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LQA12T300C, LQA12B300C
Qspeed™ Family

300 V, 12 A Q-Series Common-Cathode Diode

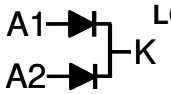
Product Summary

$I_{F(AVG)}$ per diode	6	A
V_{RRM}	300	V
Q_{RR} (Typ at 125 °C)	27	nC
I_{RRM} (Typ at 125 °C)	1.87	A
Softness t_b/t_a (Typ at 125 °C)	0.7	

Pin Assignment

TO-220AB **LQA12T300C**

TO-263AB **LQA12B300C**



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 300 V Silicon diode. Its recovery characteristics increase efficiency, reduce EMI and eliminate snubbers.

Applications

- AC/DC and DC/DC output rectification
  - Output & freewheeling diodes
- Motor drive circuits
- DC-AC 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	Per Diode, T_J = 150 °C, T_C = 117°C	6	A
		Per Device, T_J = 150 °C, T_C = 117°C	12	A
I_{FSM}	Non-repetitive peak surge current	Per Diode, 60 Hz, ½ cycle	37	A
I_{FSM}	Non-repetitive peak surge current	Per Diode, ½ cycle of t = 28 µs Sinusoid, T_C = 25 °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 °C	33.8	W

Thermal Resistance

Symbol	Resistance from:	Conditions	Rating	Units
$R_{\theta JA}$	Junction to ambient	TO-220AB (only)	62	°C/W
$R_{\theta JC}$	Junction to case	Per Diode	3.7	°C/W
		Per Device	1.9	°C/W

Electrical Specifications at T_J= 25 °C (unless otherwise specified)

Symbol	Parameter	Conditions		Min	Typ	Max	Units
DC Characteristics per diode							
I_R	Reverse current per diode	V_R = 300 V, T_J = 25 °C		-	-	25	µA
		V_R = 300 V, T_J = 125 °C		-	0.24	-	mA
V_F	Forward voltage per diode	I_F = 6 A, T_J = 25 °C		-	1.6	1.9	V
		I_F = 6 A, T_J = 150 °C		-	1.34	-	V
C_J	Junction capacitance per diode	V_R = 10 V, 1 MHz		-	19	-	pF
Dynamic Characteristics per diode							
t_{RR}	Reverse recovery time, per diode	dI_F/dt =200 A/µs V_R=200, I_F=6 A	T_J=25 °C	-	11.5	-	ns
			T_J=125 °C	-	21	-	ns
Q_{RR}	Reverse recovery charge, per diode	dI_F/dt =200 A/µs V_R=200, I_F=6 A	T_J=25 °C	-	8.5	13	nC
			T_J =125 °C	-	27	-	nC
I_{RRM}	Maximum reverse recovery current, per diode	dI_F/dt =200 A/µs V_R=200, I_F=6 A	T_J =25 °C	-	1.15	1.6	A
			T_J=125 °C	-	1.87	-	A
S	Softness per diode= $\frac{t_b}{t_a}$	dI_F/dt =200 A/µs V_R=200, I_F=6 A	T_J =25 °C	-	0.7	-	
			T_J=125 °C	-	0.7	-	

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.)

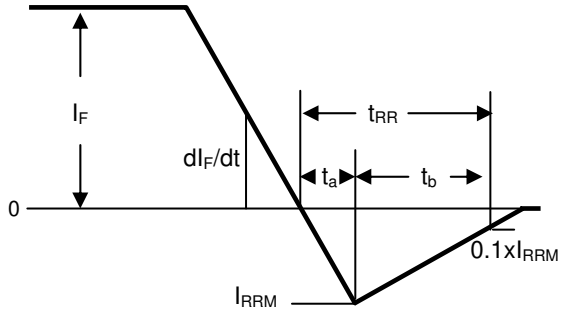


Figure 1. Reverse Recovery Definitions

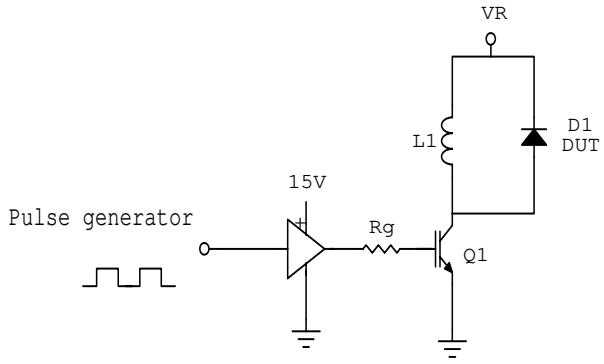


Figure 2. Reverse Recovery Test Circuit

Electrical Specifications at T_J= 25 °C (unless otherwise specified)

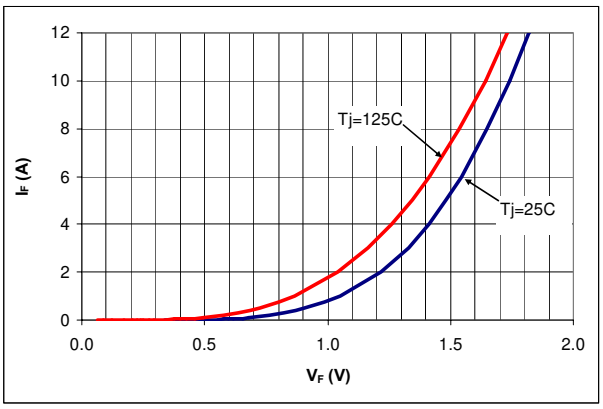


Figure 3. Typical I_F vs V_F

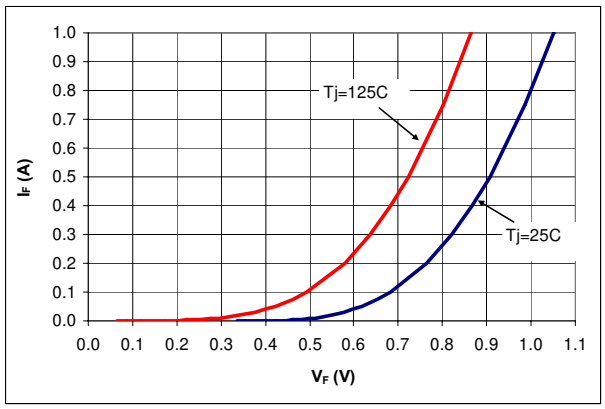


Figure 4. Typical I_F vs V_F

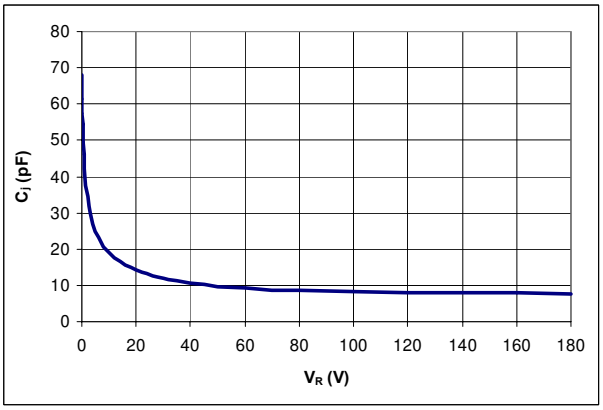


Figure 5. Typical Typical C_j vs V_R

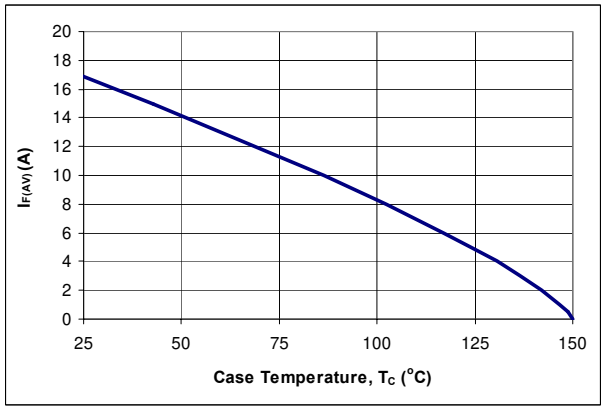


Figure 6. Typical DC Current Derating Curve

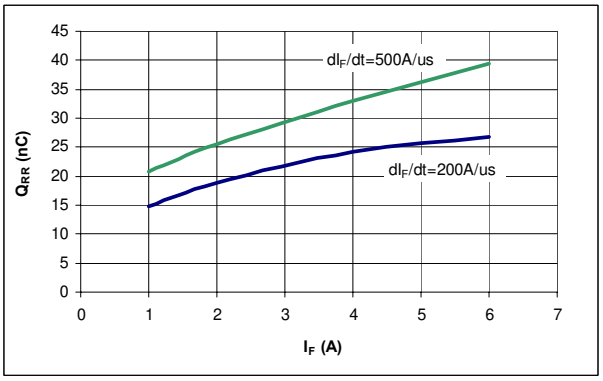


Figure 7. Typical Q_{RR} vs I_F at T_j=125 °C

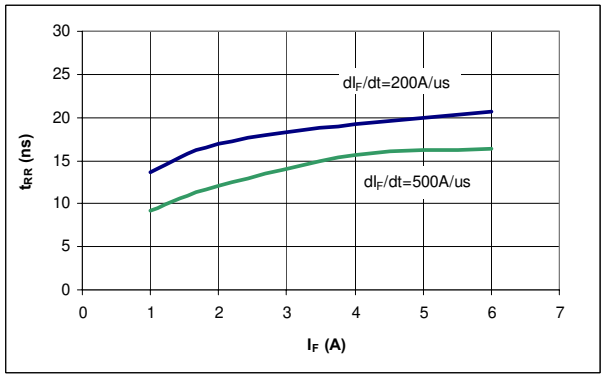


Figure 8. t_{RR} vs I_F at T_j=125 °C

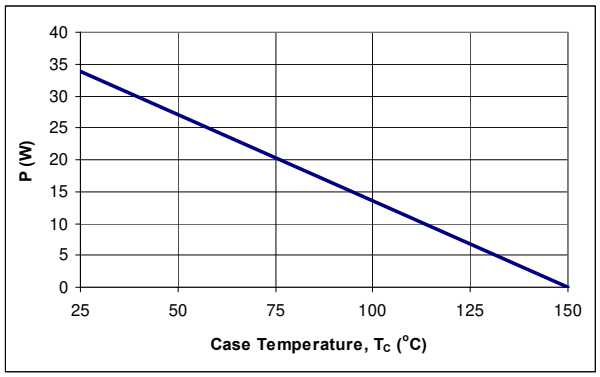


Figure 9. Power Derating Curve

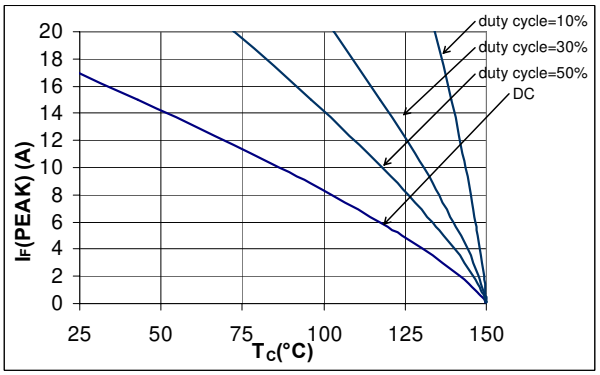


Figure 10. IF(Peak) vs TC, f=70 kHz

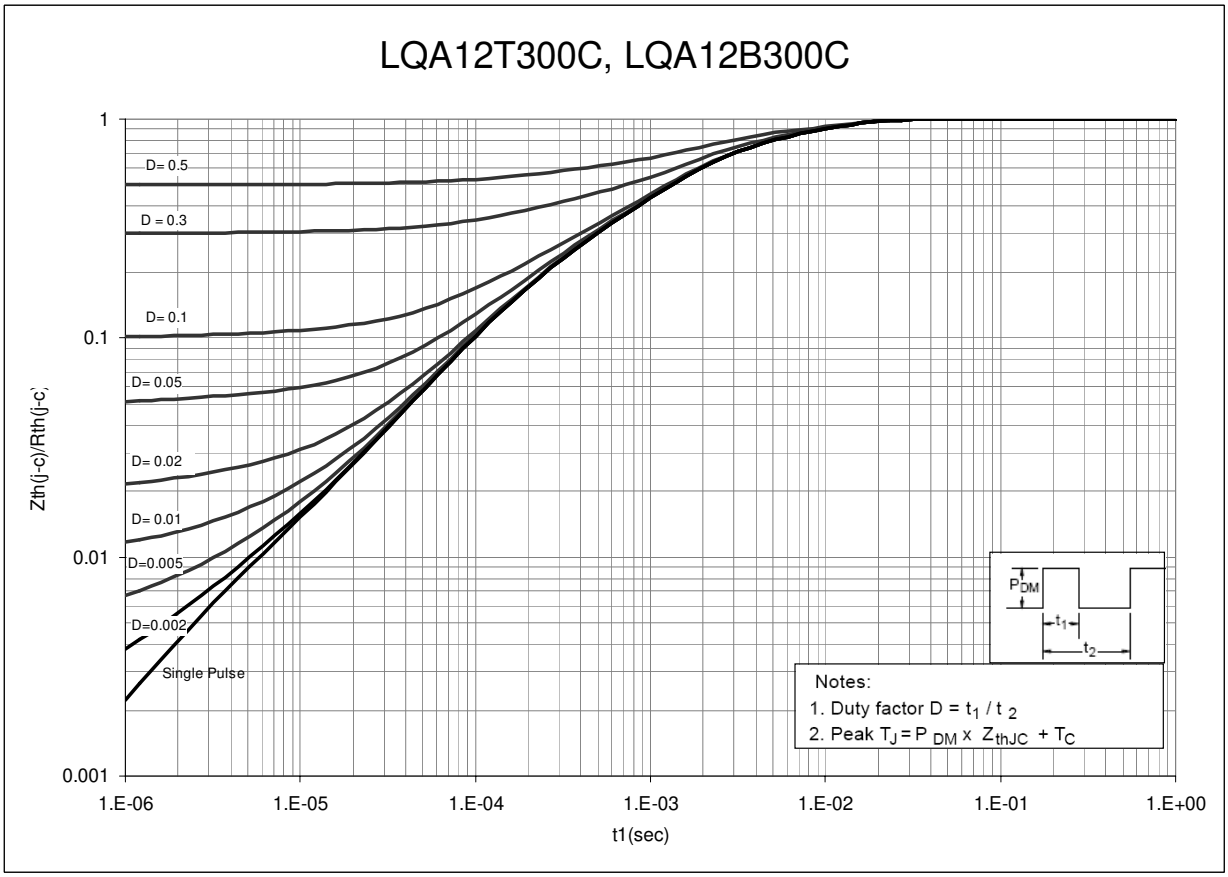
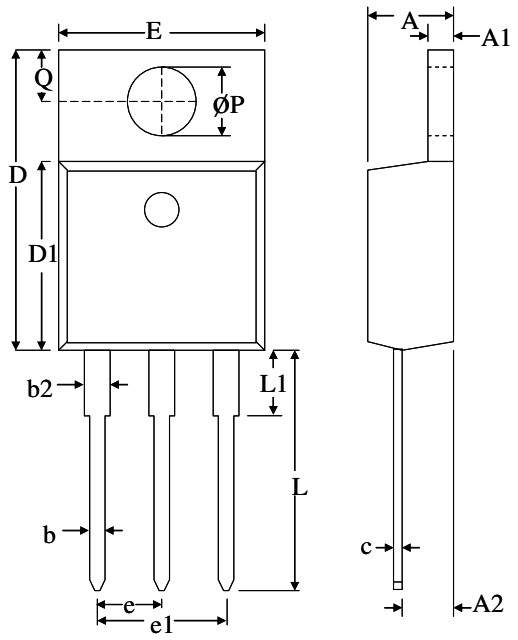


Figure 11. Normalized Maximum Transient Thermal Impedance

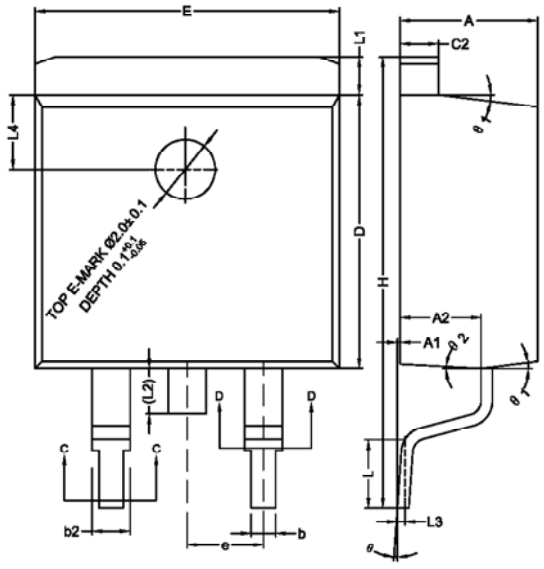
Dimensional Outline Drawings

TO-220AB



	Millimeters	
Dim	**MIN**	**MAX**
A	4.32	4.70
A1	1.11	1.38
A2	2.59	2.79
b	0.77	1.00
b2	1.23	1.36
C	0.34	0.47
D	14.71	15.75
D1	9.05	9.25
E	9.96	10.36
e	2.44	2.64
e1	4.98	5.18
L	12.70	14.22
L1	–	3.90
ØP	3.71	3.96
Q	2.54	2.90

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



	Millimeters	
A	4.40	4.70
A1	0.00	0.25
A2	2.59	2.79
b	0.77	0.90
b2	1.23	1.36
c2	1.22	1.32
D	9.05	9.25
E	10.06	10.26
e	2.54 BSC	2.54 BSC
H	14.70	15.50
L	2.00	2.60
L1	1.17	1.40
L2	–	1.75
L3	0.25 BSC	0.25 BSC
L4	2.00 BSC	2.00 BSC
Θ	0°	8°
Θ1	5°	9°
Θ2	1°	5°

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
LQA12T300C	TO-220AB	50 units/tube
LQA12B300C	TO-263AB	800 units/reel

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

Revision	Notes	Date
1.1	Released by Qspeed	10/10
1.2	Converted to Power Integrations Document	01/11

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