

HiPerFRED

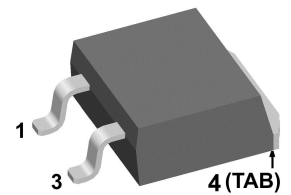
$V_{RRM} = 1200\text{ V}$
 $I_{FAV} = 12\text{ A}$
 $t_{rr} = 35\text{ ns}$

High Performance Fast Recovery Diode
 Low Loss and Soft Recovery
 Single Diode

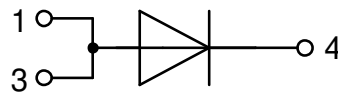
Part number

DSEP12-12BZ

Marking on Product: *DSEP12-12BZ*



Backside: cathode



Features / Advantages:

- Planar passivated chips
- Very low leakage current
- Very short recovery time
- Improved thermal behaviour
- Very low I_{rm} -values
- Very soft recovery behaviour
- Avalanche voltage rated for reliable operation
- Soft reverse recovery for low EMI/RFI
- Low I_{rm} reduces:
 - Power dissipation within the diode
 - Turn-on loss in the commutating switch

Applications:

- Antiparallel diode for high frequency switching devices
- Antisaturation diode
- Snubber diode
- Free wheeling diode
- Rectifiers in switch mode power supplies (SMPS)
- Uninterruptible power supplies (UPS)

Package: TO-263 (D2Pak-HV)

- Industry standard outline
- RoHS compliant
- Epoxy meets UL 94V-0

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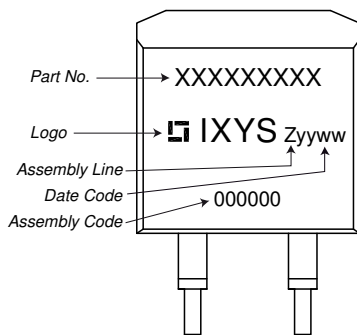


| Fast Diode | | | | Ratings | | | |
|------------|----------------------------------------------|-----------------------------------------------------------|-------------------------|---------|------|------------|--|
| Symbol | Definition | Conditions | min. | typ. | max. | Unit | |
| V_{RSM} | max. non-repetitive reverse blocking voltage | $T_{VJ} = 25^{\circ}C$ | | | 1200 | V | |
| V_{RRM} | max. repetitive reverse blocking voltage | $T_{VJ} = 25^{\circ}C$ | | | 1200 | V | |
| I_R | reverse current, drain current | $V_R = 1200 V$ | $T_{VJ} = 25^{\circ}C$ | | 100 | μA | |
| | | $V_R = 1200 V$ | $T_{VJ} = 150^{\circ}C$ | | 0.5 | mA | |
| V_F | forward voltage drop | $I_F = 15 A$ | $T_{VJ} = 25^{\circ}C$ | | 3.25 | V | |
| | | $I_F = 30 A$ | | | 3.96 | V | |
| | | $I_F = 15 A$ | $T_{VJ} = 150^{\circ}C$ | | 2.06 | V | |
| | | $I_F = 30 A$ | | | 2.89 | V | |
| I_{FAV} | average forward current | $T_C = 130^{\circ}C$ rectangular $d = 0.5$ | $T_{VJ} = 175^{\circ}C$ | | 12 | A | |
| V_{FO} | threshold voltage | } for power loss calculation only | $T_{VJ} = 175^{\circ}C$ | | 1.00 | V | |
| r_F | slope resistance | | | | 55 | m Ω | |
| R_{thJC} | thermal resistance junction to case | | | | 1.6 | K/W | |
| R_{thCH} | thermal resistance case to heatsink | | | 0.25 | | K/W | |
| P_{tot} | total power dissipation | | $T_C = 25^{\circ}C$ | | 95 | W | |
| I_{FSM} | max. forward surge current | $t = 10 ms; (50 Hz), sine; V_R = 0 V$ | $T_{VJ} = 45^{\circ}C$ | | 90 | A | |
| C_J | junction capacitance | $V_R = 600 V \quad f = 1 MHz$ | $T_{VJ} = 25^{\circ}C$ | | 5 | pF | |
| I_{RM} | max. reverse recovery current | } $I_F = 15 A; V_R = 800 V$ $-di_F / dt = 500 A/\mu s$ | $T_{VJ} = 25^{\circ}C$ | | 14 | A | |
| | | | $T_{VJ} = 125^{\circ}C$ | | 23 | A | |
| t_{rr} | reverse recovery time | | $T_{VJ} = 25^{\circ}C$ | | 70 | ns | |
| | | | $T_{VJ} = 125^{\circ}C$ | | 300 | ns | |



| Package TO-263 (D2Pak-HV) | | Ratings | | | | |
|---------------------------|--------------------------------------------------------------|----------------------|------|------|------|------|
| Symbol | Definition | Conditions | min. | typ. | max. | Unit |
| I_{RMS} | RMS current | per terminal | | | 35 | A |
| T_{VJ} | virtual junction temperature | | -55 | | 175 | °C |
| T_{op} | operation temperature | | -55 | | 150 | °C |
| T_{stg} | storage temperature | | -55 | | 150 | °C |
| Weight | | | | 1.5 | | g |
| F_C | mounting force with clip | | 20 | | 60 | N |
| $d_{Spp/App}$ | creepage distance on surface / striking distance through air | terminal to terminal | 4.2 | | | mm |
| $d_{Spb/Apb}$ | | terminal to backside | 4.7 | | | mm |

Product Marking



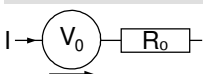
| Ordering | Ordering Number | Marking on Product | Delivery Mode | Quantity | Code No. |
|-------------|-----------------|--------------------|---------------|----------|----------|
| Standard | DSEP12-12BZ-TRL | DSEP12-12BZ | Tape & Reel | 800 | 514454 |
| Alternative | DSEP12-12BZ-TUB | DSEP12-12BZ | Tube | 50 | 523901 |

| Similar Part | Package | Voltage class |
|--------------|------------------------|---------------|
| DSEP12-12AZ | TO-263AB (D2Pak) (2HV) | 1200 |

Equivalent Circuits for Simulation

* on die level

$T_{VJ} = 175\text{°C}$



Fast Diode

| | | | |
|--------------|--------------------|----|----|
| $V_{0\ max}$ | threshold voltage | 1 | V |
| $R_{0\ max}$ | slope resistance * | 52 | mΩ |

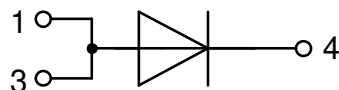


Outlines TO-263 (D2Pak-HV)



| Dim. | Millimeter | | Inches | |
|------|------------|-------|-------------|-------|
| | min | max | min | max |
| A | 4.06 | 4.83 | 0.160 | 0.190 |
| A1 | typ. 0.10 | | typ. 0.004 | |
| A2 | 2.41 | | 0.095 | |
| b | 0.51 | 0.99 | 0.020 | 0.039 |
| b2 | 1.14 | 1.40 | 0.045 | 0.055 |
| c | 0.40 | 0.74 | 0.016 | 0.029 |
| c2 | 1.14 | 1.40 | 0.045 | 0.055 |
| D | 8.38 | 9.40 | 0.330 | 0.370 |
| D1 | 8.00 | 8.89 | 0.315 | 0.350 |
| D2 | 2.3 | | 0.091 | |
| E | 9.65 | 10.41 | 0.380 | 0.410 |
| E1 | 6.22 | 8.50 | 0.245 | 0.335 |
| e | 2,54 BSC | | 0,100 BSC | |
| e1 | 4.28 | | 0.169 | |
| H | 14.61 | 15.88 | 0.575 | 0.625 |
| L | 1.78 | 2.79 | 0.070 | 0.110 |
| L1 | 1.02 | 1.68 | 0.040 | 0.066 |
| W | typ. 0.02 | 0.040 | typ. 0.0008 | 0.002 |

All dimensions conform with and/or within JEDEC standard.



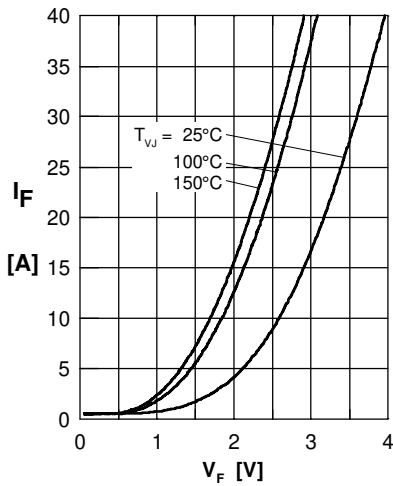
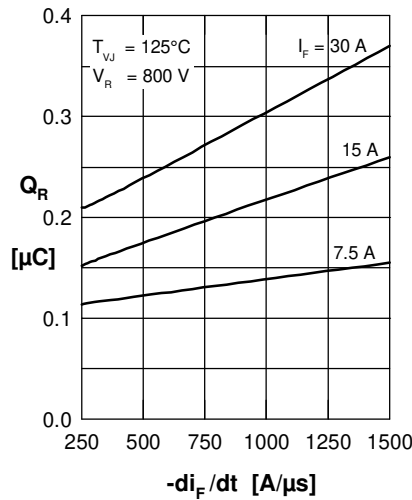
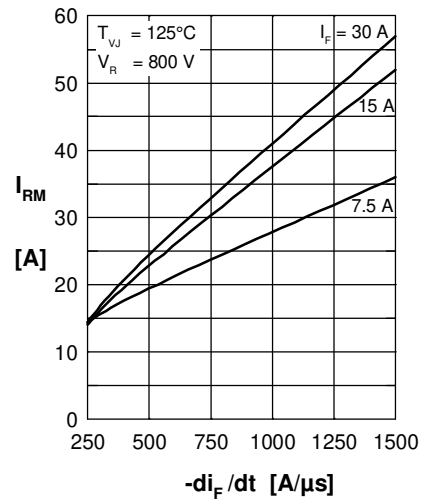
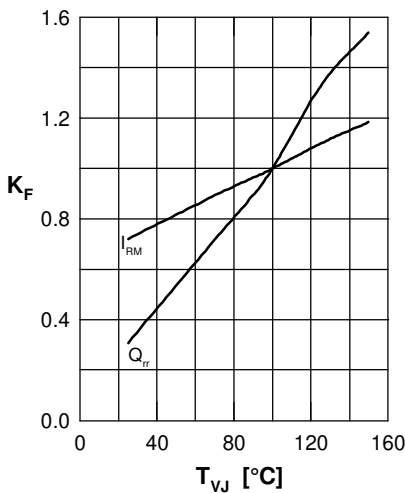
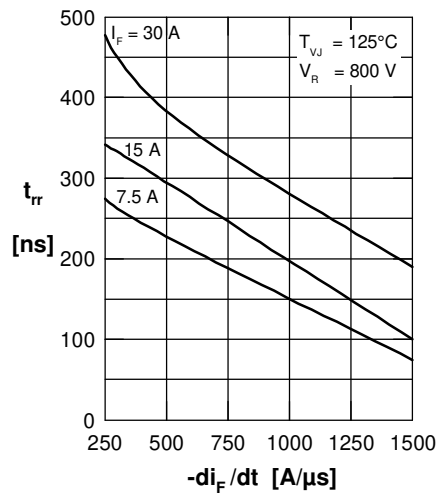
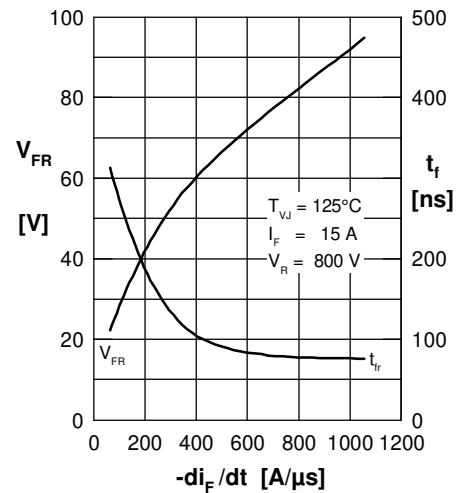
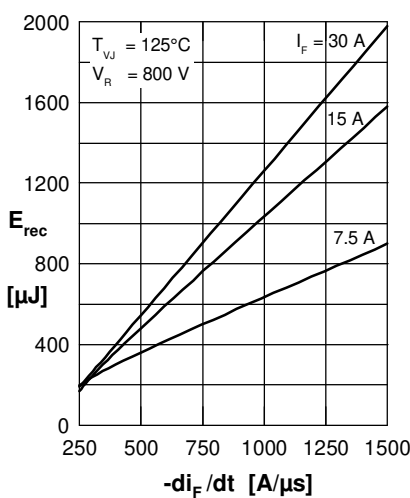
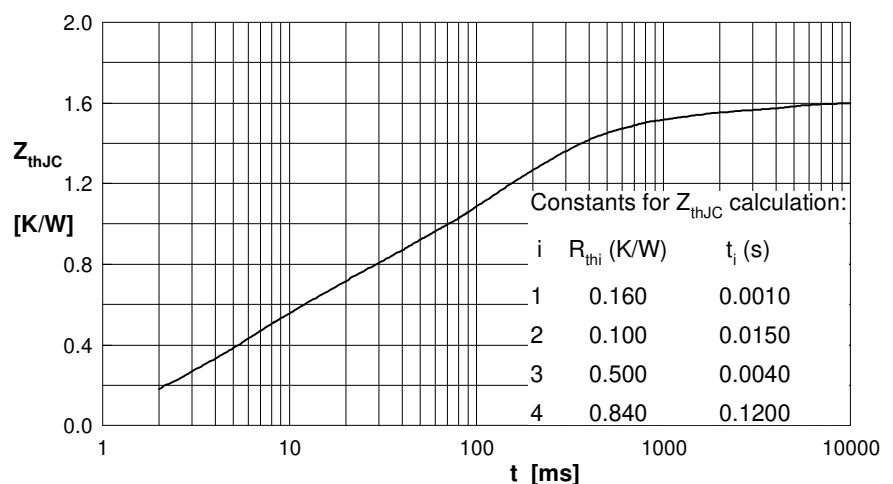
Fast Diode

 Fig. 1 Forward current I_F versus V_F

 Fig. 2 Typ. reverse recov. charge Q_R versus $-di_F/dt$

 Fig. 3 Typ. peak reverse current I_{RM} versus $-di_F/dt$

 Fig. 4 Typ. dynamic parameters Q_R , I_{RM} versus T_{VJ}

 Fig. 5 Typ. recovery time t_{rr} versus $-di_F/dt$

 Fig. 6 Typ. peak forward voltage V_{FR} and t_{tr} versus di_F/dt

 Fig. 7 Typ. recovery energy E_{rec} versus $-di_F/dt$


Fig. 8 Transient thermal resistance junction to case

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