

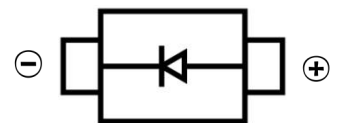
SCHOTTKY BARRIER DIODE

FEATURES

- Small foot print, surface mountable
- Low forward voltage drop
- High frequency operation
- Guard ring for enhanced ruggedness and long term reliability



SMB



Applications:

- Disk Drives
- Switching power supply
- Redundant power subsystems
- Converters
- Free-Wheeling diodes
- Reverse battery protection
- Battery Charging

MECHANICAL DATA

- Case: SMB(DO-214AA)
- Case Material: Molded Plastic. UL flammability
- Classification Rating: 94V-0
- Weight: 0.088 grams (approximate)

Major Ratings and Characteristics

Characteristics	10BQ040	Units
$I_{F(AV)}$ Rectangular waveform	1.0	A
V_{RRM}	40	V
I_{FSM} @ $t_p = 5 \mu s$ sine	430	A
V_F @ 1.0 Apk, $T_J = 125^\circ C$	0.49	V
T_J range	-55 to 150	$^\circ C$

Voltage Ratings

Part number	10BQ040
V_R Max. DC Reverse Voltage (V)	40
V_{RWM} Max. Working Peak Reverse Voltage (V)	

Absolute Maximum Ratings

Parameters	10BQ	Units	Conditions
$I_{F(AV)}$ Max. Average Forward Current	1.0	A	50% duty cycle @ $T_L = 112^\circ C$, rectangular wave form
I_{FSM} Max. Peak One Cycle Non-Repetitive Surge Current	430	A	5 μs Sine or 3 μs Rect. pulse
	45		10ms Sine or 6ms Rect. pulse
E_{AS} Non- Repetitive Avalanche Energy	3.0	mJ	$T_J = 25^\circ C$, $I_{AS} = 1A$, $L = 6mH$
I_{AR} Repetitive Avalanche Current	1.0	A	Current decaying linearly to zero in 1 μs ec Frequency limited by T_J max. $V_a = 1.5 \times V_r$ typical

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Electrical Specifications

Parameters			10BQ	Units	Conditions	
V _{FM}	Max. Forward Voltage Drop (1) * See Fig. 1		0.53	V	@ 1A	T _J = 25 °C
			0.70	V	@ 2A	
			0.49	V	@ 1A	T _J = 125 °C
			0.64	V	@ 2A	
I _{RM}	Max. Reverse Leakage Current (1) * See Fig. 2		0.1	mA	T _J = 25 °C	V _R = rated V _R
			4	mA	T _J = 125 °C	
C _T	Typical Junction Capacitance		80	pF	V _R = 5V _{DC} , (test signal range 100kHz to 1MHz) 25°C	
L _S	Typical Series Inductance		2.0	nH	Measured lead to lead 5mm from package body	
dv/dt	Max. Volatge Rate of Charge (Rated V _R)		10000	V/ μs		

(1) Pulse Width < 300μs, Duty Cycle < 2%

Thermal-Mechanical Specifications

Parameters	10BQ	Units	Conditions
T _J Max. Junction Temperature Range (*)	-55 to 150	°C	
T _{stg} Max. Storage Temperature Range	-55 to 150	°C	
R _{thJL} Max. Thermal Resistance Junction to Lead (**)	36	°C/W	DC operation
R _{thJA} Max. Thermal Resistance Junction to Ambient	80	°C/W	
wt Approximate Weight	0.10(0.003)	g(oz.)	
Case Style	SMB		Similar DO-214AA
Device Marking	IR1F		

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

(**) Mounted 1 inch square PCB

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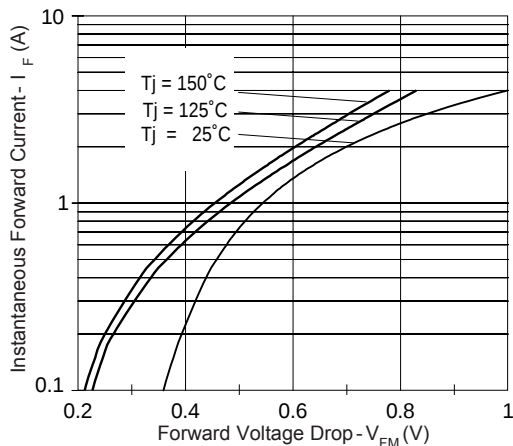


Fig. 1 - Maximum Forward Voltage Drop Characteristics

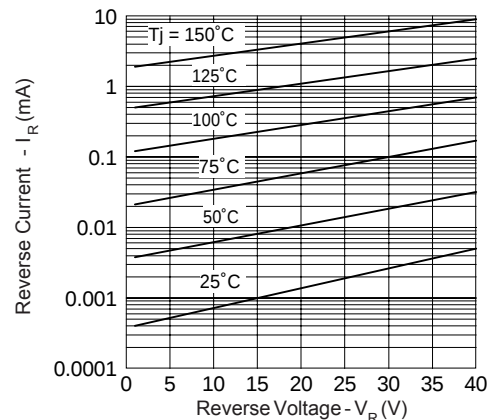


Fig. 2 - Typical Peak Reverse Current Vs. Reverse Voltage

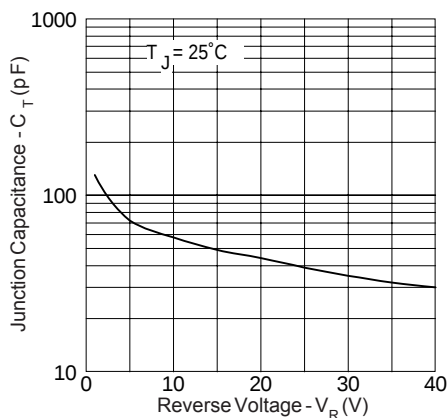


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage

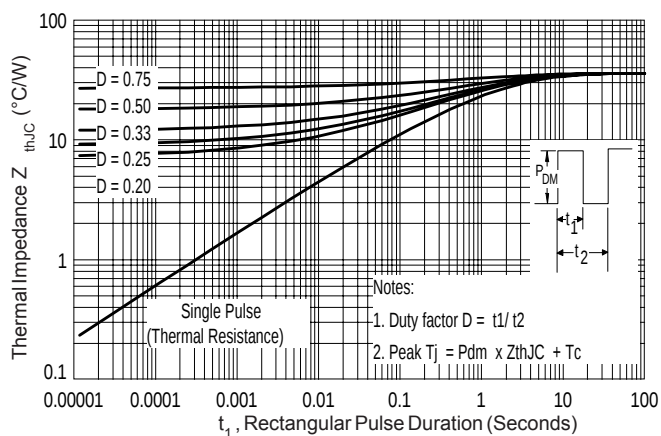


Fig. 4 - Max. Thermal Impedance Z_{thJC} Characteristics (Per Leg)

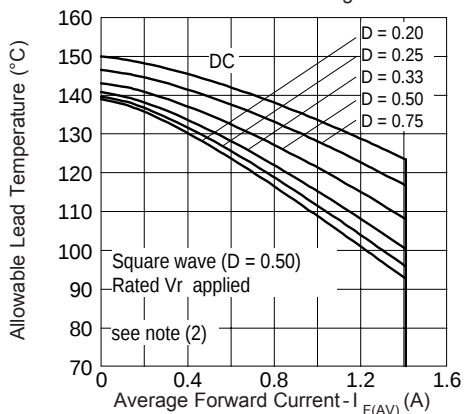


Fig. 5 - Maximum Average Forward Current Vs. Allowable Lead Temperature

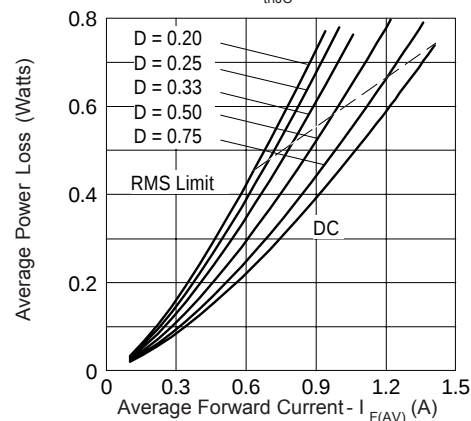


Fig. 6 - Maximum Average Forward Dissipation Vs. Average Forward Current

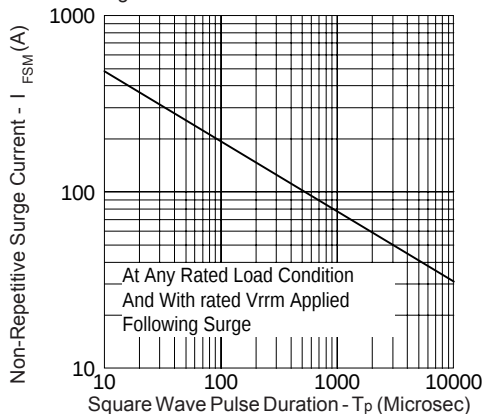


Fig. 7 - Maximum Peak Surge Forward Current Vs. Pulse Duration

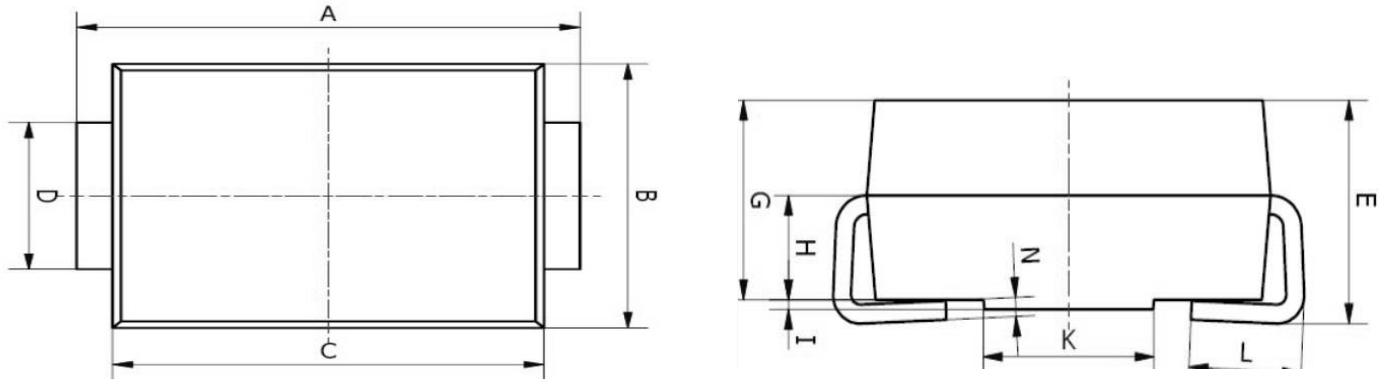
(2) Formula used: $T_c = T_J - (P_d + P_{d_{REV}}) \times R_{thJC}$;

P_d = Forward Power Loss = $I_{F(AV)} \times V_{FM} @ (I_{F(AV)} / D)$ (see Fig. 6);

$P_{d_{REV}}$ = Inverse Power Loss = $V_{R1} \times I_R (1 - D)$; $I_R @ V_{R1} = 80\%$ rated V_R

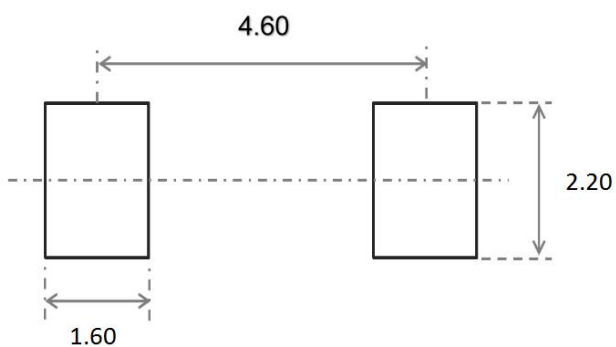
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SMB Package Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	5.00	5.45	0.197	0.215
B	3.20	4.00	0.126	0.157
C	4.30	4.70	0.169	0.185
D	1.80	2.20	0.071	0.087
E	2.20	2.50	0.087	0.098
G	1.90	2.30	0.075	0.090
H	0.95	1.25	0.037	0.049
I	0.05	0.15	0.002	0.006
K	1.70	2.10	0.067	0.083
L	0.90	1.60	0.035	0.063
N	0.10	0.30	0.004	0.012

SMB Suggested Pad Layout



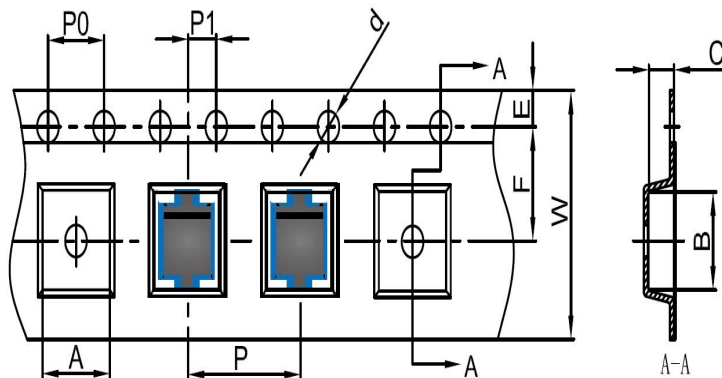
Note:

1. Controlling dimension: in millimeters
2. General tolerance: $\pm 0.05\text{mm}$
3. The pad layout is for reference purposes only

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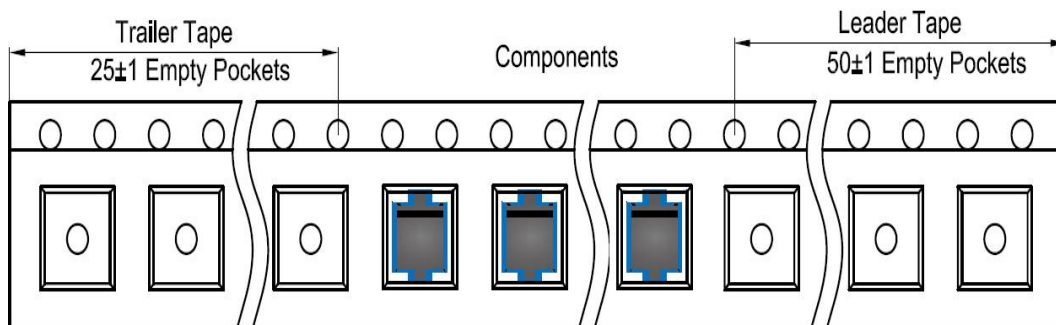
SMB Tape and Reel

SMB Embossed Carrier Tape

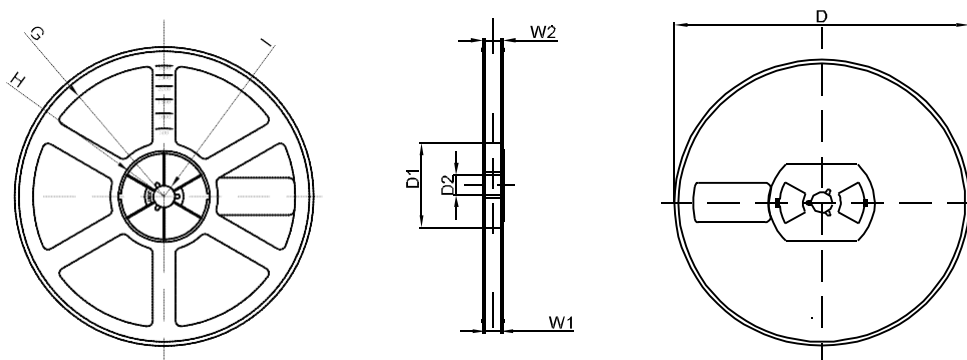


DIMENSIONS ARE IN MILLIMETER										
TYPE	A	B	C	d	E	F	P0	P	P1	W
SMB	4.10	5.50	2.58	Ø1.50	1.75	5.50	4.00	8.00	2.00	12.00
TOLERANCE	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1

SMB Tape Leader and Trailer



SMB Reel



DIMENSIONS ARE IN MILLIMETER								
REEL OPTION	D	D1	D2	G	H	I	W1	W2
13" DIA	Ø330	75.0	13.00	R165	R37.50	R6.50	12.40	17.60
TOLERANCE	±2	±1	±1	±1	±1	±1	±1	±1