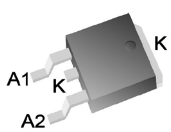
LQ20N200CQ
Qspeed™ Automotive Family

200 V, 20 A Common-Cathode Diode for Audio Automotive Applications

Product Summary

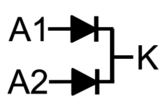
$I_{F(AVG)}$ per diode	10	A
V_{RRM}	200	V
Q_{RR} (Typ at 125 °C)	48.4	nC
I_{RRM} (Typ at 125 °C)	3.29	A
Softness t_b/t_a (Typ at 125 °C)	0.34	

Pin Assignment



TO-252 DPAK

LQ20N200CQ



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

Applications

- Automotive
  - AEC-Q101 qualified
  - Fab, assembly and test certified to IATF 16949
  - ESD HBM classification H0

Features

- Low Q_{RR}, Low I_{RRM}, Low t_{RR}
- Soft recovery

Benefits

- Increases efficiency
  - Eliminates need for snubber circuits
  - Reduces EMI filter component size and 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	T_J = 25 °C	200	V
$I_{F(AVG)}$	Average forward current	Per Diode, T_J = 150 °C, T_C = 124 °C	10	A
		Per Device, T_J = 150 °C, T_C = 124 °C	20	A
I_{FSM}	Non-repetitive peak surge current	Per Diode, 60 Hz, ½ cycle	100	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	Operating junction temperature range		–40 to 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	41.7	W

Thermal Resistance

Symbol	Resistance from:	Conditions	Rating	Units
$R_{\theta JC}$	Junction to case	Per Diode	3.0	°C/W
		Per Device	1.5	°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 = 200 V, T_J = 25 °C		-	-	500	µA
		V_R = 200 V, T_J = 125 °C		-	0.35	-	mA
V_F	Forward voltage per diode	I_F = 10 A, T_J = 25 °C		-	0.98	1.15	V
		I_F = 10 A, T_J = 150 °C		-	0.85	-	V
C_J	Junction capacitance per diode	V_R = 10 V, 1 MHz		-	38	-	pF
Dynamic Characteristics per diode							
t_{RR}	Reverse recovery time, per diode	dI_F/dt = 200 A/µs V_R = 130 V, I_F = 10 A	T_J = 25 °C	-	16	-	ns
			T_J = 125 °C	-	23.5	-	ns
Q_{RR}	Reverse recovery charge, per diode	dI_F/dt = 200 A/µs V_R = 130 V, I_F = 10 A	T_J = 25 °C	-	20	32	nC
			T_J = 125 °C	-	48.4	-	nC
I_{RRM}	Maximum reverse recovery current, per diode	dI_F/dt = 200 A/µs V_R = 130 V, I_F = 10 A	T_J = 25 °C	-	2.1	3.05	A
			T_J = 125 °C	-	3.29	-	A
S	Softness per diode = $\frac{t_b}{t_a}$	dI_F/dt = 200 A/µs V_R = 130 V, I_F = 10 A	T_J = 25 °C	-	0.41	-	
			T_J = 125 °C	-	0.34	-	

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.)

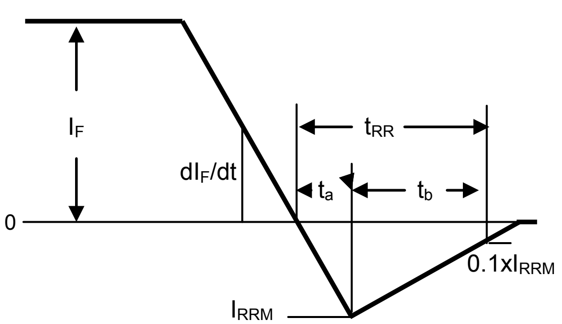


Figure 1. Reverse Recovery Definitions

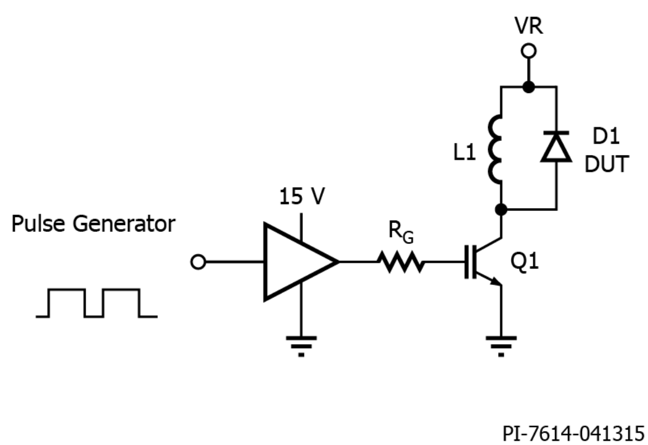


Figure 2. Reverse Recovery Test Circuit

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

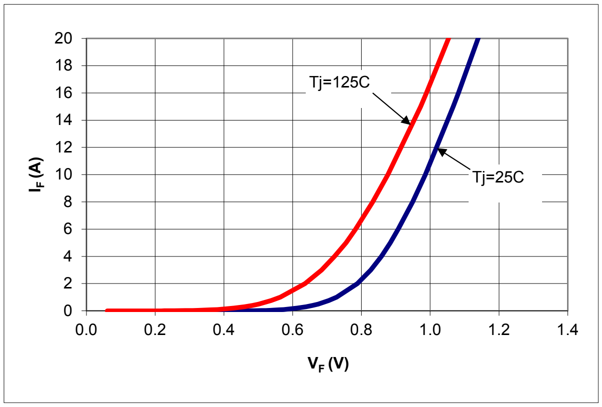


Figure 3. Typical I_F vs. V_F

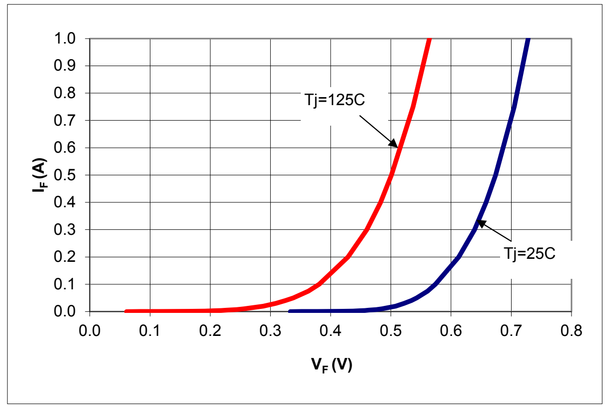


Figure 4. Typical I_F vs. V_F

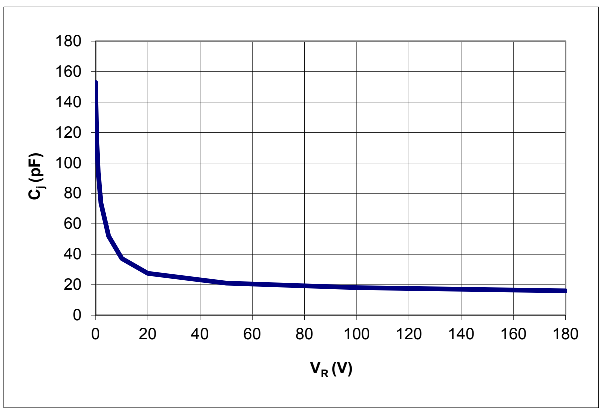


Figure 5. Typical C_J vs. V_R

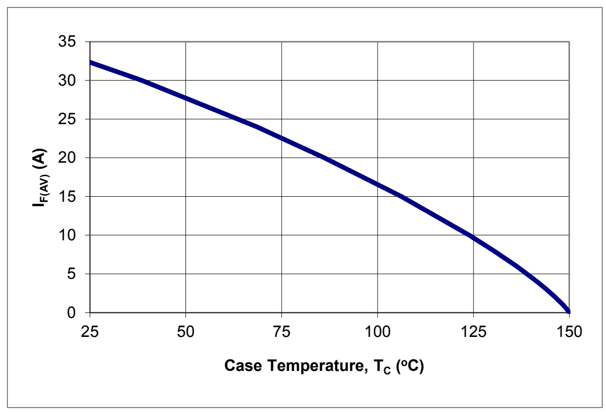


Figure 6. DC Current Derating Curve

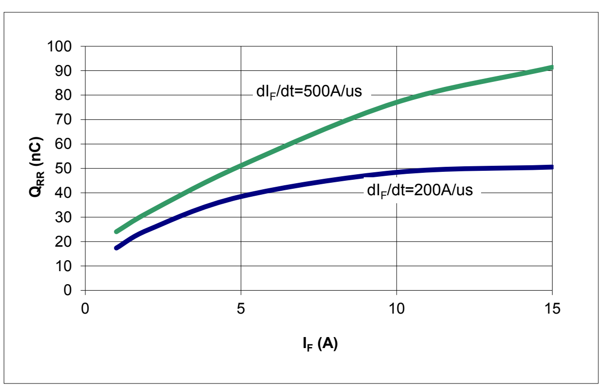


Figure 7. Typical Q_{RR} vs. I_F at T_J =125 °C

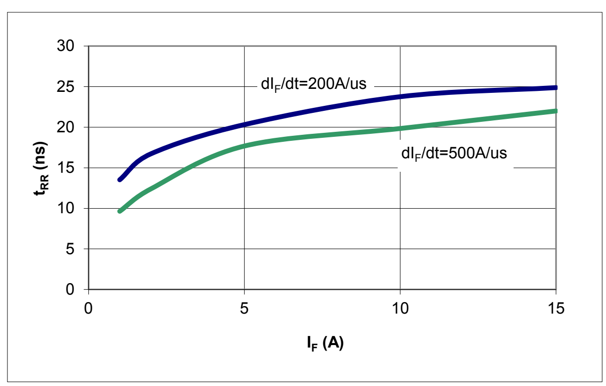


Figure 8. Typical t_{RR} vs. I_F at T_J =125 °C

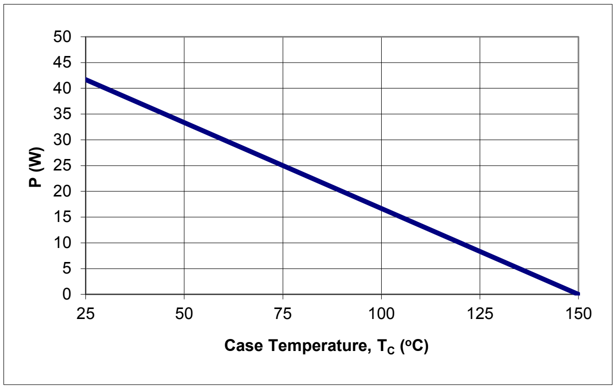


Figure 9. Power Derating Curve

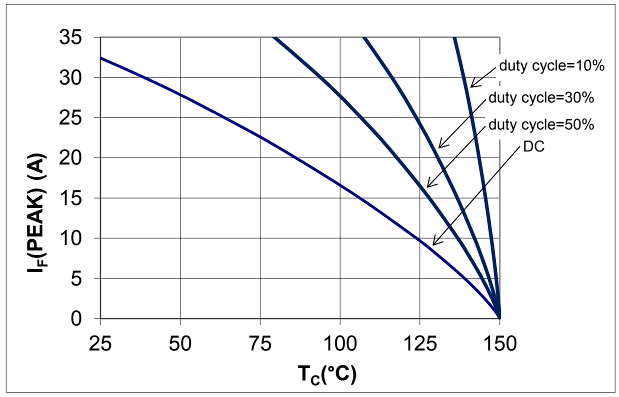


Figure 10. I_F (Peak) vs. TC, f = 70 kHz

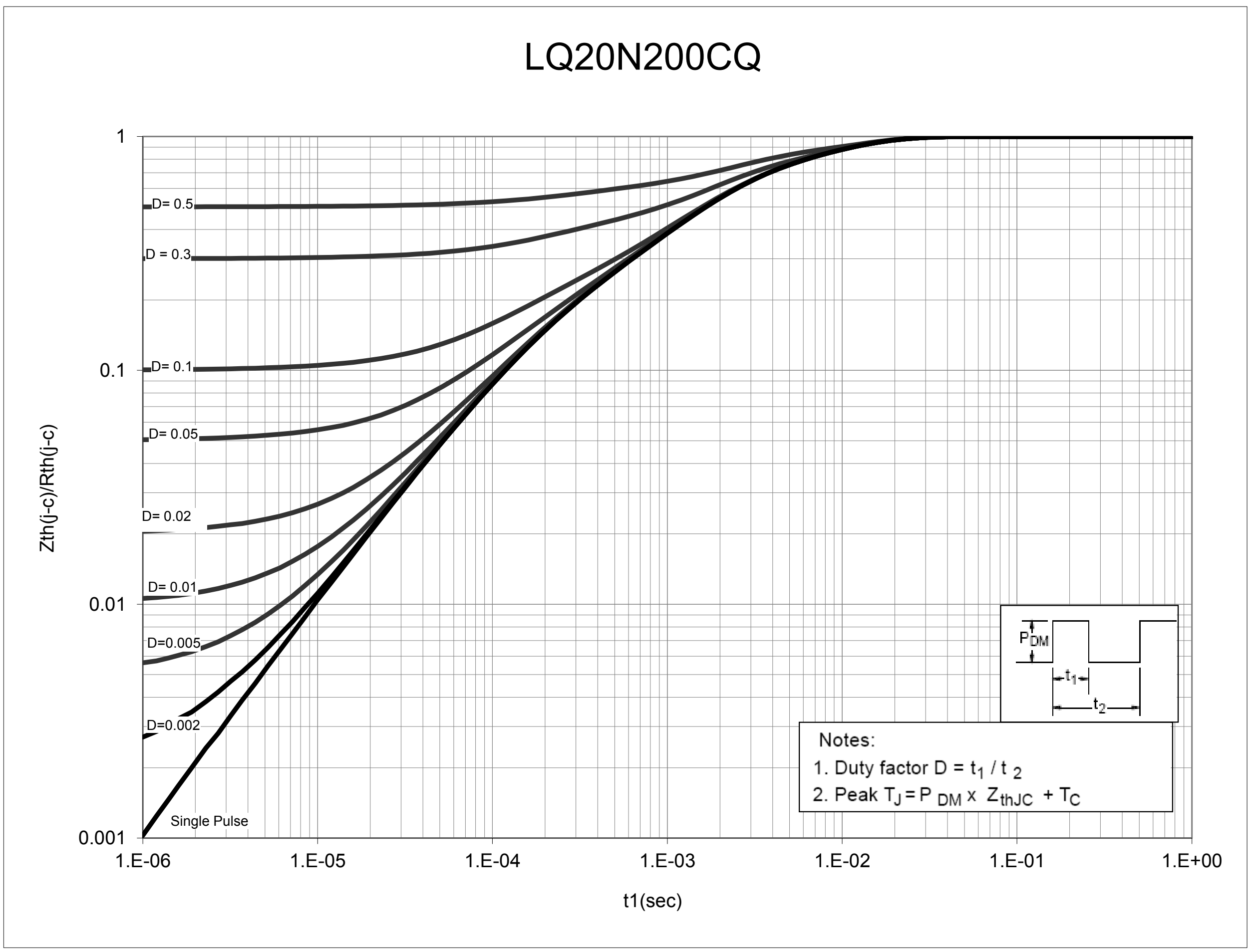
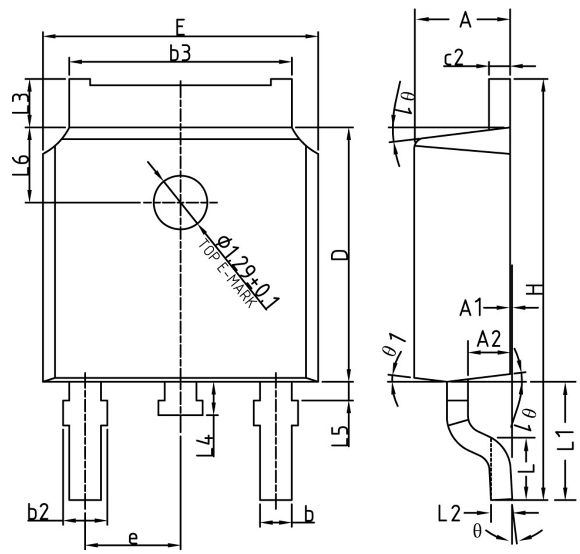


Figure 11. Normalized Maximum Transient Thermal Impedance

Dimensional Outline Drawings

TO-252 DPAK



	Millimeters	
Dim	**MIN**	**MAX**
A	2.20	2.38
A1	0	0.10
A2	0.90	1.10
b	0.72	0.85
b2	0.72	0.90
b3	5.13	5.46
c2	0.47	0.60
D	6.00	6.20
E	6.50	6.70
e	2.186	2.386
H	9.80	10.40
L	1.40	1.70
L1	2.90 REF	
L2	0.51 BSC	
L3	0.90	1.25
L4	0.60	1.00
L5	0.15	0.75
L6	1.80 REF	
Θ	0°	8°
Θ1	5°	9°

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
LQ20N200CQ	TO-252 DPAK	2500 units/reel

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

Revision	Notes	Date
1.1	Code A release.	03/19

For the latest updates, visit our website: www.power.com

Patent Information

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