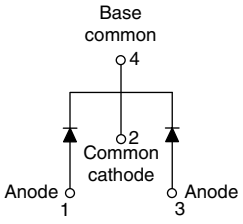
Schottky Rectifier

SOT-223



FEATURES

- Small foot print, surface mountable
- Low profile
- Very low forward voltage drop
- High frequency operation
- Guard ring for enhanced ruggedness and long term reliability
- Common cathode
- Designed and qualified for industrial level

DESCRIPTION

The 20CJQ030 surface mount Schottky rectifier series has been designed for applications requiring very low forward drop and very small foot prints. Typical applications are in portables, switching power supplies, converters, automotive system, freewheeling diodes, battery charging, and reverse battery protection.

PRODUCT SUMMARY	
$I_{F(AV)}$	2 A
V_R	30 V

MAJOR RATINGS AND CHARACTERISTICS			
SYMBOL	CHARACTERISTICS	VALUES	UNITS
$I_{F(AV)}$	Rectangular waveform (per leg)	2.0	A
V_{RRM}		30	V
I_{FSM}	at t_p = 5 µs sine	400	A
V_F	at 1 Apk, T_J = 125 °C (per leg)	0.42	V
T_J	Range	- 55 to 150	°C

VOLTAGE RATINGS			
PARAMETER	SYMBOL	20CJQ030	UNITS
DC reverse voltage	V_R	30	V
Working peak reverse voltage	V_{RWM}		

ABSOLUTE MAXIMUM RATINGS					
PARAMETER		SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum average forward current See fig. 5	per leg	$I_{F(AV)}$	50 % duty cycle at T_C = 132 °C, rectangular waveform	2	A
	per device		50 % duty cycle at T_C = 117 °C, rectangular waveform	4	
Maximum peak one cycle non-repetitive surge current per leg See fig. 7		I_{FSM}	5 µs sine or 3 µs rect. pulse; Following any rated load condition and with rated V_{RRM} applied	400	
			10 ms sine or 6 ms rect. pulse; Following any rated load condition and with rated V_{RRM} applied	24	
Non-repetitive avalanche energy per leg		E_{AS}	T_J = 25 °C, I_{AS} = 1 A, L = 4 mH	2	mJ
Repetitive avalanche current per leg		I_{AR}	Current decaying linearly to zero in 1 µs Frequency limited by T_J maximum V_A = 1.5 x V_R typical	1	A

ELECTRICAL SPECIFICATIONS

PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum forward voltage drop per leg See fig. 1	V_{FM} (1)	at 1 A	T_J = 25 °C	0.50	V
		at 2 A		0.59	
		at 1 A	T_J = 125 °C	0.42	
		at 2 A		0.52	
Maximum reverse leakage current per leg See fig. 2	I_{RM} (1)	T_J = 25 °C	V_R = Rated V_R	0.1	mA
		T_J = 125 °C		15	
Typical junction capacitance per leg	C_T	V_R = 5 V_{DC} (test signal range 100 kHz to 1 MHz) 25 °C		120	pF
Typical series inductance per leg	L_S	Measured lead to lead 5 mm from package body		6	nH
Maximum voltage rate of change	dv/dt	Rated V_R		4600	V/µs

Note

(1) Pulse width < 300 µs, duty cycle < 2 %

THERMAL - MECHANICAL SPECIFICATIONS

PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum junction temperature range	T_J (1)		- 55 to 150	°C
Maximum storage temperature range	T_{Stg}			
Maximum thermal resistance, junction to ambient	R_{thJA}	DC operation	65	°C/W
Maximum thermal resistance, junction to lead	R_{thJL}		25	
Approximate weight			0.13	g
			0.0045	oz.
Case style			SOT-223	
Device Marking			2CJQE	

Note

(1) $\frac{dP_{tot}}{dT_J} < \frac{1}{R_{thJA}}$ thermal runaway condition for a diode on its own heatsink

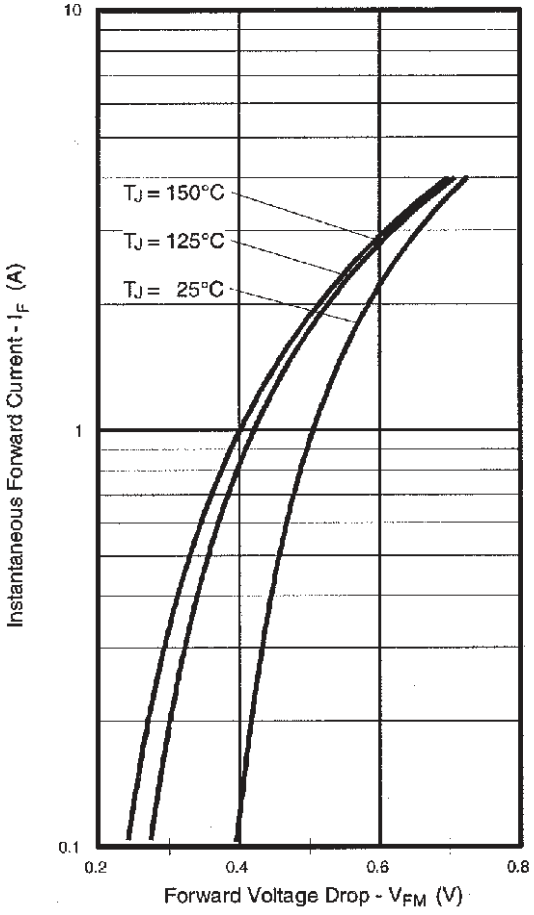


Fig. 1 - Maximum Forward Voltage Drop Characteristics (Per Leg)

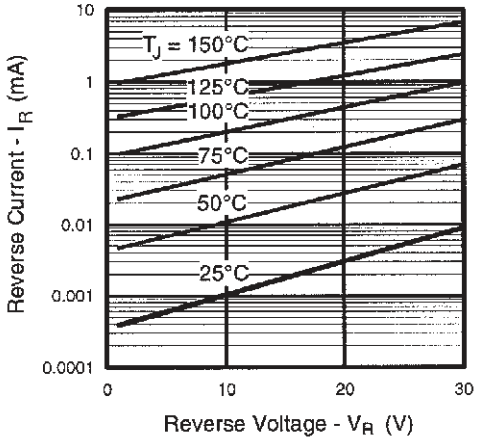


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage (Per Leg)

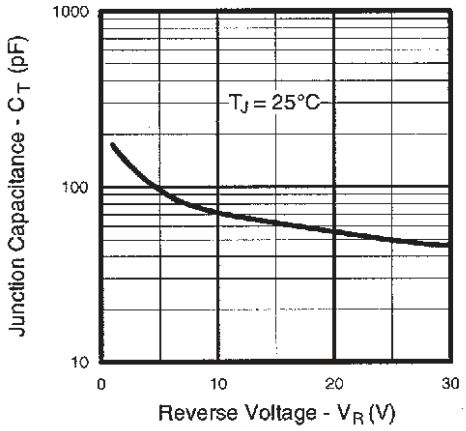


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Leg)

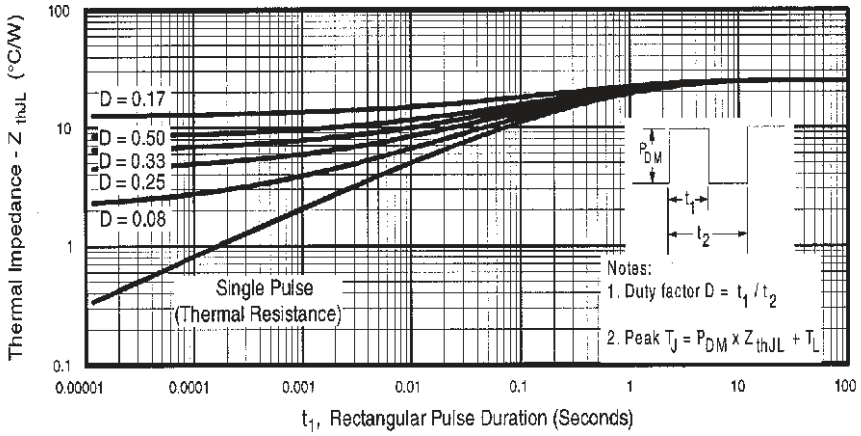


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics (Per Leg)

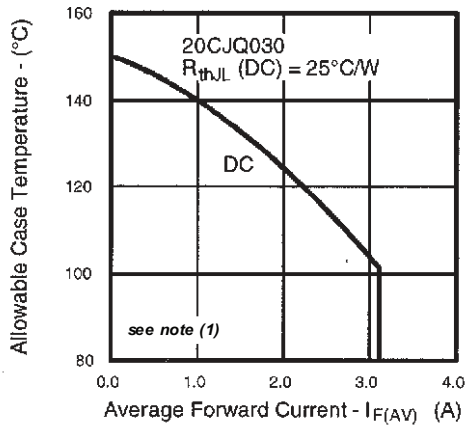


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current (Per Leg)

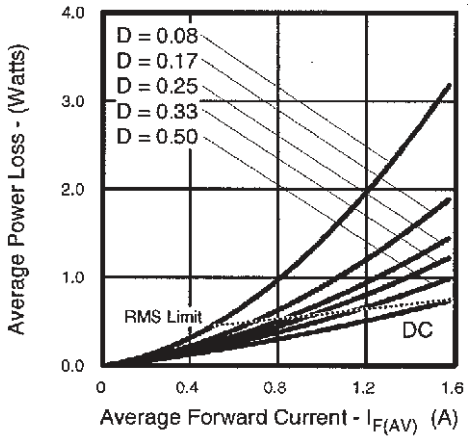


Fig. 6 - Forward Power Loss Characteristics (Per Leg)

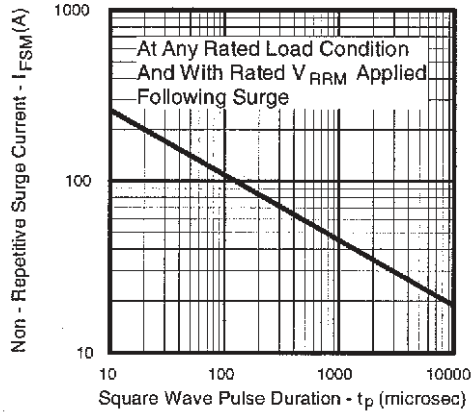


Fig. 7 - Maximum Non-Repetitive Surge Current (Per Leg)

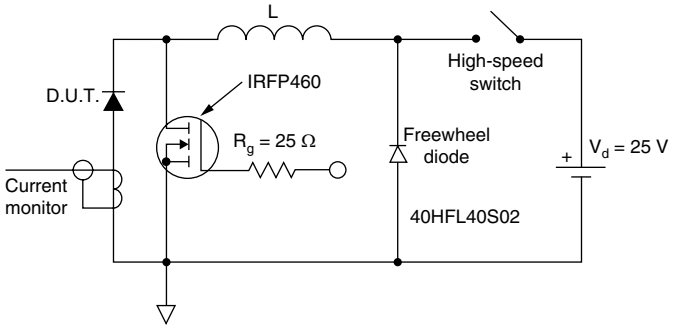
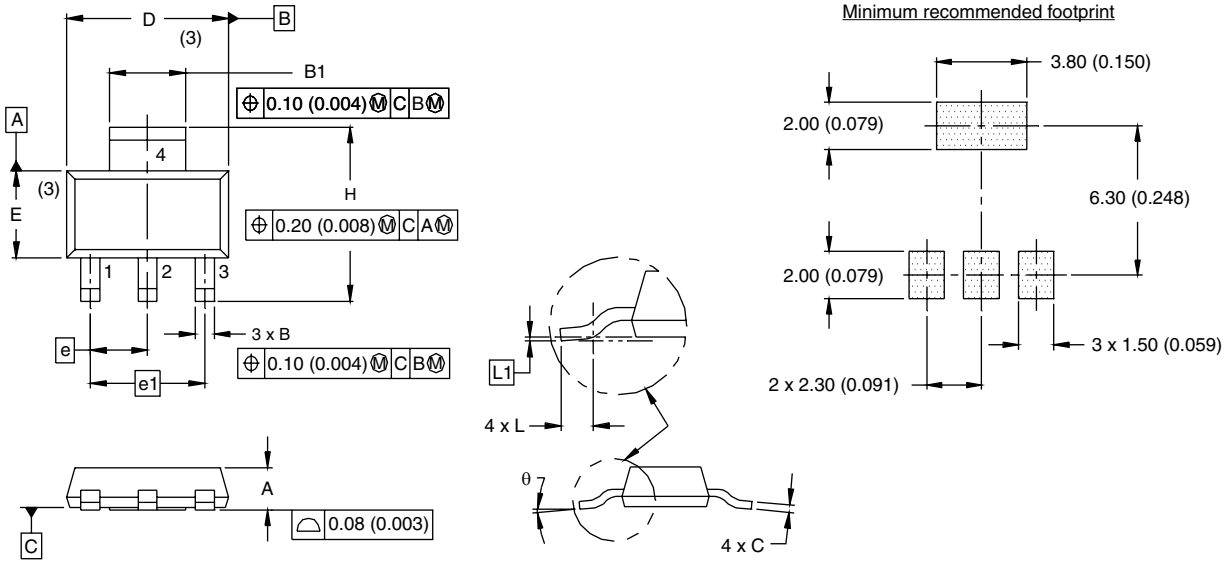


Fig. 8 - Unclamped Inductive Test Circuit

Note

(1) Formula used: $T_C = T_J - (Pd + Pd_{REV}) \times R_{thJC}$;
Pd = Forward power loss = $I_{F(AV)} \times V_{FM}$ at ($I_{F(AV)}$/D) (see fig. 6);
Pd_{REV} = Inverse power loss = $V_{R1} \times I_R$ (1 - D); I_R at V_{R1} = 80 % rated V_R

DIMENSIONS in millimeters (inches)



SYMBOL	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	1.55	1.80	0.061	0.071
B	0.65	0.85	0.026	0.033
B1	2.95	3.15	0.116	0.124
C	0.25	0.35	0.010	0.014
D	6.30	6.70	0.248	0.264
E	3.30	3.70	0.130	0.146
e	2.30 BSC		0.0905 BSC	
e1	4.60 BSC		0.181 BSC	
H	6.71	7.29	0.264	0.287
L	0.91	-	0.036	-
L1	0.061 BSC		0.0024 BSC	
θ	-	10°	-	10°

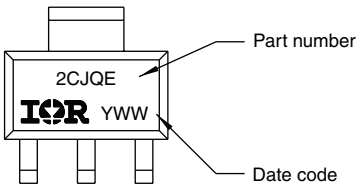
Notes

1. Dimensioning and tolerancing per ASME Y14.5M - 1994
2. Controlling dimension: inch

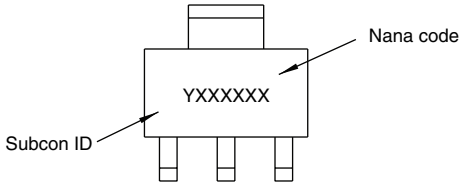
(3) Dimensions do not include mold flash

4. Outline conforms to JEDEC outline TO-261AA

PART MARKING INFORMATION

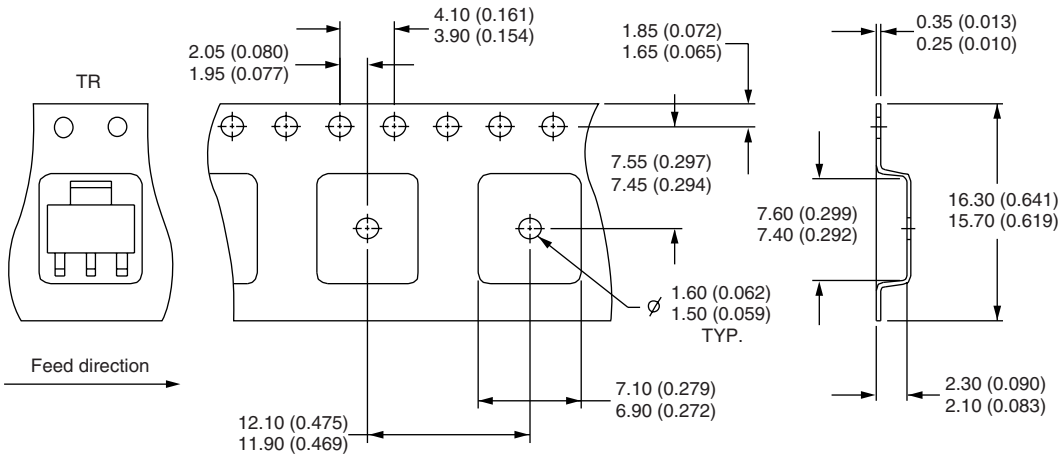


Top marking

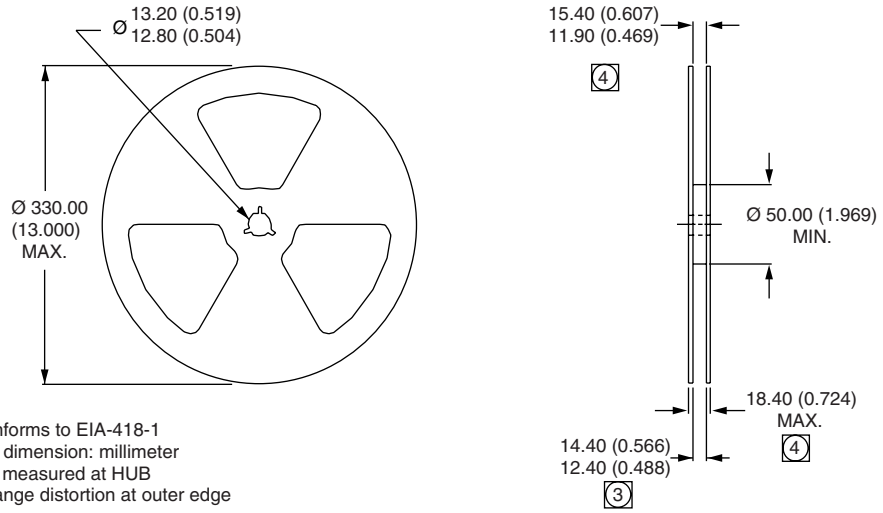


Bottom marking

TAPE AND REEL INFORMATION in millimeters (inches)



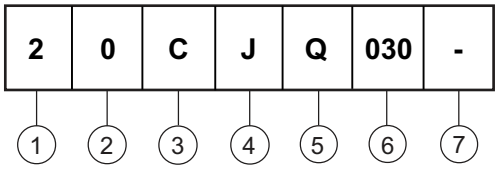
Notes:
1. Controlling dimension: millimeter
2. Outline conforms to EIA-481 and EIA-541
3. Each Ø 330.00 (13.00) reel contains 2500 devices



Notes:
1. Outline conforms to EIA-418-1
2. Controlling dimension: millimeter
3. Dimension measured at HUB
4. Includes flange distortion at outer edge

ORDERING INFORMATION TABLE

Device code



1 - Current rating (2 = 2 A)

2 - Schottky rectifier series

3 - Circuit configuration
C = Common cathode

4 - Package
J = SOT-223

5 - Schottky “Q” series

6 - Voltage rating (030 = 30 V)

7 - • None = Standard production
• PbF = Lead (Pb)-free

Notice

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