

January 7, 1998

TEL:805-498-2111 FAX:805-498-3804 WEB:http://www.semtech.com

## AXIAL LEADED HERMETICALLY SEALED HIGH VOLTAGE FAST RECTIFIER DIODE

## QUICK REFERENCE DATA

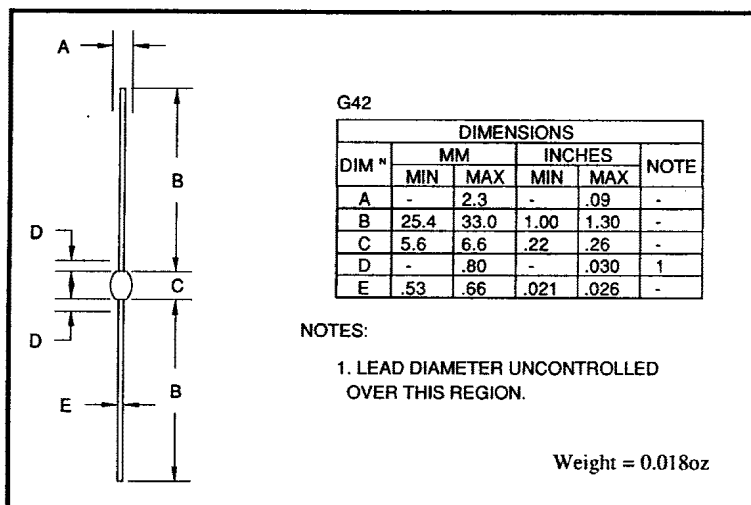
- Low reverse recovery time
- High thermal shock resistance
- Hermetically sealed with Metoxilite metal oxide
- Low switching losses
- Soft, non-snap off, recovery characteristics

- $V_R = 4 - 6kV$
- $I_F = 0.25A$
- $t_{rr} = 300ns$
- $I_R = 1\mu A$

### ABSOLUTE MAXIMUM RATINGS (@ 25°C unless otherwise specified)

|                                                                          | Symbol      | F40A            | F50A | F60A | Unit |
|--------------------------------------------------------------------------|-------------|-----------------|------|------|------|
| Working reverse voltage                                                  | $V_{RWM}$   | 4000            | 5000 | 6000 | V    |
| Repetitive reverse voltage                                               | $V_{RRM}$   | 4000            | 5000 | 6000 | V    |
| Average forward current<br>(@ 55°C in oil)                               | $I_{F(AV)}$ | ← 0.10 →        |      |      | A    |
| Repetitive surge current<br>(@ 55°C)                                     | $I_{FRM}$   | ← 0.75 →        |      |      | A    |
| Non-repetitive surge current<br>( $t_p = 8.3ms$ , @ $V_R$ & $T_{jmax}$ ) | $I_{FSM}$   | ← 2.50 →        |      |      | A    |
| Storage temperature range                                                | $T_{STG}$   | ← -65 to +175 → |      |      | °C   |
| Operating temperature range                                              | $T_{OP}$    | ← -65 to +175 → |      |      | °C   |

## MECHANICAL



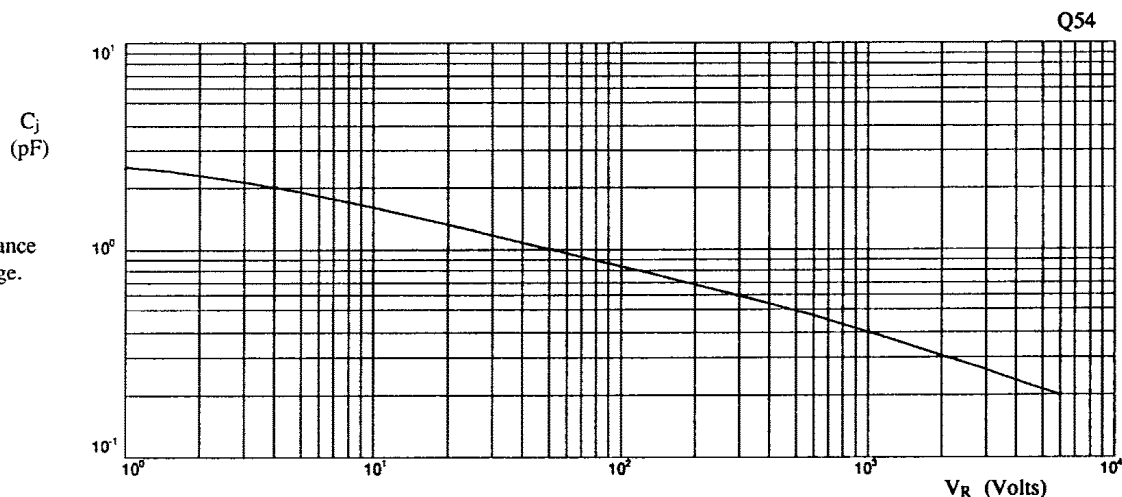
These products are available in Europe to DEF STAN 59-61 (PART 80)/034 to F and FX levels.

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## CHARACTERISTICS (@ 25°C unless otherwise specified)

|                                                                                           | Symbol          | F40A      | F50A | F60A | Unit                 |
|-------------------------------------------------------------------------------------------|-----------------|-----------|------|------|----------------------|
| Average forward current max.<br>(pcb mounted; $T_A = 55^\circ\text{C}$ )<br>for sine wave | $I_{F(av)}$     | ← 0.12 →  |      |      | A                    |
| for square wave ( $d = 0.5$ )                                                             | $I_{F(av)}$     | ← 0.13 →  |      |      | A                    |
| Average forward current max.<br>(unstirred oil at $55^\circ\text{C}$ )<br>for sine wave   | $I_{F(av)}$     | ← 0.23 →  |      |      | A                    |
| for square wave                                                                           | $I_{F(av)}$     | ← 0.25 →  |      |      | A                    |
| $I^2t$ for fusing ( $t = 8.3\text{ms}$ ) max.                                             | $I^2t$          | ← 0.026 → |      |      | $\text{A}^2\text{S}$ |
| Forward voltage drop max.<br>@ $I_F = 50\text{mA}$ , $T_j = 25^\circ\text{C}$             | $V_F$           | ← 8.0 →   |      |      | V                    |
| Reverse current max.<br>@ $V_{RWM}$ , $T_j = 25^\circ\text{C}$                            | $I_R$           | ← 1.0 →   |      |      | $\mu\text{A}$        |
| @ $V_{RWM}$ , $T_j = 100^\circ\text{C}$                                                   | $I_R$           | ← 10 →    |      |      | $\mu\text{A}$        |
| Reverse recovery time max.<br>50mA $I_F$ to 100mA $I_R$ . Recover to 25mA $I_{RR}$ .      | $t_{rr}$        | ← 300 →   |      |      | nS                   |
| Junction capacitance typ.<br>@ $V_R = 5\text{V}$ , $f = 1\text{MHz}$                      | $C_j$           | ← 2.0 →   |      |      | pF                   |
| Thermal resistance - junction to oil<br>Stirred oil                                       | $R_{\theta JO}$ | ← 26 →    |      |      | $^\circ\text{C/W}$   |
| Unstirred oil                                                                             | $R_{\theta JO}$ | ← 40 →    |      |      | $^\circ\text{C/W}$   |
| Thermal resistance - junction to amb.<br>on 0.06" thick pcb. 1oz copper.                  | $R_{\theta JA}$ | ← 95 →    |      |      | $^\circ\text{C/W}$   |

Fig 1 Junction capacitance  
against reverse voltage.



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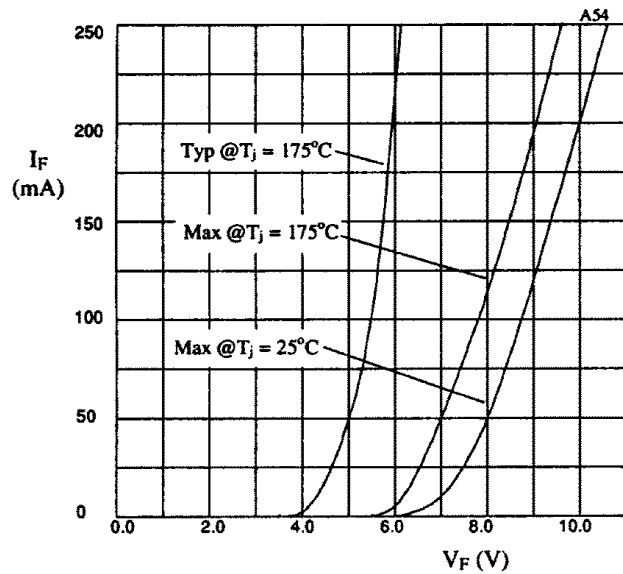


Fig 2. Forward voltage drop as a function of forward current.

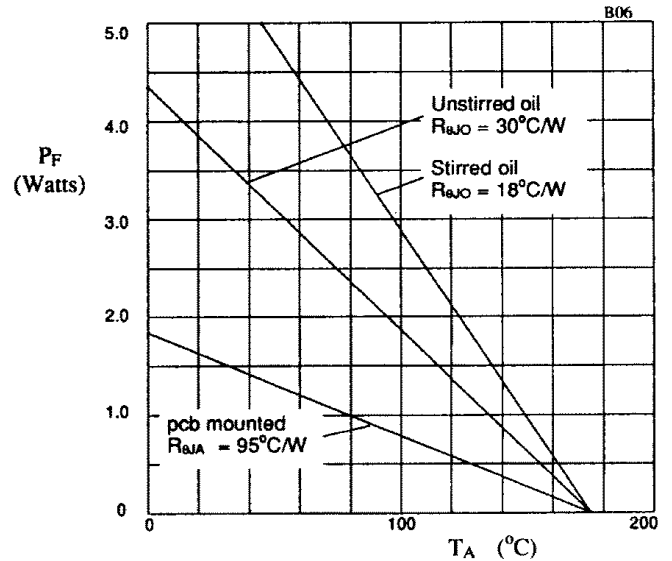


Fig 3. Power derating in air and oil.

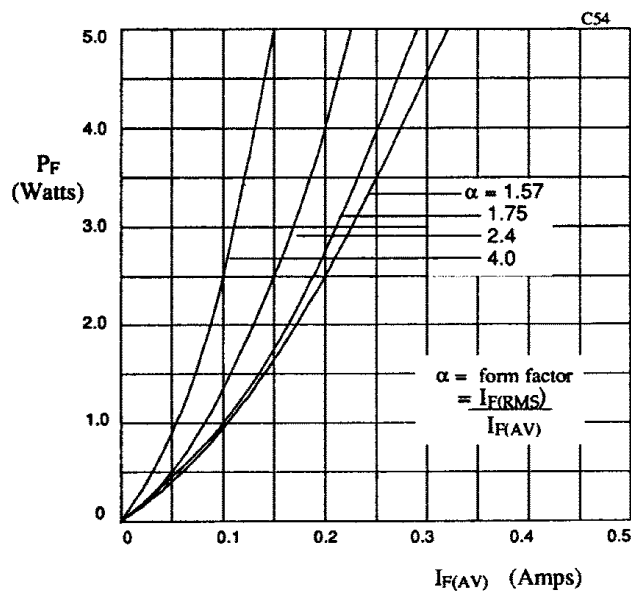


Fig 4. Forward power dissipation as a function of forward current, for sinusoidal operation.

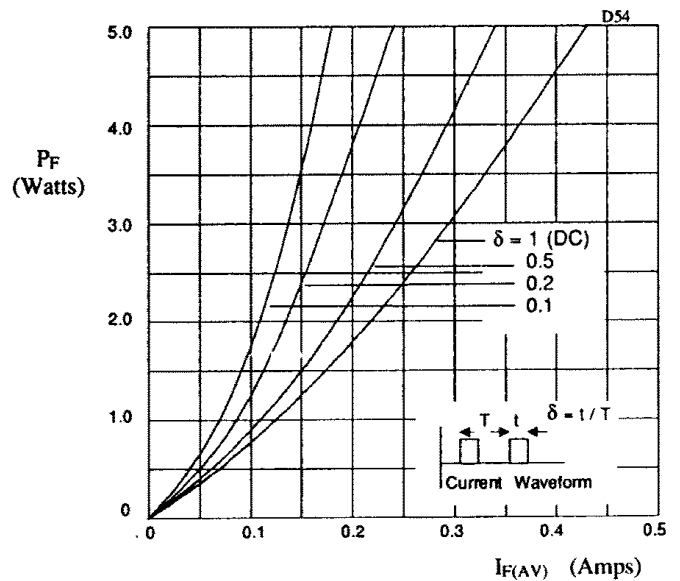


Fig 5. Forward power dissipation as a function of forward current, for square wave operation.