

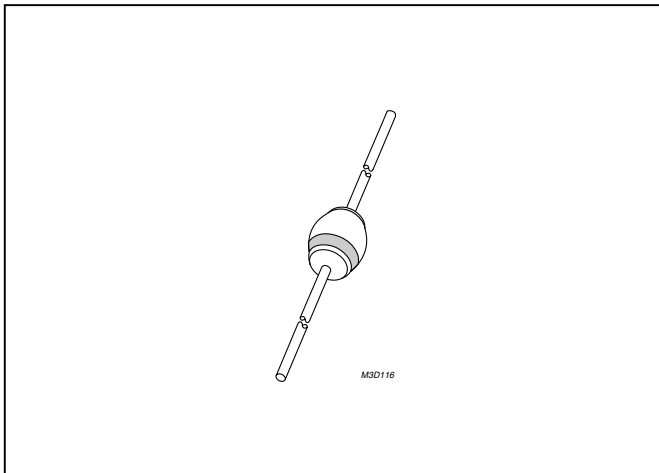
# High-quality glass-passivated diodes (Glass Bead)

## BYV27-200 competitor investigation

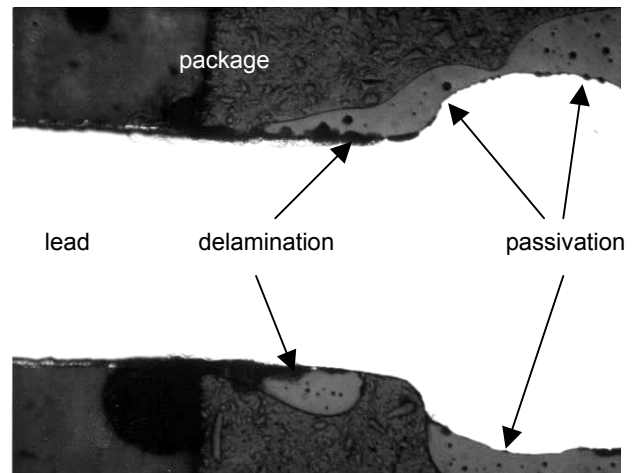
This publication offers a direct comparison between Philips Semiconductors' BYV27-200 Glass Bead diode family and two major competitor products. The comparison highlights major

advantages of the BYV27-200, including high reliability, low switching losses and excellent thermal performance with no tendency toward delamination at the lead-package interfaces.

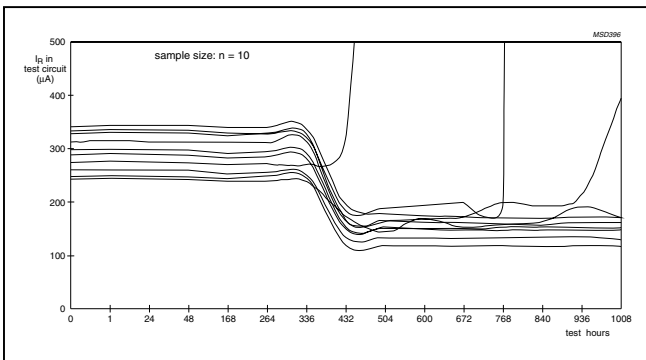
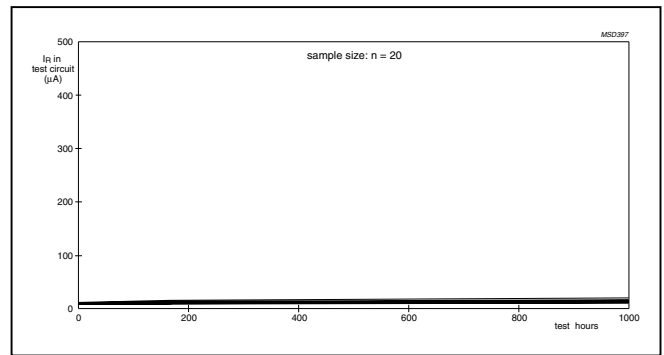
| Philips' BYV27-200                                                                                 | Comparable competitor I                                                                                                  | Comparable competitor II                                                                                 |
|----------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|
| <b>Package</b>                                                                                     |                                                                                                                          |                                                                                                          |
| • Glass Bead SOD57                                                                                 | • Plastic DO-41                                                                                                          | • Glass plastic DO-41                                                                                    |
| <b>Electrical</b>                                                                                  |                                                                                                                          |                                                                                                          |
| • Glass passivated                                                                                 | • Silicon rubber passivation                                                                                             | • Glass bead moulded in plastic or OSP chip                                                              |
| • High maximum operating temperature ( $T_{jmax} = 175\text{ }^{\circ}\text{C}$ )                  | • Low max operating temperature ( $T_{jmax} = 125\text{ }^{\circ}\text{C}$ )                                             | • Lower max operating temperature ( $T_{jmax} = 150\text{ }^{\circ}\text{C}$ )                           |
| • Low leakage current (typ. $I_R = 8.5\text{ }\mu\text{A}$ , $T_a = 150\text{ }^{\circ}\text{C}$ ) | • Higher leakage current due to passivation (typ. $I_R = 900\text{ }\mu\text{A}$ , $T_a = 150\text{ }^{\circ}\text{C}$ ) | • Comparable leakage current (typ. $I_R = 10\text{ }\mu\text{A}$ , $T_a = 150\text{ }^{\circ}\text{C}$ ) |
| • Low switching losses                                                                             | • Comparable or higher switching losses                                                                                  | • Comparable or higher switching losses                                                                  |
| • Excellent stability (zero defects in 259k device hours)                                          | • Poor stability although level of instability is just acceptable                                                        | • Stability is acceptable                                                                                |
| • Guaranteed avalanche energy absorption capability ( $E_{RSM}$ to destruction = 52 mJ)            | • Poor capability to withstand reverse energy ( $E_{RSM}$ to destruction = 1.1 mJ)                                       | • Lower capability to withstand reverse energy ( $E_{RSM}$ to destruction = 10 — 20 mJ)                  |
| <b>Mechanical</b>                                                                                  |                                                                                                                          |                                                                                                          |
| • High-temperature alloyed construction                                                            | • Low temperature soldering construction                                                                                 | • Low temperature soldering construction                                                                 |
| • Not sensitive to moisture, hermetically sealed — no rejects on humidity tests                    | • Sensitive to moisture, plastic is hygroscopic, delamination after moulding                                             | • Glass-plastic is still sensitive to moisture                                                           |
| • Fatigue free because coefficients of expansion of all used parts are matched                     | • Plastic coefficient of expansion does not match with the other parts, resulting in delamination                        | • With glass-plastic, delaminations are still seen                                                       |
| • Excellent thermal-fatigue performance — no rejects in fatigue tests                              | • Often rejects, chip cracks due to coefficients of expansion                                                            | • Better than just plastic but not as good as glass bead                                                 |



The BYV27-200's SOD57 package



Competitor product showing delamination

High-temperature reverse bias — competitor type;  
 $V_r = 200\text{ V}$ ,  $T_a = 150\text{ }^{\circ}\text{C}$ High-temperature reverse bias — BYV27-200;  
 $V_r = 200\text{ V}$ ,  $T_a = 150\text{ }^{\circ}\text{C}$ 

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