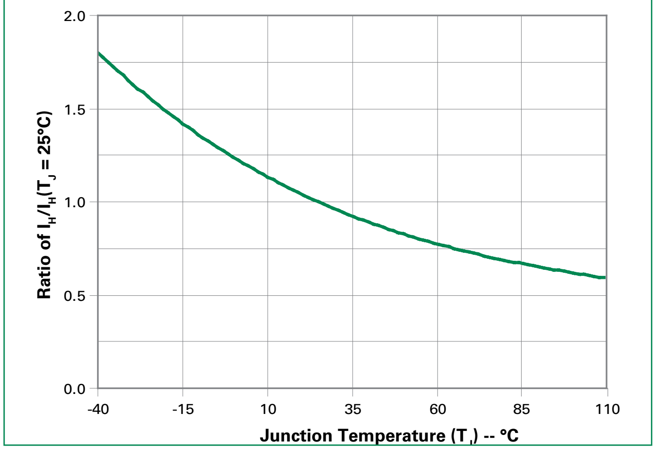


Figure 2: On-State Current vs. On-State Voltage (Typical) (4A)

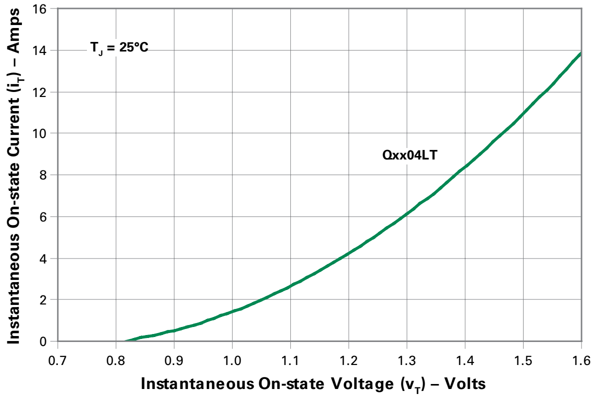


Figure 3: On-State Current vs. On-State Voltage (Typical) (6A to 15A)

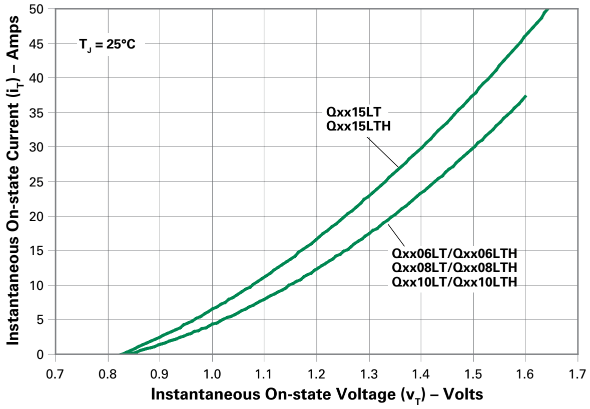


Figure 4: Power Dissipation vs. RMS On-State Current (Typical) (4A)

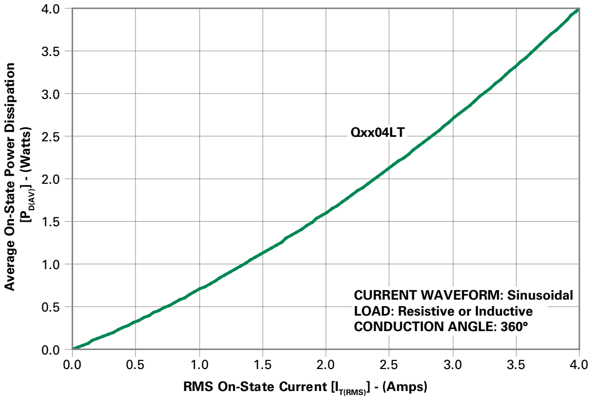


Figure 5: Power Dissipation vs. RMS On-State Current (Typical) (6A to 15A)

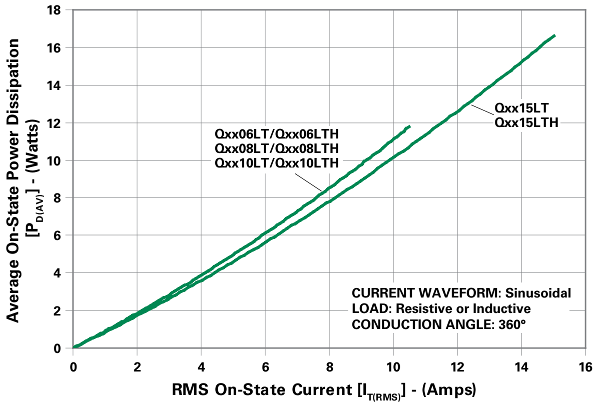
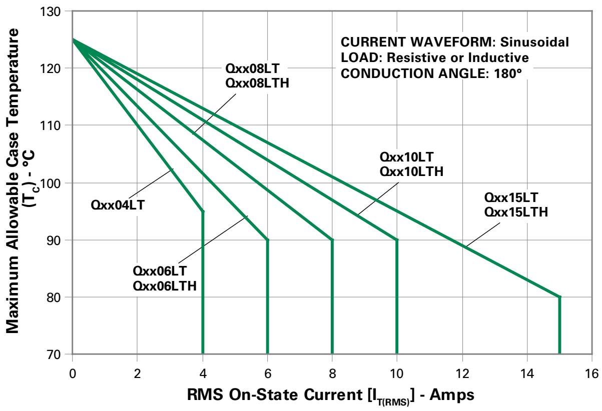
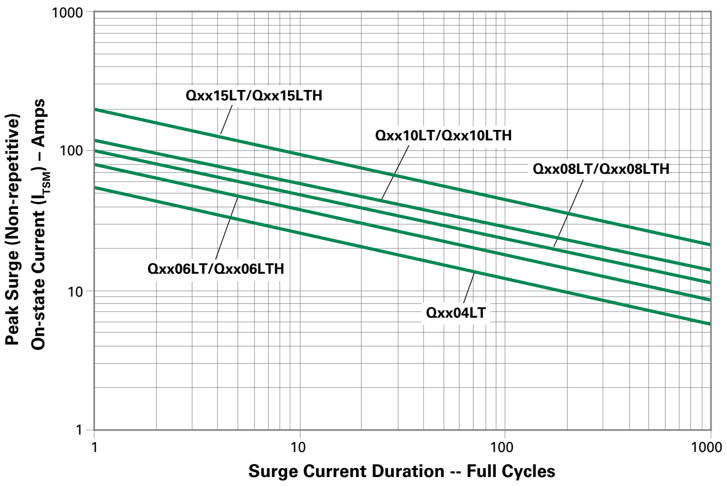


Figure 6: Maximum Allowable Case Temperature vs. RMS On-State Current



Revised: 12/14/14

Figure 7: Surge Peak On-State Current vs. Number of Cycles



Supply Frequency: 60Hz Sinusoidal
Load: Resistive
RMS On-State Current: [$I_{T(RMS)}$]: Maximum Rated Value at Specific Case Temperature

Notes:

1. Gate control may be lost during and immediately following surge current interval.
2. Overload may not be repeated until junction temperature has returned to steady-state rated value.

Note: xx = voltage

Figure 8: DIAC V_{BO} Change vs. Junction Temperature

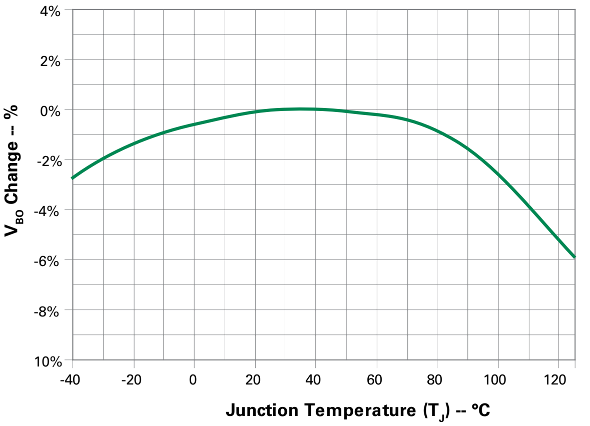


Figure 9: Test Circuit

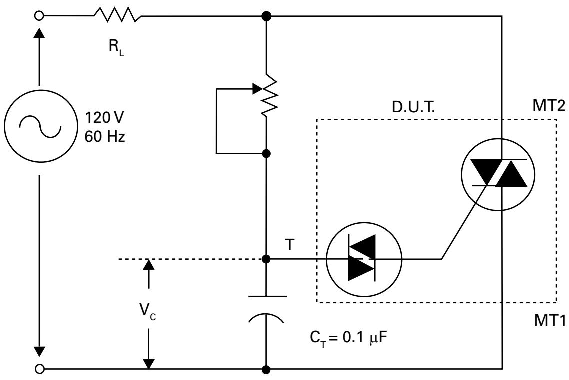
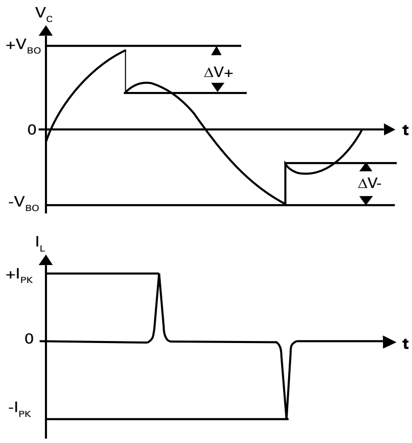
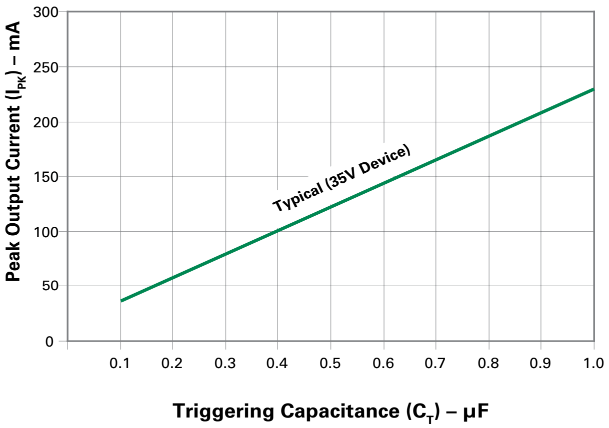


Figure 10: Test Circuit Waveform



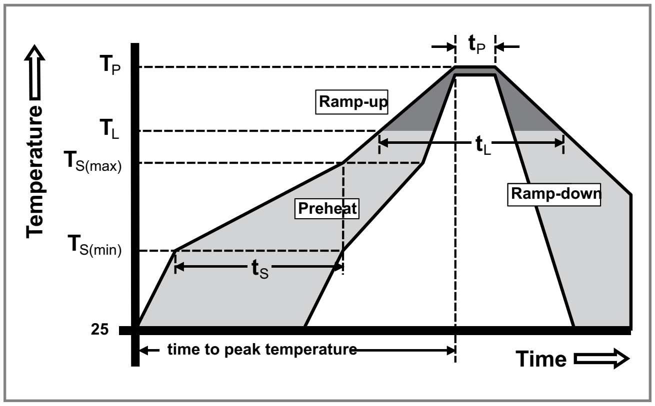
Typical pulse base width is 10µs

Figure 11: Peak Output Current vs Triggering Capacitance (Per Figure 9)



Soldering Parameters

Reflow Condition		Pb – Free assembly
Pre Heat	- Temperature Min ($T_{s(min)}$)	150°C
	- Temperature Max ($T_{s(max)}$)	200°C
	- Time (min to max) (t_s)	60 – 180 secs
Average ramp up rate (Liquidus Temp) (T_L) to peak		5°C/second max
$T_{S(max)}$ to T_L - Ramp-up Rate		5°C/second max
Reflow	- Temperature (T_L) (Liquidus)	217°C
	- Temperature (t_L)	60 – 150 seconds
Peak Temperature (T_P)		$260^{+0/-5}$ °C
Time within 5°C of actual peak Temperature (t_p)		20 – 40 seconds
Ramp-down Rate		5°C/second max
Time 25°C to peak Temperature (T_P)		8 minutes Max.
Do not exceed		280°C



Physical Specifications

Terminal Finish	1005 Matte Tin-plated
Body Material	UL Recognized epoxy meeting flammability classification 94v-0
Lead Material	Copper Alloy

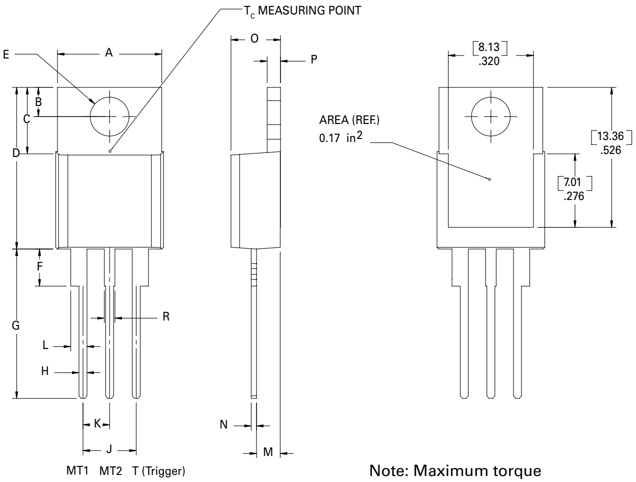
Design Considerations

Careful selection of the correct device for the application's operating parameters and environment will go a long way toward extending the operating life of the Thyristor. Good design practice should limit the maximum continuous current through the main terminals to 75% of the device rating. Other ways to ensure long life for a power discrete semiconductor are proper heat sinking and selection of voltage ratings for worst case conditions. Overheating, overvoltage (including dv/dt), and surge currents are the main killers of semiconductors. Correct mounting, soldering, and forming of the leads also help protect against component damage.

Environmental Specifications

Test	Specifications and Conditions
High Temperature Voltage Blocking	MIL-STD-750: Method 1040, Condition A Rated V_{DRM} (VAC-peak), 125°C, 1008 hours
Temperature Cycling	MIL-STD-750: Method 1051 -40°C to 150°C, 15-minute dwell, 100 cycles
Biased Temperature & Humidity	EIA/JEDEC: JESD22-A101 320VDC, 85°C, 85%RH, 1008 hours
High Temp Storage	MIL-STD-750: Method 1031 150°C, 1008 hours
Low-Temp Storage	-40°C, 1008 hours
Thermal Shock	MIL-STD-750: Method 1056 0°C to 100°C, 5-minute dwell, 10-second transfer, 10 cycles
Autoclave (Pressure Cooker Test)	EIA/JEDEC: JESD22-A102 121°C, 100%RH, 2atm, 168 hours
Resistance to Solder Heat	MIL-STD-750: Method 2031 260°C, 10 seconds
Solderability	ANSI/J-STD-002, Category 3, Test A
Lead Bend	MIL-STD-750: Method 2036, Condition E

Dimensions — TO-220AB (L-Package) — Isolated Mounting Tab



Note: Maximum torque
to be applied to mounting tab
is 8 in-lbs. (0.904 Nm).

Dimension	Inches		Millimeters	
	Min	Max	Min	Max
A	0.380	0.420	9.65	10.67
B	0.105	0.115	2.67	2.92
C	0.230	0.250	5.84	6.35
D	0.590	0.620	14.99	15.75
E	0.142	0.147	3.61	3.73
F	0.110	0.130	2.79	3.30
G	0.540	0.575	13.72	14.61
H	0.025	0.035	0.64	0.89
J	0.195	0.205	4.95	5.21
K	0.095	0.105	2.41	2.67
L	0.060	0.075	1.52	1.91
M	0.085	0.095	2.16	2.41
N	0.018	0.024	0.46	0.61
O	0.178	0.188	4.52	4.78
P	0.045	0.060	1.14	1.52
R	0.038	0.048	0.97	1.22

Product Selector

Part Number	Voltage				Type	Package
	400V	600V	800V	1000V		
Qxx04LT	X	X			Quadrac	TO-220L
Qxx06LT	X	X			Quadrac	TO-220L
Qxx06LTH	X	X			Alternistor Quadrac	TO-220L
Qxx08LT	X	X			Quadrac	TO-220L
Qxx08LTH	X	X			Alternistor Quadrac	TO-220L
Qxx10LT	X	X			Quadrac	TO-220L
Qxx10LTH	X	X			Alternistor Quadrac	TO-220L
Qxx15LT	X	X			Quadrac	TO-220L
Qxx15LTH	X	X			Alternistor Quadrac	TO-220L

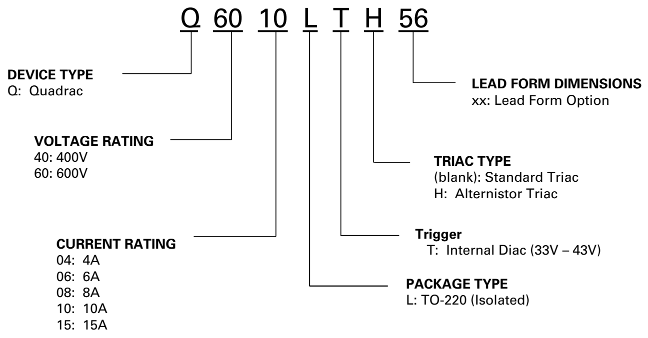
Note: xx = Voltage

Packing Options

Part Number	Marking	Weight	Packing Mode	Base Quantity
Qxx04LT	Qxx04LT	2.2 g	Bulk	500
Qxx04LTTP	Qxx04LT	2.2 g	Tube	500 (50 per tube)
Qxx06LT	Qxx06LT	2.2 g	Bulk	500
Qxx06LTTP	Qxx06LT	2.2 g	Tube	500 (50 per tube)
Qxx06LTH	Qxx06LTH	2.2 g	Bulk	500
Qxx06LTHTP	Qxx06LTH	2.2 g	Tube	500 (50 per tube)
Qxx08LT	Qxx08LT	2.2 g	Bulk	500
Qxx08LTTP	Qxx08LT	2.2 g	Tube	500 (50 per tube)
Qxx08LTH	Qxx08LTH	2.2 g	Bulk	500
Qxx08LTHTP	Qxx08LTH	2.2 g	Tube	500 (50 per tube)
Qxx10LT	Qxx10LT	2.2 g	Bulk	500
Qxx10LTTP	Qxx10LT	2.2 g	Tube	500 (50 per tube)
Qxx10LTH	Qxx10LTH	2.2 g	Bulk	500
Qxx10LTHTP	Qxx10LTH	2.2 g	Tube	500 (50 per tube)
Qxx15LT	Qxx15LT	2.2 g	Bulk	500
Qxx15LTTP	Qxx15LT	2.2 g	Tube	500 (50 per tube)
Qxx15LTH	Qxx15LTH	2.2 g	Bulk	500
Qxx15LTHTP	Qxx15LTH	2.2 g	Tube	500 (50 per tube)

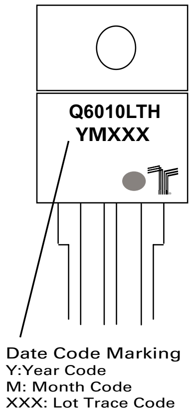
Note: xx = Voltage

Part Numbering System



Part Marking System

TO-220 AB - (L Package)



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