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LQA30T300

Qspeed™ Family

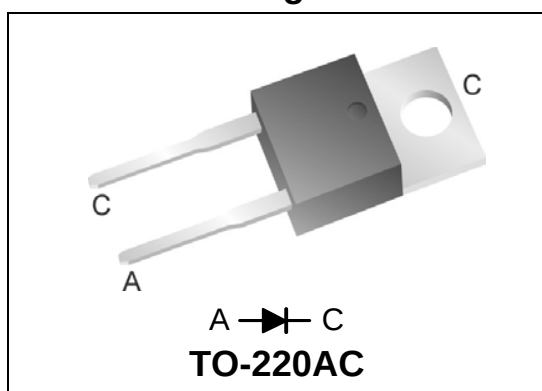
300 V, 30 A Q-Series Diode



Product Summary

$I_{F(AVG)}$	30	A
V_{RRM}	300	V
Q_{RR} (Typ at 125 °C)	53	nC
I_{RRM} (Typ at 125 °C)	2.85	A
Softness t_b/t_a (Typ at 125 °C)	0.6	

Pin Assignment



RoHS Compliant

Package uses Lead-free plating and Green mold compound.
Halogen free per IEC 61249-2-21.

General Description

This device has the lowest Q_{RR} of any 300V Silicon diode. Its recovery characteristics increase efficiency, reduce EMI and eliminate snubbers.

Applications

- AC/DC and DC/DC output rectification
 - Output & freewheeling diodes
- Motor control drive circuits
- Uninterruptible Power Supply (UPS) inverters

Features

- Low Q_{RR} , Low I_{RRM} , Low t_{RR}
- High dI_F/dt capable (1000A/μs)
- Soft recovery

Benefits

- Increases efficiency
 - Eliminates need for snubber circuits
 - Reduces EMI filter component size & count
- Enables extremely fast switching

Absolute Maximum Ratings

Absolute maximum ratings are the values beyond which the device may be damaged or have its useful life impaired. Functional operation under these conditions is not implied.

Symbol	Parameter	Conditions	Rating	Units
V_{RRM}	Peak repetitive reverse voltage		300	V
$I_{F(AVG)}$	Average forward current	$T_J = 150\text{ °C}$, $T_C = 99\text{ °C}$	30	A
I_{FSM}	Non-repetitive peak surge current	60 Hz, ½ cycle	200	A
I_{FSM}	Non-repetitive peak surge current	½ cycle of $T = 28\text{ us}$ Sinusoid, $T_C = 25\text{ °C}$	350	A
T_J	Maximum junction temperature		150	°C
T_{STG}	Storage temperature		-55 to 150	°C
	Lead soldering temperature	Leads at 1.6mm from case, 10 sec	300	°C
P_D	Power dissipation	$T_C = 25\text{ °C}$	113	W

Thermal Resistance

Symbol	Resistance from:	Conditions	Rating	Units
$R_{\theta JA}$	Junction to ambient	TO-220	62	°C/W
$R_{\theta JC}$	Junction to case	TO-220	1.1	°C/W

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Electrical Specifications at $T_J = 25\text{ }^{\circ}\text{C}$ (unless otherwise specified)

Symbol	Parameter	Conditions	Min	Typ	Max	Units	
DC Characteristics							
I _R	Reverse current	V _R = 300 V, T _J = 25 °C	-	-	250	μA	
		V _R = 300 V, T _J = 125 °C	-	1.0	-	mA	
V _F	Forward voltage	I _F = 30 A, T _J = 25 °C	-	1.66	1.95	V	
		I _F = 30 A, T _J = 150 °C	-	1.45	-	V	
C _J	Junction capacitance	V _R = 10 V, 1 MHz	-	89	-	pF	
Dynamic Characteristics							
t _{RR}	Reverse recovery time,	dI _F /dt = 200A/μs V _R =200V, I _F =30 A	T _J =25 °C	-	13.7	-	ns
			T _J =125 °C	-	28.5	-	ns
Q _{RR}	Reverse recovery charge,	dI _F /dt = 200A/μs V _R =200V, I _F =30 A	T _J =25 °C	-	13	19	nC
			T _J =125 °C	-	53	-	nC
I _R RM	Maximum reverse recovery current,	dI _F /dt =200A/μs V _R =200V, I _F =30 A	T _J =25 °C	-	1.5	2.2	A
			T _J =125 °C	-	2.85	-	A
S	Softness = $\frac{t_b}{t_a}$	dI _F /dt =200A/μs V _R =200V, I _F =30 A	T _J =25 °C	-	0.6	-	
			T _J =125 °C	-	0.6	-	

Note to component engineers: Q-Series diodes employ Schottky technologies in their design and construction. Therefore, component engineers should plan their test setups to be similar to traditional Schottky test setups. (For further details, see application note AN-300.)

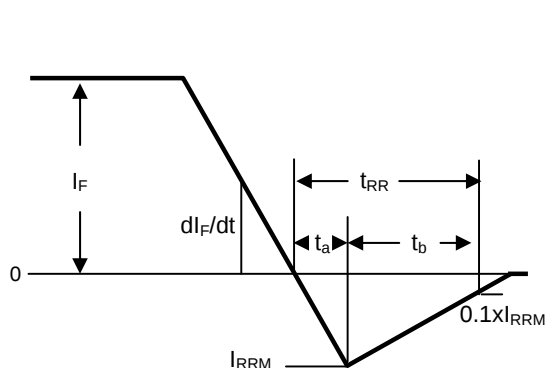


Figure 1. Reverse Recovery Definitions

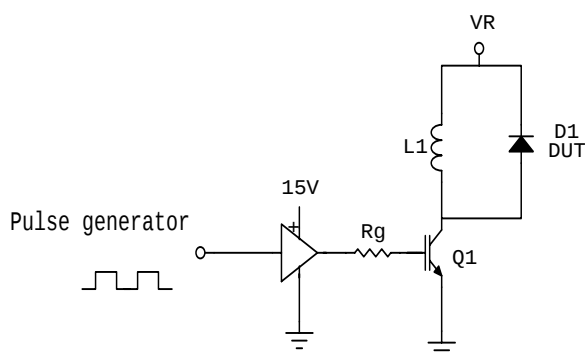


Figure 2. Reverse Recovery Test Circuit

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Electrical Specifications at $T_J = 25^\circ\text{C}$ (unless otherwise specified)

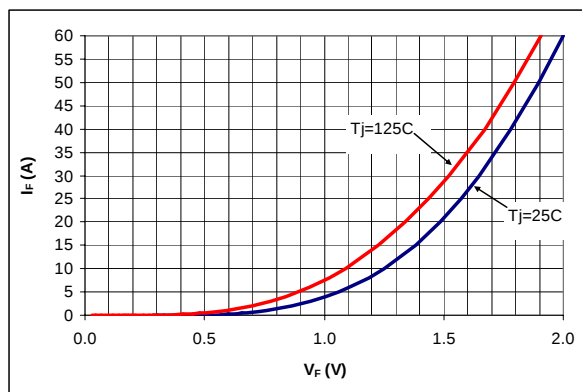


Figure 3. Typical I_F vs V_F

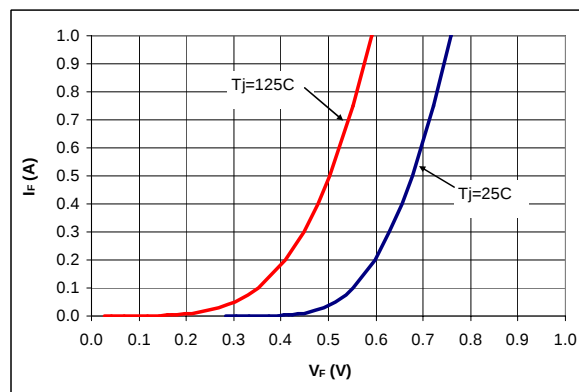


Figure 4. Typical I_F vs V_F

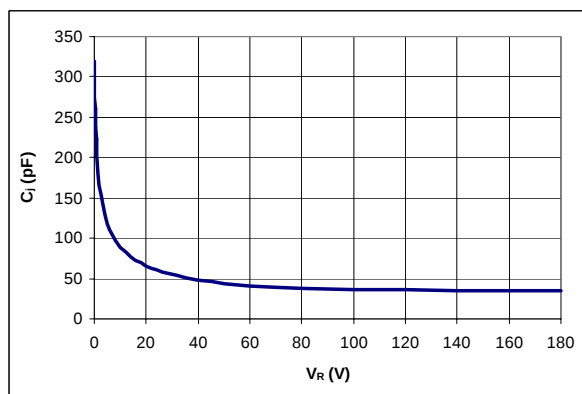


Figure 5. Typical C_j vs V_R

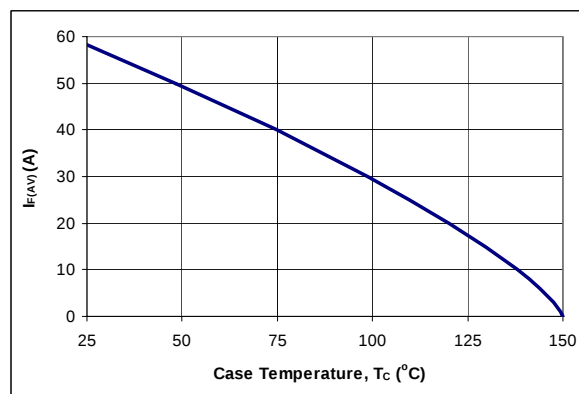


Figure 6. DC Current Derating Curve

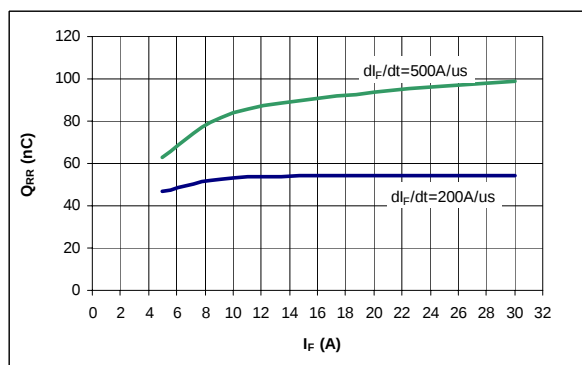


Figure 7. Typical Q_{RR} vs I_F at $T_J = 125^\circ\text{C}$

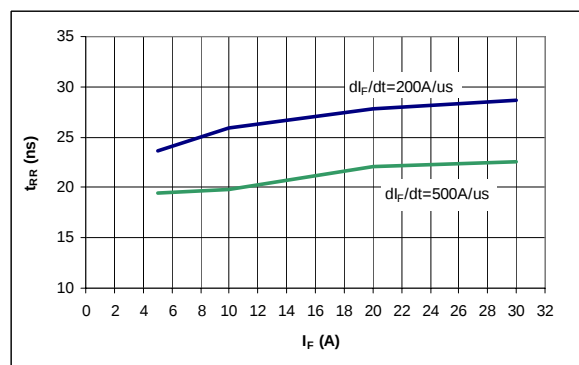


Figure 8. Typical t_{RR} vs I_F at $T_J = 125^\circ\text{C}$

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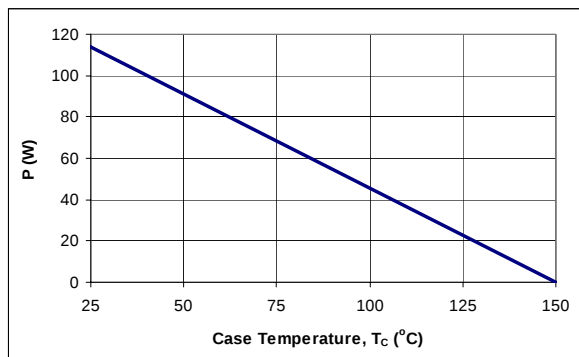


Figure 9. Power Derating Curve

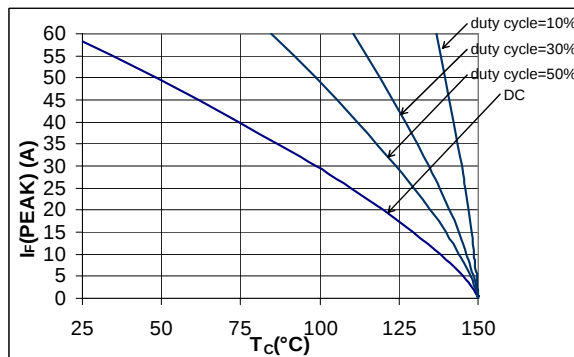


Figure 10. $I_F(\text{Peak})$ vs T_c , $f=70$ kHz

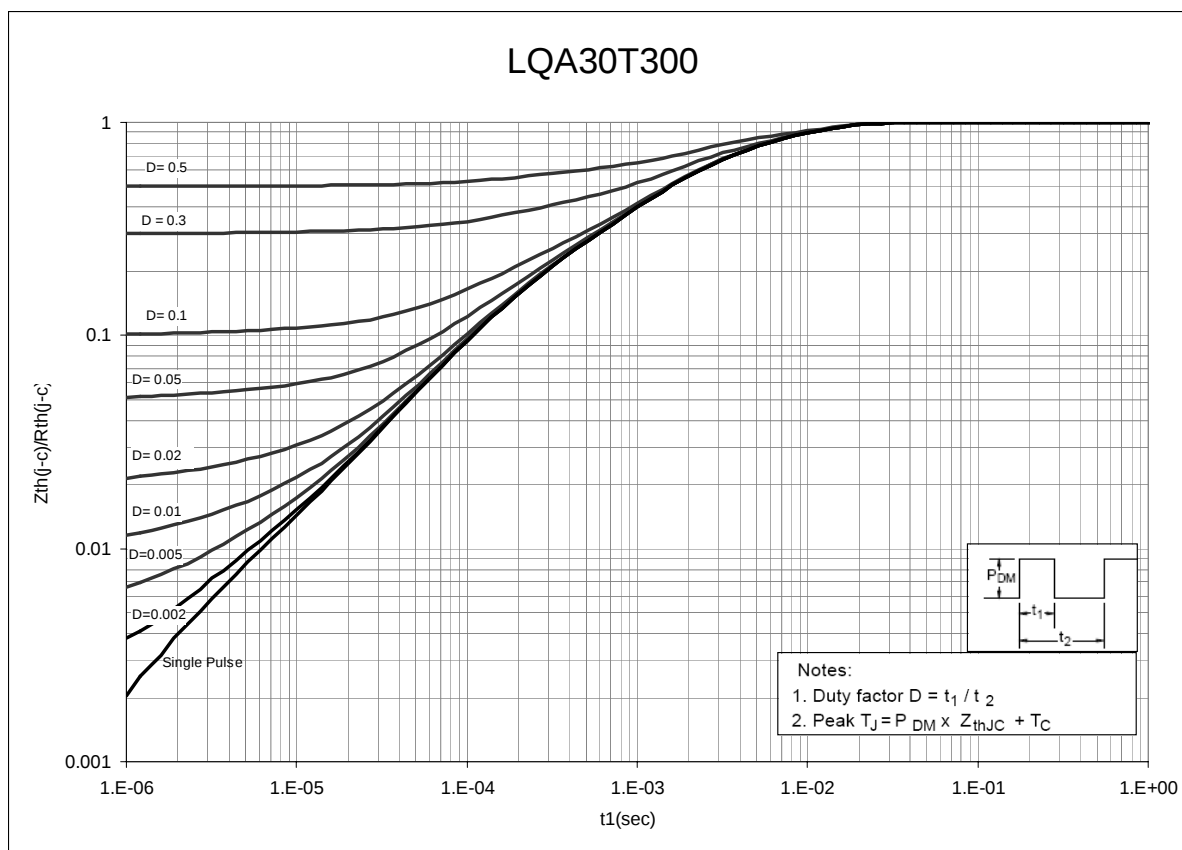
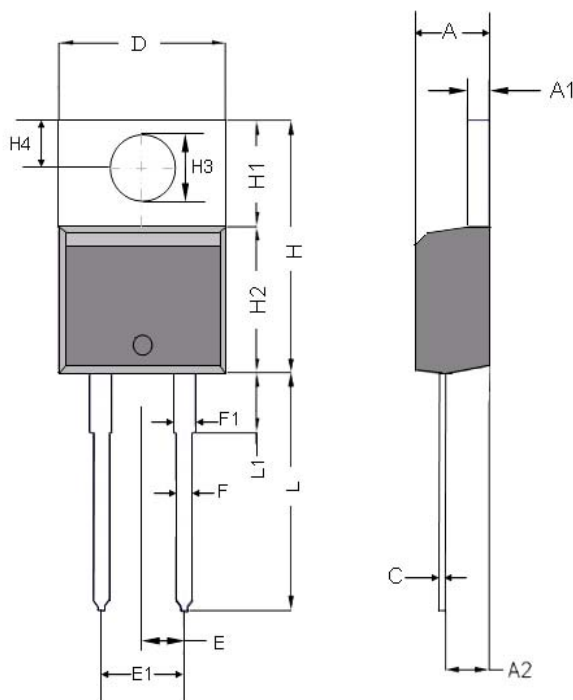


Figure 11. Normalized Maximum Transient Thermal Impedance

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Dimensional Outline Drawings



Dim	Millimeters	
	MIN	MAX
A	4.32	4.70
A1	1.14	1.40
A2	2.03	2.79
C	0.34	0.610
D	9.65	10.67
E	2.49	2.59
E1	4.98	5.18
F	0.508	1.016
F1	1.14	1.78
H	14.71	16.51
H1	5.84	6.55
H2	8.51	9.25
H3	3.53	3.96
H4	2.54	3.05
L	12.70	14.22
L1	-	6.35

Mechanical Mounting Method	Maximum Torque / Pressure specification
Screw through hole in package tab	1 Newton Meter (nm) or 8.8 inch-pounds (lb-in)
Clamp against package body	12.3 kilogram-force per square centimeter (kgf/cm ²) or 175 lbf/in ²

Soldering time and temperature: This product has been designed for use with high-temperature, lead-free solder. The component leads can be subjected to a maximum temperature of 300 °C, for up to 10 seconds. See Application Note AN-303, for more details.

Ordering Information

Part Number	Package	Packing
LQA30T300	TO-220AC	50 units/tube

The information contained in this document is subject to change without notice.

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Revision	Notes	Date
1.1	Released by Qspeed	05/09
1.2	Converted to Power Integrations Document	01/11

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Power Integrations Worldwide Sales Support Locations

WORLD HEADQUARTERS

5245 Hellyer Avenue
 San Jose, CA 95138, USA.
 Main: +1-408-414-9200
 Customer Service:
 Phone: +1-408-414-9665
 Fax: +1-408-414-9765
 e-mail:
usasales@powerint.com

GERMANY

Rueckertstrasse 3
 D-80336, Munich
 Germany
 Phone: +49-89-5527-3911
 Fax: +49-89-5527-3920
 e-mail:
eurosales@powerint.com

JAPAN

Kosei Dai-3 Building
 2-12-11, Shin-Yokohama,
 Kohoku-ku, Yokohama-shi,
 Kanagawa 222-0033
 Japan
 Phone: +81-45-471-1021
 Fax: +81-45-471-3717
 e-mail: japansales@powerint.com

TAIWAN

5F, No. 318, Nei Hu Rd., Sec. 1
 Nei Hu District
 Taipei 114, Taiwan R.O.C.
 Phone: +886-2-2659-4570
 Fax: +886-2-2659-4550
 e-mail:
taiwansales@powerint.com

CHINA (SHANGHAI)

Rm 1601/1610, Tower 1
 Kerry Everbright City
 No. 218 Tianmu Road West
 Shanghai, P.R.C. 200070
 Phone: +86-021-6354-6323
 Fax: +86-021-6354-6325
 e-mail:
chinasales@powerint.com

INDIA

#1, 14th Main Road
 Vasanthanagar
 Bangalore-560052
 India
 Phone: +91-80-4113-8020
 Fax: +91-80-4113-8023
 e-mail:
indiasales@powerint.com

KOREA

RM 602, 6FL
 Korea City Air Terminal B/D, 159-6
 Samsung-Dong, Kangnam-Gu,
 Seoul, 135-728
 Korea
 Phone: +82-2-2016-6610
 Fax: +82-2-2016-6630
 e-mail: koreasales@powerint.com

EUROPE HQ

1st Floor, St. James's House
 East Street, Farnham
 Surrey GU9 7TJ
 United Kingdom
 Phone: +44 (0) 1252-730-141
 Fax: +44 (0) 1252-727-689
 e-mail:
eurosales@powerint.com

CHINA (SHENZHEN)

Rm A, B & C 4th Floor, Block C,
 Electronics Science and
 Technology Building
 2070 Shennan Zhong Road
 Shenzhen, Guangdong,
 P.R.C. 518031
 Phone: +86-755-8379-3243
 Fax: +86-755-8379-5828
 e-mail:
chinasales@powerint.com

ITALY

Via De Amicis 2
 20091 Bresso MI
 Italy
 Phone: +39-028-928-6000
 Fax: +39-028-928-6009
 e-mail:
eurosales@powerint.com

SINGAPORE

51 Newton Road,
 #19-01/05 Goldhill Plaza
 Singapore, 308900
 Phone: +65-6358-2160
 Fax: +65-6358-2015
 e-mail:
singaporesales@powerint.com

APPLICATIONS HOTLINE

World Wide +1-408-414-9660

APPLICATIONS FAX

World Wide +1-408-414-9760