TAYCHIPST

SCHOTTKY RECTIFIER

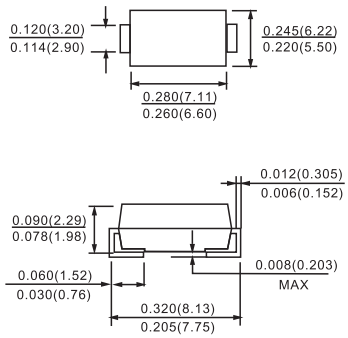
**30BQ040**

40V 3.0A

**FEATURES**

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

DO-214AB(SMC)




Dimensions in inches and (millimeters)

## MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

### Absolute Maximum Ratings

| Parameters | | 30BQ | Units | Conditions | |
|---|---|---|---|---|---|
| $I_{F(AV)}$ | Max. Average Forward Current | 3.0 | A | 50% duty cycle @ $T_L$ = 118 °C, rectangular wave form | |
| | | 4.0 | | 50% duty cycle @ $T_L$ = 110 °C, rectangular wave form | |
| $I_{FSM}$ | Max. Peak One Cycle Non-Repetitive | 2000 | A | 5µs Sine or 3µs Rect. pulse | Following any rated load condition and with rated $V_{RRM}$ applied |
| | Surge Current | 110 | | 10ms Sine or 6ms Rect. pulse | |
| $E_{AS}$ | Non Repetitive Avalanche Energy | 6.0 | mJ | $T_J$ = 25 °C, $I_{AS}$ = 1.0A, L = 12mH | |
| $I_{AR}$ | Repetitive Avalanche Current | 1.0 | A | Current decaying linearly to zero in 1 µsec<br>Frequency limited by $T_J$ max. Va = 1.5 x Vr typical | |

### Electrical Specifications

| Parameters | | 30BQ | Units | Conditions | |
|---|---|---|---|---|---|
| $V_{FM}$ | Max. Forward Voltage Drop (1) | 0.53 | V | @ 3A | $T_J$ = 25 °C |
| | | 0.68 | V | @ 6A | |
| | | 0.43 | V | @ 3A | $T_J$ = 125 °C |
| | | 0.57 | V | @ 6A | |
| $I_{RM}$ | Max. Reverse Leakage Current (1) | 0.5 | mA | $T_J$ = 25 °C | $V_R$ = rated $V_R$ |
| | | 30 | mA | $T_J$ = 125 °C | |
| $C_T$ | Max. Junction Capacitance | 230 | pF | $V_R$ = 5$V_{DC}$ (test signal range 100KHz to 1Mhz) 25°C | |
| $L_S$ | Typical Series Inductance | 3.0 | nH | Measured lead to lead 5mm from package body | |
| dv/dt | Max. Voltage Rate of Change | 10000 | V/µs | (Rated $V_R$) | |

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

### Thermal-Mechanical Specifications

| Parameters | | 30BQ | 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 (**) | 12 | °C/W | DC operation |
| $R_{thJA}$ | Max. Thermal Resistance Junction to Ambient | 46 | °C/W | DC operation |
| wt | Approximate Weight | 0.24 (0.008) | g (oz.) | |
| | Case Style | SMC | | Similar to DO-214AB |
| | Device Marking | IR3F | | |

(*) $\frac{dPtot}{dTj} < \frac{1}{Rth(j\text{-}a)}$ thermal runaway condition for a diode on its own heatsink

(**) Mounted 1 inch square PCB

## RATINGS AND CHARACTERISTIC CURVES 30BQ040

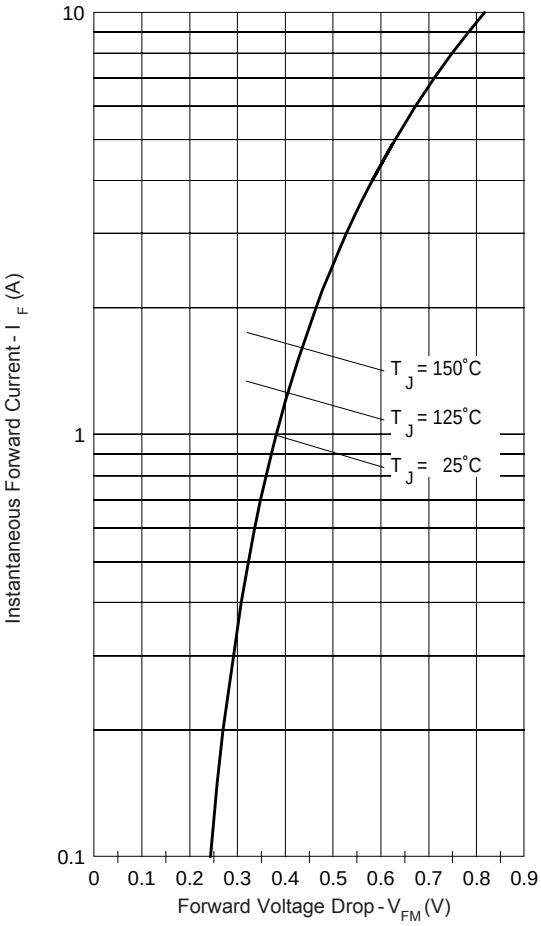



Fig. 1 - Max. Forward Voltage Drop Characteristics (Per Leg)

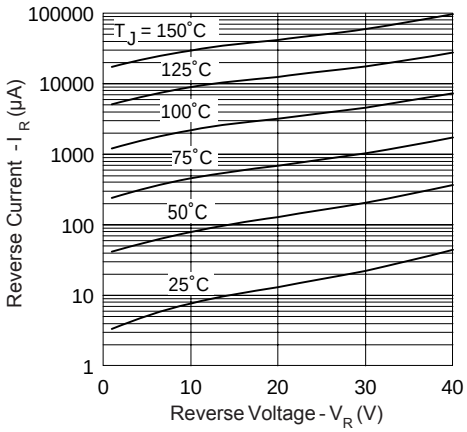



Fig. 2 - Typical Values Of Reverse Current Vs. Reverse Voltage (Per Leg)

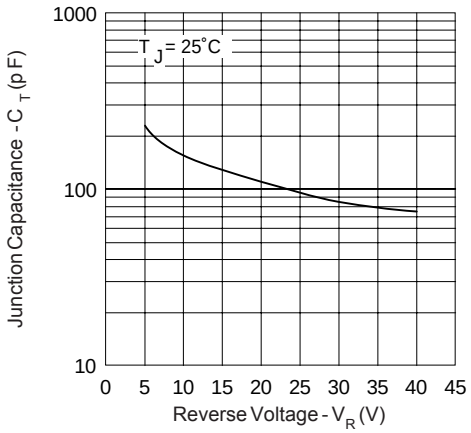



Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage (Per Leg)

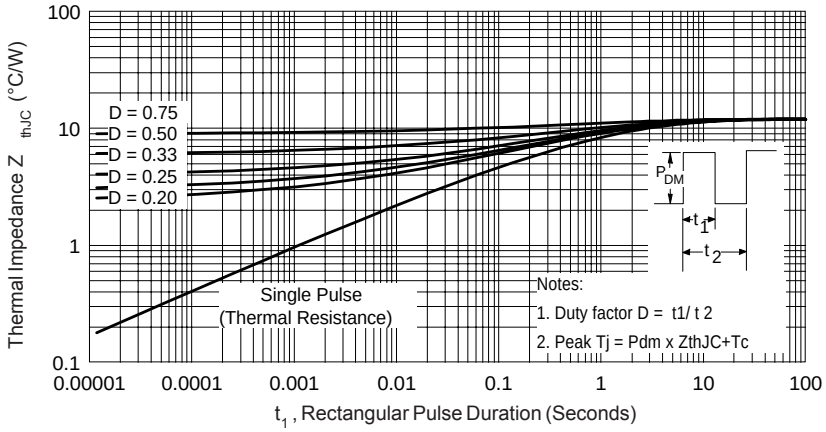



Fig. 4 - Max. Thermal Impedance $Z_{thJC}$ Characteristics (Per Leg)

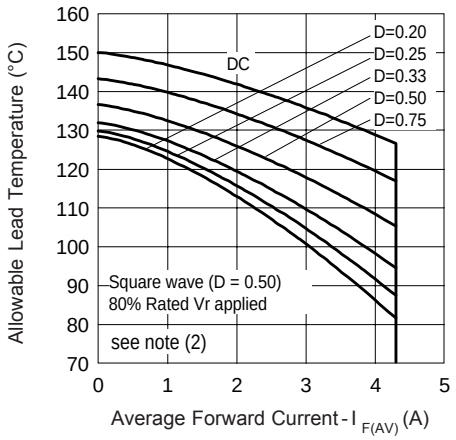



Fig. 4 - Maximum Average Forward Current Vs. Allowable Lead Temperature

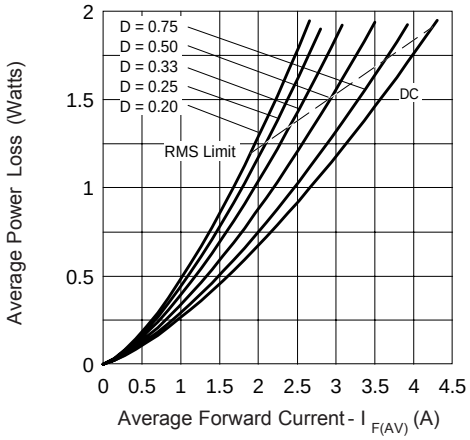



Fig. 5 - Maximum Average Forward Dissipation Vs. Average Forward Current

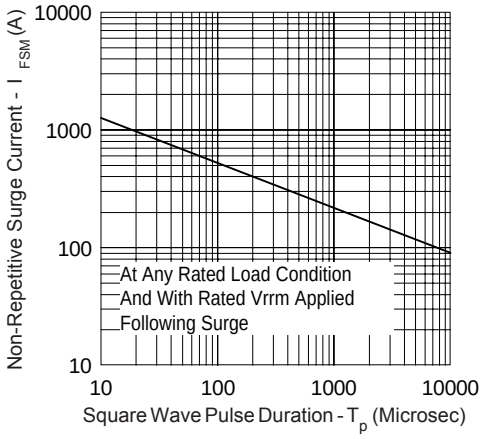



Fig. 6 - Maximum Peak Surge Forward Current Vs. Pulse Duration

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