



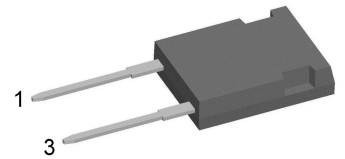
HiPerDynFRED

$V_{RRM} = 1200\text{ V}$
 $I_{FAV} = 30\text{ A}$
 $t_{rr} = 15\text{ ns}$

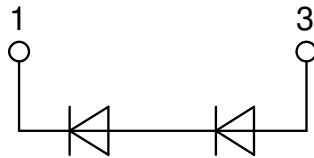
High Performance Dynamic Fast Recovery Diode
 Extreme Low Loss and Soft Recovery
 Single Diode

Part number

DSEP30-12CR



Backside: isolated



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
- 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: ISOPLUS247

- Isolation Voltage: 3600 V~
- Industry standard outline
- RoHS compliant
- Epoxy meets UL 94V-0
- Soldering pins for PCB mounting
- Backside: DCB ceramic
- Reduced weight
- Advanced power cycling

Disclaimer Notice

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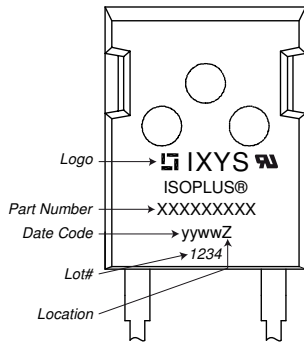


| Fast Diode | | | | Ratings | | | |
|------------|--|---|-------------------------|---------|------|------------|--|
| Symbol | Definition | Conditions | min. | typ. | max. | Unit | |
| V_{RSM} | max. non-repetitive reverse blocking voltage | $T_{VJ} = 25^{\circ}C$ | | | 1200 | V | |
| V_{RRM} | max. repetitive reverse blocking voltage | $T_{VJ} = 25^{\circ}C$ | | | 1200 | V | |
| I_R | reverse current, drain current | $V_R = 1200 V$ | $T_{VJ} = 25^{\circ}C$ | | 250 | μA | |
| | | $V_R = 1200 V$ | $T_{VJ} = 150^{\circ}C$ | | 2 | mA | |
| V_F | forward voltage drop | $I_F = 30 A$ | $T_{VJ} = 25^{\circ}C$ | | 4.98 | V | |
| | | $I_F = 60 A$ | | | 6.33 | V | |
| | | $I_F = 30 A$ | $T_{VJ} = 150^{\circ}C$ | | 3.18 | V | |
| | | $I_F = 60 A$ | | | 4.40 | V | |
| I_{FAV} | average forward current | $T_C = 105^{\circ}C$ rectangular $d = 0.5$ | $T_{VJ} = 175^{\circ}C$ | | 30 | A | |
| V_{FO} | threshold voltage | } for power loss calculation only | $T_{VJ} = 175^{\circ}C$ | | 1.69 | V | |
| r_F | slope resistance | | | | 36.6 | m Ω | |
| R_{thJC} | thermal resistance junction to case | | | | 0.6 | K/W | |
| R_{thCH} | thermal resistance case to heatsink | | | 0.3 | | K/W | |
| P_{tot} | total power dissipation | | $T_C = 25^{\circ}C$ | | 250 | W | |
| I_{FSM} | max. forward surge current | $t = 10 ms; (50 Hz), sine; V_R = 0 V$ | $T_{VJ} = 45^{\circ}C$ | | 250 | A | |
| C_J | junction capacitance | $V_R = 800 V \quad f = 1 MHz$ | $T_{VJ} = 25^{\circ}C$ | | 13 | pF | |
| I_{RM} | max. reverse recovery current | } $I_F = 30 A; V_R = 600 V$ $-di_F / dt = 600 A/\mu s$ | $T_{VJ} = 25^{\circ}C$ | | 5.5 | A | |
| | | | $T_{VJ} = 100^{\circ}C$ | | 12.5 | A | |
| t_{rr} | reverse recovery time | | $T_{VJ} = 25^{\circ}C$ | | 15 | ns | |
| | | | $T_{VJ} = 100^{\circ}C$ | | 70 | ns | |



| Package ISOPLUS247 | | Ratings | | | | |
|--------------------|--|----------------------|------|------|------|------|
| Symbol | Definition | Conditions | min. | typ. | max. | Unit |
| I_{RMS} | RMS current | per terminal | | | 70 | A |
| T_{VJ} | virtual junction temperature | | -55 | | 175 | °C |
| T_{op} | operation temperature | | -55 | | 150 | °C |
| T_{stg} | storage temperature | | -55 | | 150 | °C |
| Weight | | | | 6 | | g |
| F_C | mounting force with clip | | 20 | | 120 | N |
| $d_{Spp/ App}$ | creepage distance on surface / striking distance through air | terminal to terminal | 5.4 | | | mm |
| $d_{Spb/ Apb}$ | | terminal to backside | 4.1 | | | mm |
| V_{ISOL} | isolation voltage | t = 1 second | 3600 | | | V |
| | | t = 1 minute | 3000 | | | V |

Product Marking



| Ordering | Ordering Number | Marking on Product | Delivery Mode | Quantity | Code No. |
|----------|-----------------|--------------------|---------------|----------|----------|
| Standard | DSEP30-12CR | DSEP30-12CR | Tube | 30 | 481955 |

| Similar Part | Package | Voltage class |
|--------------|----------------|---------------|
| DSEP30-12A | TO-247AD (2) | 1200 |
| DSEP29-12A | TO-220AC (2) | 1200 |
| DSEP30-12AR | ISOPLUS247 (2) | 1200 |
| DHG30I1200HA | TO-247AD (2) | 1200 |

Equivalent Circuits for Simulation

* on die level

$T_{VJ} = 175^{\circ}C$

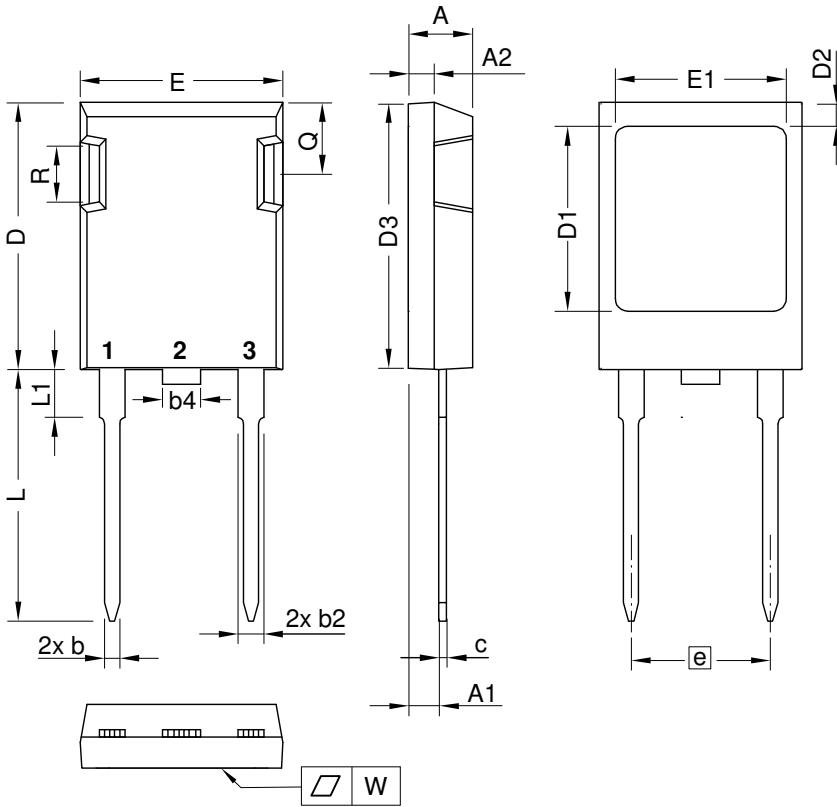


Fast Diode

| | | | |
|--------------|--------------------|------|----|
| $V_{0\ max}$ | threshold voltage | 1.69 | V |
| $R_{0\ max}$ | slope resistance * | 34 | mΩ |



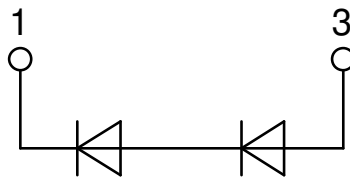
Outlines ISOPLUS247



| Dim. | Millimeter | | Inches | |
|------|------------|-------|-----------|-------|
| | min | max | min | max |
| A | 4.83 | 5.21 | 0.190 | 0.205 |
| A1 | 2.29 | 2.54 | 0.090 | 0.100 |
| A2 | 1.91 | 2.16 | 0.075 | 0.085 |
| b | 1.14 | 1.40 | 0.045 | 0.055 |
| b2 | 1.91 | 2.20 | 0.075 | 0.087 |
| b4 | 2.92 | 3.24 | 0.115 | 0.128 |
| c | 0.61 | 0.83 | 0.024 | 0.033 |
| D | 20.80 | 21.34 | 0.819 | 0.840 |
| D1 | 15.75 | 16.26 | 0.620 | 0.640 |
| D2 | 1.65 | 2.15 | 0.065 | 0.085 |
| D3 | 20.30 | 20.70 | 0.799 | 0.815 |
| E | 15.75 | 16.13 | 0.620 | 0.635 |
| E1 | 13.21 | 13.72 | 0.520 | 0.540 |
| e | 10.90 BSC | | 0.429 BSC | |
| L | 19.81 | 20.60 | 0.780 | 0.811 |
| L1 | 3.81 | 4.38 | 0.150 | 0.172 |
| Q | 5.59 | 6.20 | 0.220 | 0.244 |
| R | 4.25 | 5.50 | 0.167 | 0.217 |
| W | - | 0.10 | - | 0.004 |

Die konvexe Form des Substrates ist typ. < 0.04 mm über der Kunststoffoberfläche der Bauteilunterseite
The convex bow of substrate is typ. < 0.04 mm over plastic surface level of device bottom side

Die Gehäuseabmessungen entsprechen dem Typ TO-247 AD gemäß JEDEC außer Schraubloch und L_{max} .
This drawing will meet all dimensions requirement of JEDEC outline TO-247 AD except screw hole and except L_{max} .



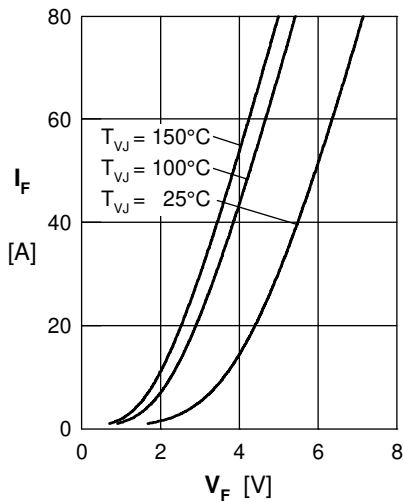
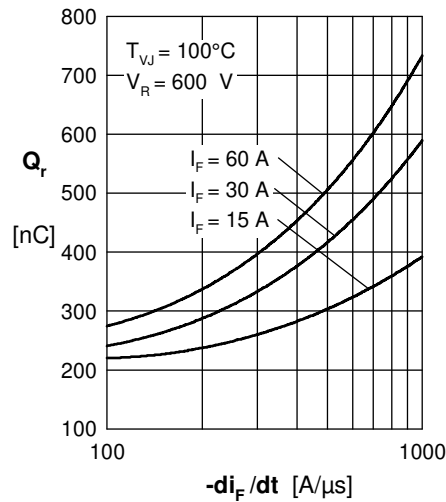
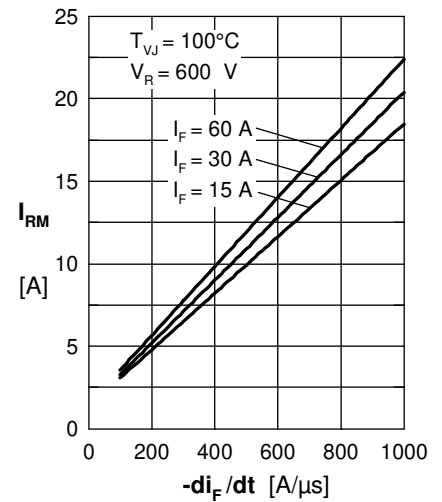
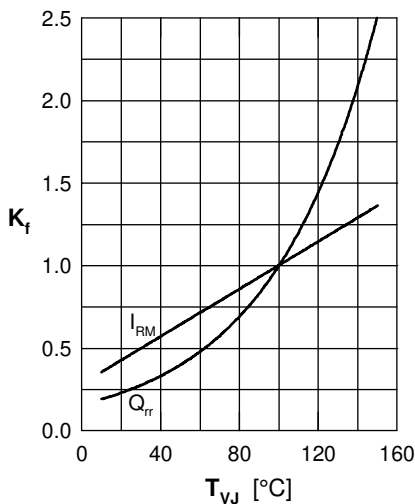
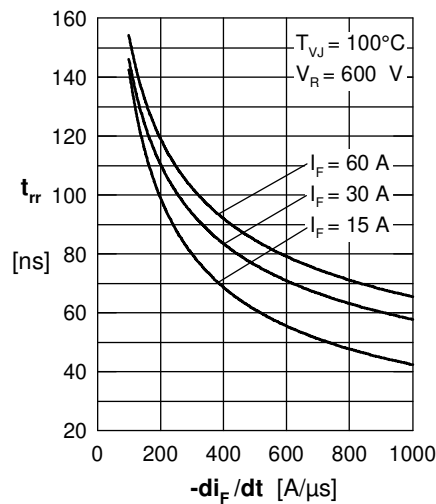
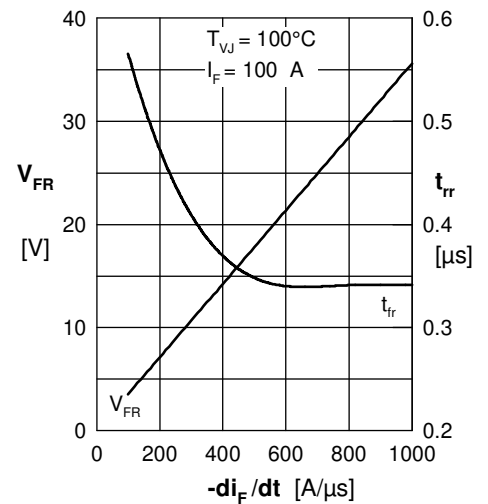
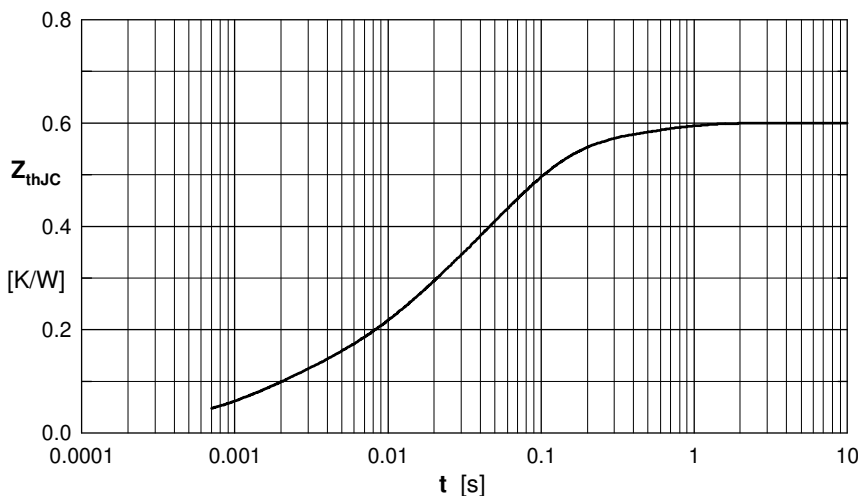
Fast Diode

 Fig. 1 Forward current I_F vs. V_F

 Fig. 2 Reverse recovery charge Q_r versus $-di_F/dt$

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

 Fig. 4 Dynamic parameters Q_r , I_{RM} versus T_{VJ}

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

 Fig. 6 Peak forward voltage V_{FR} and t_{rr} versus di_F/dt


Fig. 7 Transient thermal resistance junction to case

 Constants for Z_{thJC} calculation:

| i | R_{thi} (K/W) | t_i (s) |
|---|-----------------|-----------|
| 1 | 0.08 | 0.0013 |
| 2 | 0.122 | 0.0097 |
| 3 | 0.116 | 0.037 |
| 4 | 0.23 | 0.07 |
| 5 | 0.052 | 0.45 |