



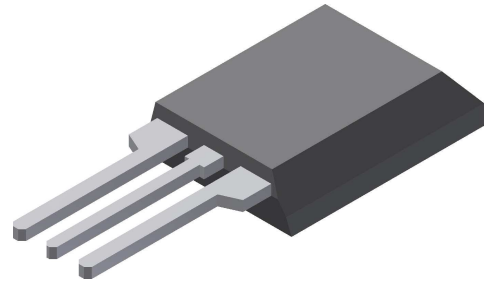
HiPerFRED

$V_{RRM} = 2 \times 600 \text{ V}$
 $I_{FAV} = 30 \text{ A}$
 $t_{rr} = 35 \text{ ns}$

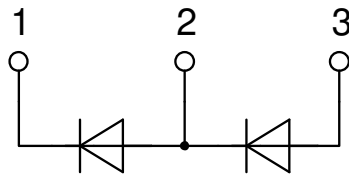
High Performance Fast Recovery Diode
 Low Loss and Soft Recovery
 Phase leg

Part number

DSEE29-12CC



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
- 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: ISOPLUS220

- 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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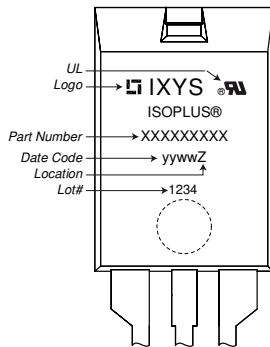


| Fast Diode | | | | Ratings | | | |
|------------|--|---|-------------------------|---------|------|------------|--|
| Symbol | Definition | Conditions | min. | typ. | max. | Unit | |
| V_{RSM} | max. non-repetitive reverse blocking voltage | $T_{VJ} = 25^{\circ}C$ | | | 600 | V | |
| V_{RRM} | max. repetitive reverse blocking voltage | $T_{VJ} = 25^{\circ}C$ | | | 600 | V | |
| I_R | reverse current, drain current | $V_R = 600 V$ | $T_{VJ} = 25^{\circ}C$ | | 500 | μA | |
| | | $V_R = 600 V$ | $T_{VJ} = 150^{\circ}C$ | | 1 | mA | |
| V_F | forward voltage drop | $I_F = 30 A$ | $T_{VJ} = 25^{\circ}C$ | | 1.62 | V | |
| | | $I_F = 60 A$ | | | 1.95 | V | |
| | | $I_F = 30 A$ | $T_{VJ} = 150^{\circ}C$ | | 1.27 | V | |
| | | $I_F = 60 A$ | | | 1.58 | V | |
| I_{FAV} | average forward current | $T_C = 130^{\circ}C$ rectangular $d = 0.5$ | $T_{VJ} = 175^{\circ}C$ | | 30 | A | |
| V_{FO} | threshold voltage | } for power loss calculation only | $T_{VJ} = 175^{\circ}C$ | | 1.00 | V | |
| r_F | slope resistance | | | | 10 | m Ω | |
| R_{thJC} | thermal resistance junction to case | | | | 0.9 | K/W | |
| R_{thCH} | thermal resistance case to heatsink | | | 0.5 | | K/W | |
| P_{tot} | total power dissipation | | $T_C = 25^{\circ}C$ | | 165 | W | |
| I_{FSM} | max. forward surge current | $t = 10 ms; (50 Hz), sine; V_R = 0 V$ | $T_{VJ} = 45^{\circ}C$ | | 200 | A | |
| C_J | junction capacitance | $V_R = 400 V$ $f = 1 MHz$ | $T_{VJ} = 25^{\circ}C$ | | 26 | pF | |
| I_{RM} | max. reverse recovery current | } $I_F = 30 A; V_R = 300 V$ $-di_F / dt = 600 A/\mu s$ | $T_{VJ} = 25^{\circ}C$ | | 17 | A | |
| | | | $T_{VJ} = 100^{\circ}C$ | | 29 | A | |
| t_{rr} | reverse recovery time | | $T_{VJ} = 25^{\circ}C$ | | 35 | ns | |
| | | | $T_{VJ} = 100^{\circ}C$ | | 90 | ns | |



| Package ISOPLUS220 | | 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 | | | | 2 | | g |
| F_C | mounting force with clip | | 20 | | 60 | N |
| $d_{Spp/App}$ | creepage distance on surface / striking distance through air | terminal to terminal | 1.0 | | | mm |
| $d_{Spb/Apb}$ | | terminal to backside | 3.0 | | | mm |
| V_{ISOL} | isolation voltage | t = 1 second | 3600 | | | V |
| | | t = 1 minute | 3000 | | | V |

Product Marking



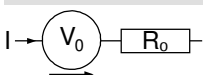
| Ordering | Ordering Number | Marking on Product | Delivery Mode | Quantity | Code No. |
|----------|-----------------|--------------------|---------------|----------|----------|
| Standard | DSEE29-12CC | DSEE29-12CC | Tube | 50 | 500694 |

| Similar Part | Package | Voltage class |
|--------------|--------------|---------------|
| DSEE30-12A | TO-247AD (3) | 600 |

Equivalent Circuits for Simulation

* on die level

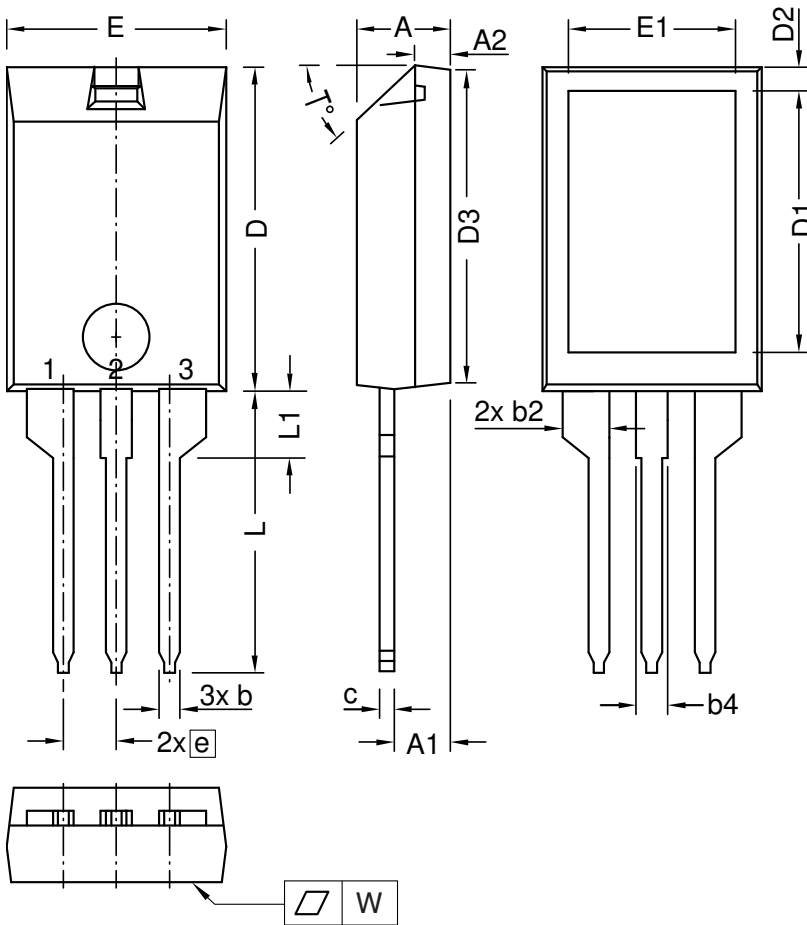
$T_{VJ} = 175^{\circ}C$



| Symbol | Definition | Fast Diode | Unit |
|--------------|--------------------|------------|------|
| $V_{0\ max}$ | threshold voltage | 1 | V |
| $R_{0\ max}$ | slope resistance * | 6.2 | mΩ |



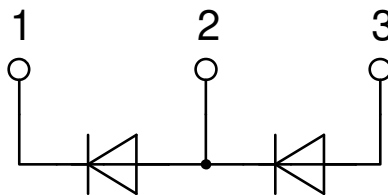
Outlines ISOPLUS220



| Dim. | Millimeters | | Inches | |
|------|-------------|-------|-----------|-------|
| | min | max | min | max |
| A | 4.00 | 5.00 | 0.157 | 0.197 |
| A1 | 2.50 | 3.00 | 0.098 | 0.118 |
| A2 | 1.60 | 1.80 | 0.063 | 0.071 |
| b | 0.90 | 1.30 | 0.035 | 0.051 |
| b2 | 2.35 | 2.55 | 0.093 | 0.100 |
| b4 | 1.25 | 1.65 | 0.049 | 0.065 |
| c | 0.70 | 1.00 | 0.028 | 0.039 |
| D | 15.00 | 16.00 | 0.591 | 0.630 |
| D1 | 12.00 | 13.00 | 0.472 | 0.512 |
| D2 | 1.10 | 1.50 | 0.043 | 0.059 |
| D3 | 14.90 | 15.50 | 0.587 | 0.610 |
| E | 10.00 | 11.00 | 0.394 | 0.433 |
| E1 | 7.50 | 8.50 | 0.295 | 0.335 |
| e | 2.54 BSC | | 0.100 BSC | |
| L | 13.00 | 14.50 | 0.512 | 0.571 |
| L1 | 3.00 | 3.50 | 0.118 | 0.138 |
| T° | 42.5 | 47.5 | | |
| W | - | 0.1 | - | 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-273 gemäß JEDEC außer D und D1.
This drawing will meet all dimensions requirement of JEDEC outline TO-273 except D and D1.





Fast Diode

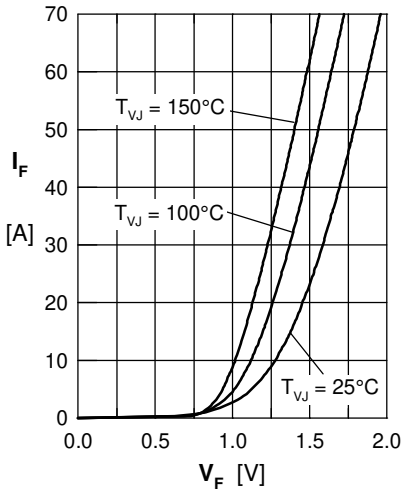


Fig. 1 Forward current I_F vs. V_F

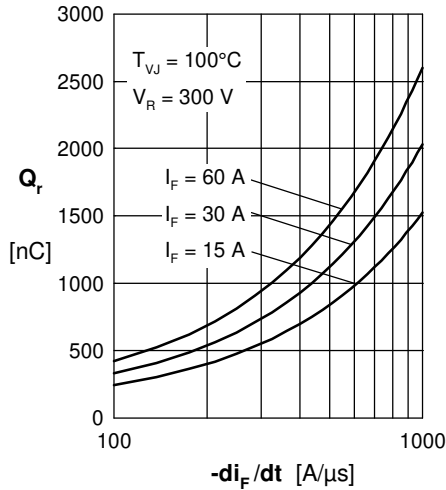


Fig. 2 Typ. reverse recovery charge Q_r versus $-di_F/dt$

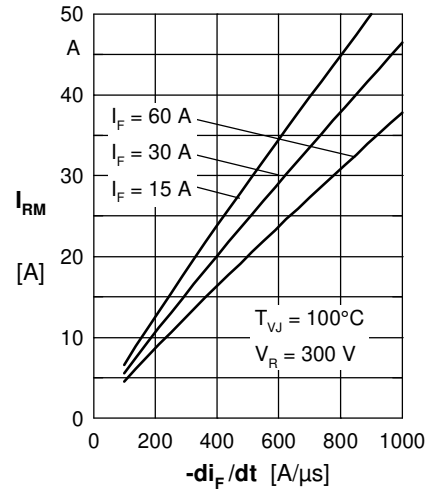


Fig. 3 Typ. peak reverse current I_{RM} versus $-di_F/dt$

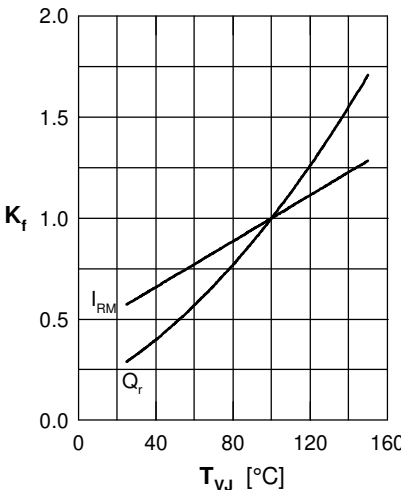


Fig. 4 Dynamic parameters Q_r , I_{RM} versus T_{VJ}

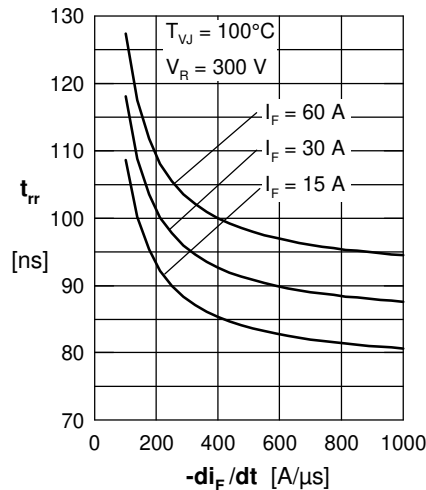


Fig. 5 Typ. recovery time t_{tr} versus $-di_F/dt$

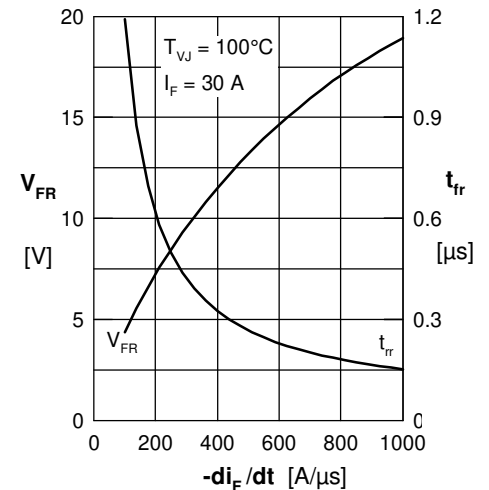


Fig. 6 Typ. peak forward voltage V_{FR} and typ. forward recovery time t_{tr} versus di_F/dt

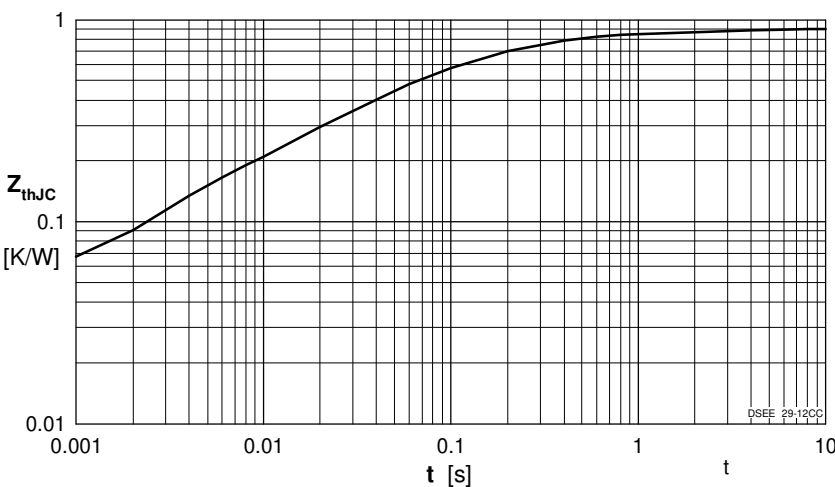


Fig. 7 Transient thermal resistance junction to case

Constants for Z_{thJC} calculation:

| i | R_{thi} (K/W) | t_i (s) |
|---|-----------------|-----------|
| 1 | 0.038 | 0.00024 |
| 2 | 0.07 | 0.0036 |
| 3 | 0.245 | 0.0235 |
| 4 | 0.198 | 0.1421 |
| 5 | 0.35 | 0.25 |