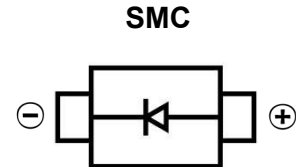


SCHOTTKY BARRIER DIODE
FEATURES

- Small foot print, surface mountable
- Very low forward voltage drop
- High frequency operation
- Guard ring for enhanced ruggedness and long term reliability
- Lead (Pb)-free ("PbF" suffix)
- Designed and qualified for industrial level


MECHANICAL DATA

- Case: SMC(DO-214AB)
- Case Material: Molded Plastic. UL flammability
- Classification Rating: 94V-0
- Weight: 0.21 grams (approximate)
- Marking: 30BQ040



| MAJOR RATINGS AND CHARACTERISTICS | | | |
|--|------------------------------|-------------|------------|
| SYMBOL | CHARACTERISTICS | VALUES | UNITS |
| $I_{F(AV)}$ | Rectangular waveform | 3.0 | A |
| V_{RRM} / V_R | | 40 | V |
| I_{FSM} | $t_p = 5 \mu s$ sine | 2000 | A |
| V_F | 3.0 Apk, $T_J = 125^\circ C$ | 0.43 | V |
| T_J | Range | - 55 to 150 | $^\circ C$ |

| VOLTAGE RATINGS | | | |
|--------------------------------------|-----------|---------|-------|
| PARAMETER | SYMBOL | 30BQ040 | UNITS |
| Maximum DC reverse voltage | V_R | 40 | V |
| Maximum working peak reverse voltage | V_{RWM} | | |

| ABSOLUTE MAXIMUM RATINGS | | | | | |
|---|-------------|---|---|--------|-------|
| PARAMETER | SYMBOL | TEST CONDITIONS | | VALUES | UNITS |
| Maximum average forward current | $I_{F(AV)}$ | 50 % duty cycle at $T_L = 118^\circ C$, rectangular waveform | | 3.0 | A |
| | | 50 % duty cycle at $T_L = 110^\circ C$, rectangular waveform | | 4.0 | |
| Maximum peak one cycle non-repetitive surge current | I_{FSM} | 5 μs sine or 3 μs rect. pulse | Following any rated load condition and with rated V_{RRM} applied | 2000 | |
| | | 10 ms sine or 6 ms rect. pulse | | 110 | |
| Non-repetitive avalanche energy | E_{AS} | $T_J = 25^\circ C$, $I_{AS} = 1.0$ A, $L = 12$ mH | | 6.0 | mJ |
| Repetitive avalanche current | I_{AR} | Current decaying linearly to zero in 1 μs Frequency limited by T_J maximum $V_A = 1.5 \times V_R$ typical | | 1.0 | A |

| ELECTRICAL SPECIFICATIONS | | | | | |
|----------------------------------|----------------|--|---------------------------|--------|------------|
| PARAMETER | SYMBOL | TEST CONDITIONS | | VALUES | UNITS |
| Maximum forward voltage drop | $V_{FM}^{(1)}$ | 3 A | $T_J = 25^\circ C$ | 0.53 | V |
| | | 6 A | | 0.68 | |
| | | 3 A | $T_J = 125^\circ C$ | 0.43 | |
| | | 6 A | | 0.57 | |
| Maximum reverse leakage current | $I_{RM}^{(1)}$ | $T_J = 25^\circ C$ | $V_R = \text{Rated } V_R$ | 0.5 | mA |
| | | $T_J = 125^\circ C$ | | 30 | |
| Maximum junction capacitance | C_T | $V_R = 5 V_{DC}$ (test signal range 100 kHz to 1 MHz) $25^\circ C$ | | 230 | pF |
| Typical series inductance | L_S | Measured lead to lead 5 mm from package body | | 3.0 | nH |
| Maximum voltage rate of change | dV/dt | Rated V_R | | 10 000 | V/ μs |

Note

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

SCHOTTKY BARRIER DIODE

| THERMAL - MECHANICAL SPECIFICATIONS | | | | |
|---|----------------------|--------------------------------------|-------------|-------|
| PARAMETER | SYMBOL | TEST CONDITIONS | VALUES | UNITS |
| Maximum junction and storage temperature range | $T_J^{(1)}, T_{Stg}$ | | - 55 to 150 | °C |
| Maximum thermal resistance, junction to lead | $R_{thJL}^{(2)}$ | DC operation | 12 | °C/W |
| Maximum thermal resistance, junction to ambient | R_{thJA} | | 46 | |
| Approximate weight | | | 0.24 | g |
| | | | 0.008 | oz. |
| Marking device | | Case style SMC (similar to DO-214AB) | V3F | |

Notes

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

(2) Mounted 1" square PCB

Typical Characteristics

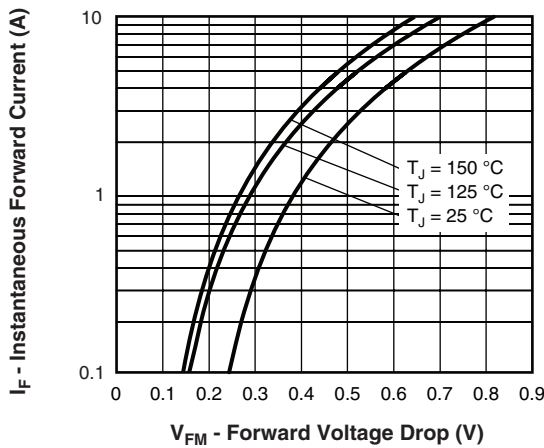


Fig. 1 - Maximum Forward Voltage Drop Characteristics (Per Leg)

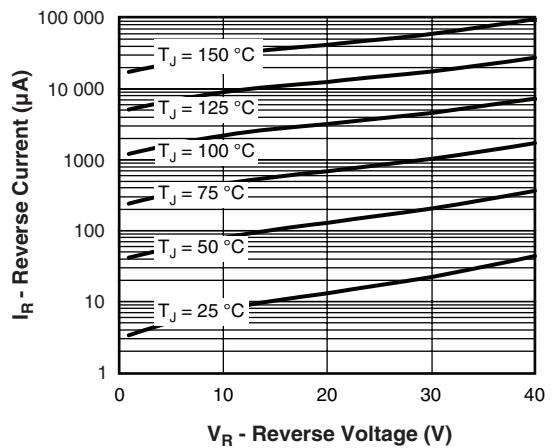


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage (Per Leg)

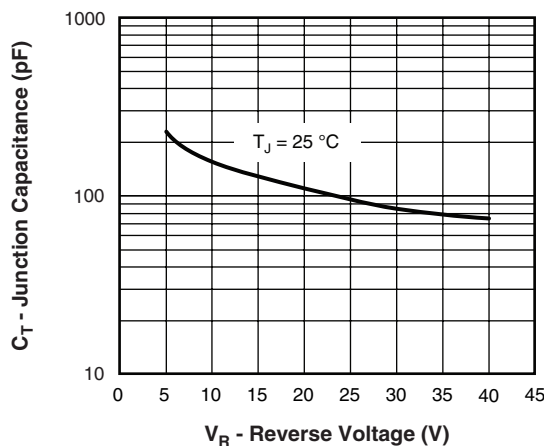


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Leg)

SCHOTTKY BARRIER DIODE

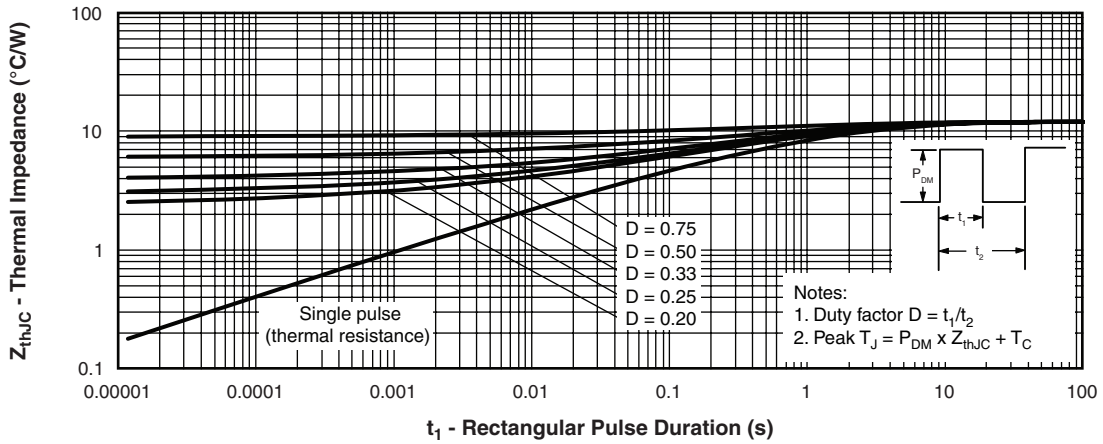


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics (Per Leg)

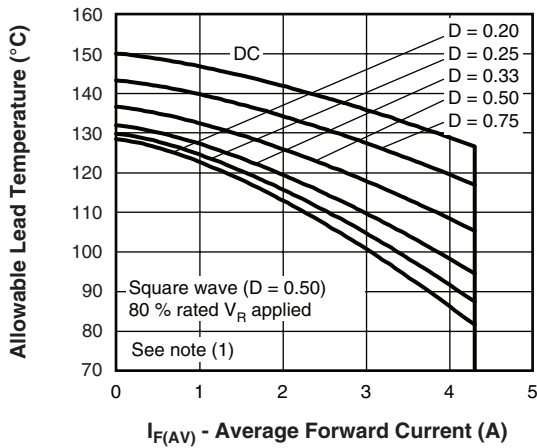


Fig. 5 - Maximum Average Forward Current vs. Allowable Lead Temperature

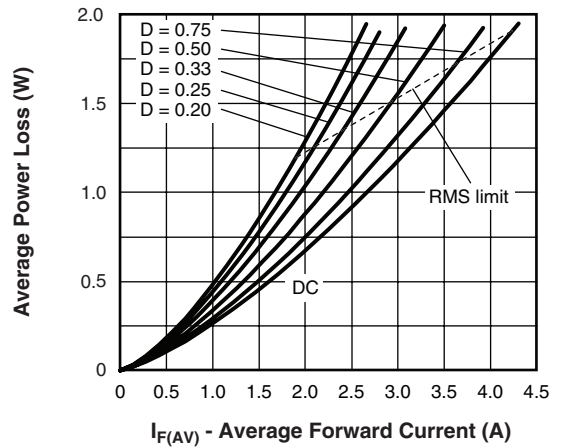


Fig. 6 - Maximum Average Forward Dissipation vs. Average Forward Current

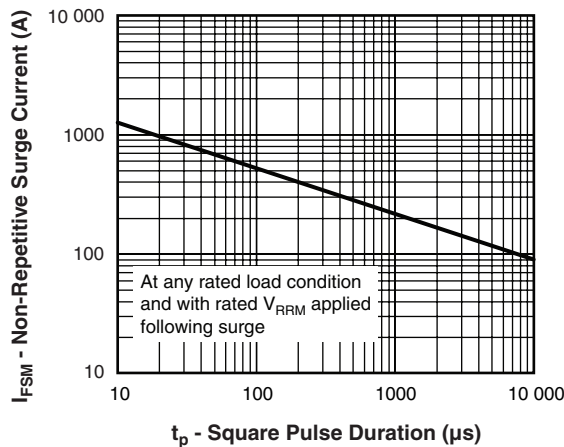
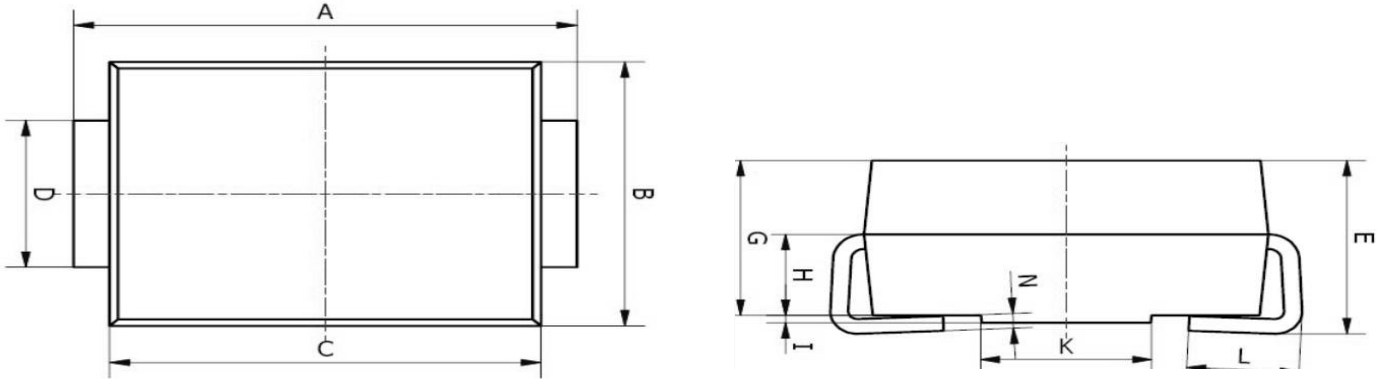


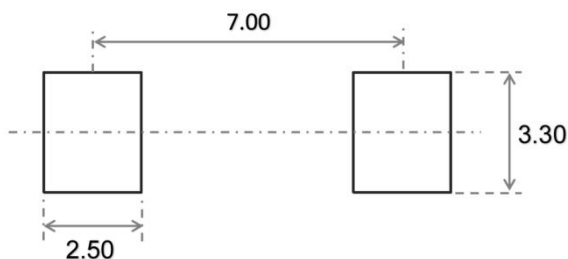
Fig. 7 - Maximum Peak Surge Forward Current vs. Pulse Duration

Note

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

SCHOTTKY BARRIER DIODE
SMC Package Outline Dimensions


| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|--------|---------------------------|------|----------------------|-------|
| | Min. | Max. | Min. | Max. |
| A | 7.75 | 8.13 | 0.305 | 0.320 |
| B | 5.59 | 6.22 | 0.220 | 0.245 |
| C | 6.60 | 7.11 | 0.260 | 0.280 |
| D | 2.75 | 3.25 | 0.108 | 0.128 |
| E | 2.25 | 2.82 | 0.089 | 0.111 |
| G | 2.00 | 2.62 | 0.079 | 0.103 |
| H | 1.26 | 1.56 | 0.050 | 0.061 |
| I | 0.05 | 0.15 | 0.002 | 0.006 |
| K | 4.30 | 6.00 | 0.169 | 0.236 |
| L | 1.25 | 1.75 | 0.049 | 0.069 |
| N | 0.10 | 0.30 | 0.004 | 0.012 |

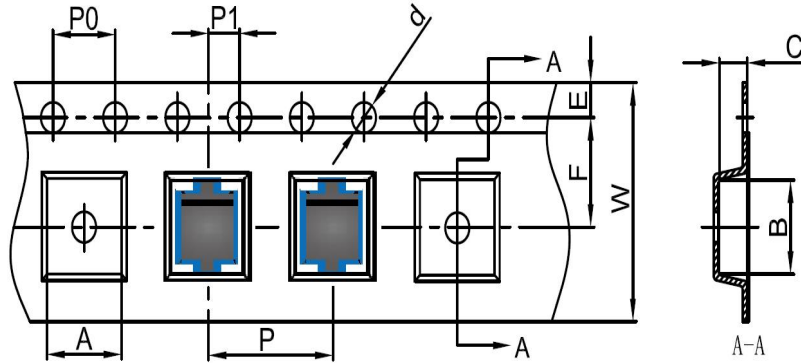
SMC Suggested Pad Layout

Note:

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

SCHOTTKY BARRIER DIODE

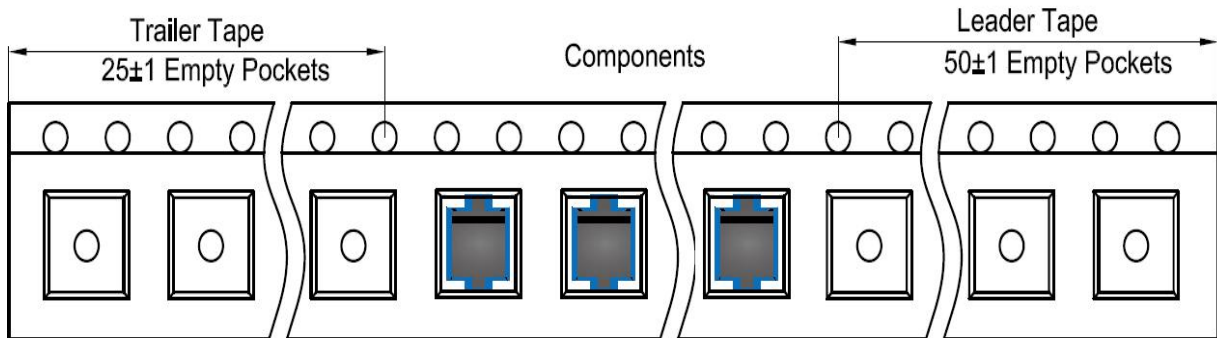
SMC Tape and Reel

SMC Embossed Carrier Tape

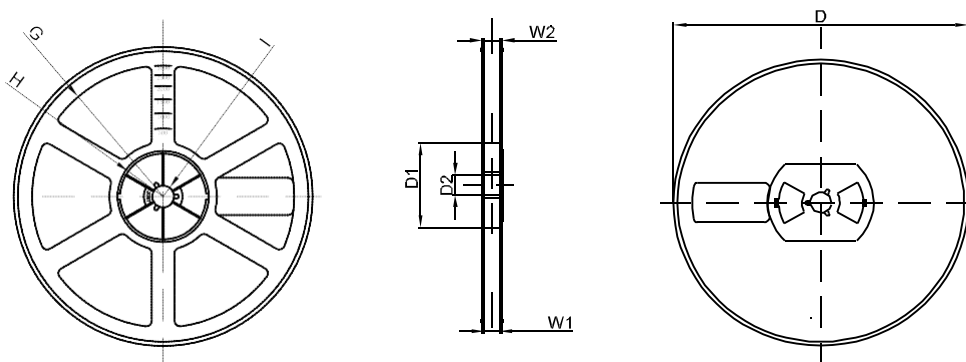


| DIMENSIONS ARE IN MILLIMETER | | | | | | | | | | |
|------------------------------|------|------|------|-------|------|------|------|------|------|-------|
| TYPE | A | B | C | d | E | F | P0 | P | P1 | W |
| SMC | 6.3 | 8.25 | 2.90 | Ø1.55 | 1.75 | 7.50 | 4.00 | 8.00 | 2.00 | 16.00 |
| TOLERANCE | ±0.1 | ±0.1 | ±0.1 | ±0.1 | ±0.1 | ±0.1 | ±0.1 | ±0.1 | ±0.1 | ±0.1 |

SMC Tape Leader and Trailer



SMC Reel



| DIMENSIONS ARE IN MILLIMETER | | | | | | | | |
|------------------------------|------|-----|----|------|-----|-------|------|-------|
| REEL OPTION | D | D1 | D2 | G | H | I | W1 | W2 |
| 13" DIA | Ø330 | 100 | 21 | R165 | R50 | R6.50 | 16.4 | 21.00 |
| TOLERANCE | ±2 | ±1 | ±1 | ±1 | ±1 | ±1 | ±1 | ±1 |