



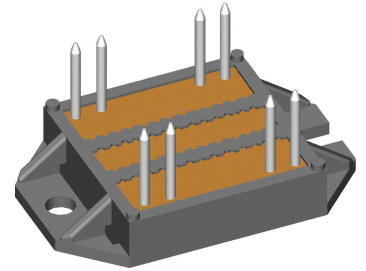
FRED Module

$V_{RRM} = 1200\text{ V}$
 $I_{FAV} = 2 \times 60\text{ A}$
 $t_{rr} = 50\text{ ns}$

Fast Recovery Epitaxial Diode
 Low Loss and Soft Recovery
 Parallel legs

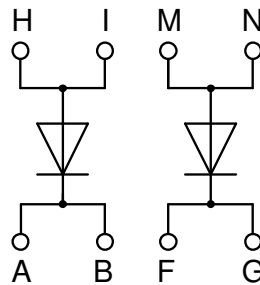
Part number

DSEI2x61-12P



Backside: isolated

E72873



Features / Advantages:

- Planar passivated chips
- 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: ECO-PAC1

- Isolation Voltage: 3000 V~
- Industry standard outline
- RoHS compliant
- Soldering pins for PCB mounting
- Height: 9 mm
- Base plate: 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 | $V_R = 1200 V$ | $T_{VJ} = 25^{\circ}C$ | | 2.2 | mA | |
| | | $V_R = 960 V$ | $T_{VJ} = 125^{\circ}C$ | | 14 | mA | |
| V_F | forward voltage drop | $I_F = 60 A$ | $T_{VJ} = 25^{\circ}C$ | | 2.41 | V | |
| | | $I_F = 120 A$ | | | 2.76 | V | |
| | | $I_F = 60 A$ | $T_{VJ} = 150^{\circ}C$ | | 2.05 | V | |
| | | $I_F = 120 A$ | | | 2.56 | V | |
| I_{FAV} | average forward current | $T_C = 45^{\circ}C$ rectangular $d = 0.5$ | $T_{VJ} = 150^{\circ}C$ | | 60 | A | |
| V_{FO} | threshold voltage | } for power loss calculation only | $T_{VJ} = 150^{\circ}C$ | | 1.58 | V | |
| r_F | slope resistance | | | | 7.9 | mΩ | |
| R_{thJC} | thermal resistance junction to case | | | | 0.7 | K/W | |
| R_{thCH} | thermal resistance case to heatsink | | | 0.10 | | K/W | |
| P_{tot} | total power dissipation | | $T_C = 25^{\circ}C$ | | 180 | W | |
| I_{FSM} | max. forward surge current | $t = 10 ms; (50 Hz), sine; V_R = 0 V$ | $T_{VJ} = 45^{\circ}C$ | | 450 | A | |
| C_J | junction capacitance | $V_R = 600 V$ $f = 1 MHz$ | $T_{VJ} = 25^{\circ}C$ | | 31 | pF | |
| I_{RM} | max. reverse recovery current | } $I_F = 60 A; V_R = 540 V$ | $T_{VJ} = 25^{\circ}C$ | | 13 | A | |
| | | | $T_{VJ} = 100^{\circ}C$ | | 20 | A | |
| t_{rr} | reverse recovery time | } $-di_F/dt = 300 A/\mu s$ | $T_{VJ} = 25^{\circ}C$ | | 190 | ns | |
| | | | $T_{VJ} = 100^{\circ}C$ | | 380 | ns | |



| Package ECO-PAC1 | | Ratings | | | | |
|------------------|--|----------------------|------|------|------|------|
| Symbol | Definition | Conditions | min. | typ. | max. | Unit |
| I_{RMS} | RMS current | per terminal | | | 100 | A |
| T_{VJ} | virtual junction temperature | | -40 | | 150 | °C |
| T_{op} | operation temperature | | -40 | | 125 | °C |
| T_{stg} | storage temperature | | -40 | | 125 | °C |
| Weight | | | | 19 | | g |
| M_D | mounting torque | | 1.4 | | 2 | Nm |
| $d_{Spp/App}$ | creepage distance on surface / striking distance through air | terminal to terminal | 6.0 | | | mm |
| $d_{Spb/Apb}$ | | terminal to backside | 10.0 | | | mm |
| V_{ISOL} | isolation voltage | t = 1 second | 3000 | | | V |
| | | t = 1 minute | 2500 | | | V |



| Ordering | Ordering Number | Marking on Product | Delivery Mode | Quantity | Code No. |
|----------|-----------------|--------------------|---------------|----------|----------|
| Standard | DSEI2x61-12P | DSEI2x61-12P | Box | 25 | 490806 |

Equivalent Circuits for Simulation

* on die level

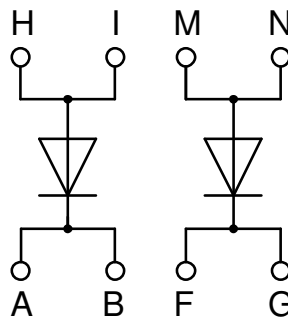
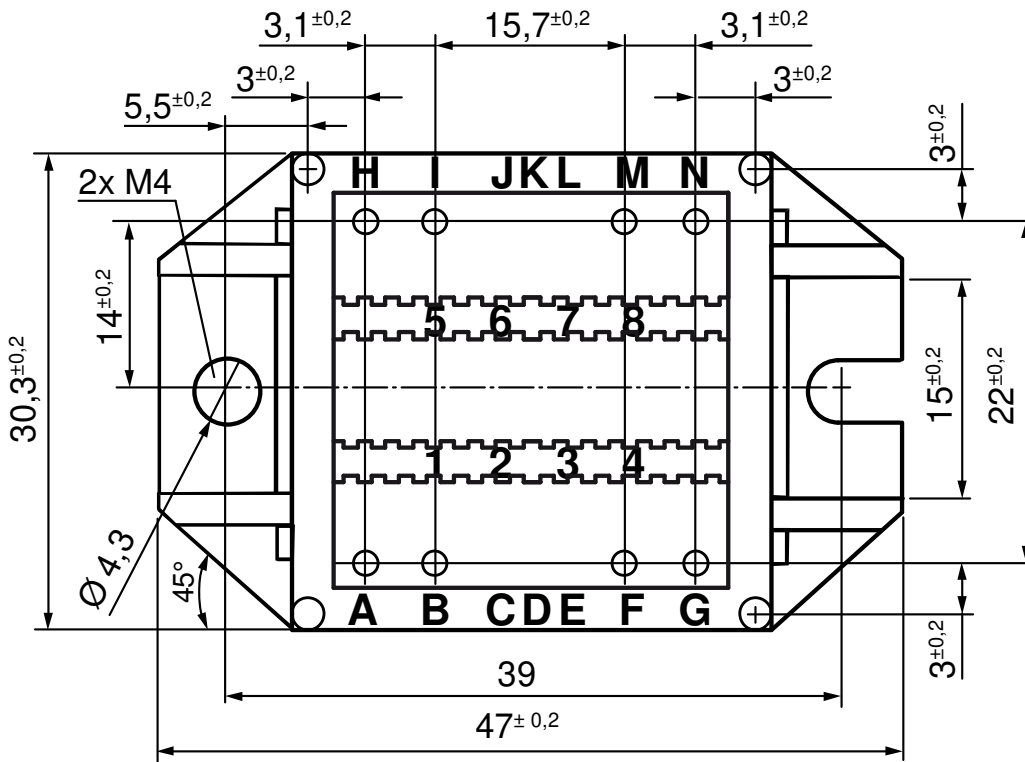
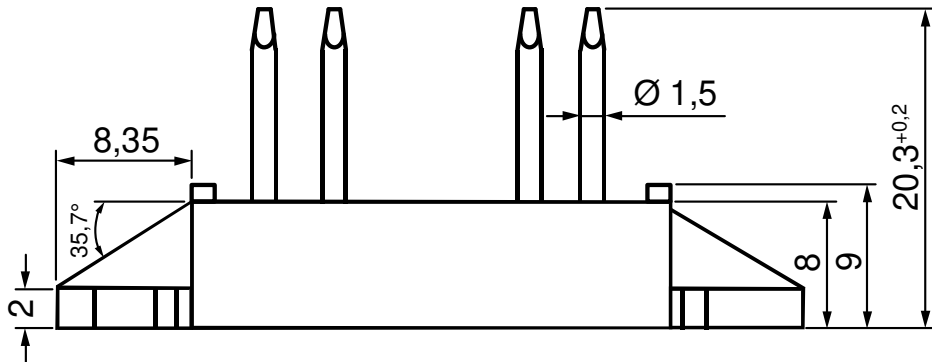
$T_{VJ} = 150^{\circ}C$



| | | Fast Diode | |
|--------------|--------------------|------------|----|
| $V_{0\ max}$ | threshold voltage | 1.58 | V |
| $R_{0\ max}$ | slope resistance * | 6.6 | mΩ |



Outlines ECO-PAC1



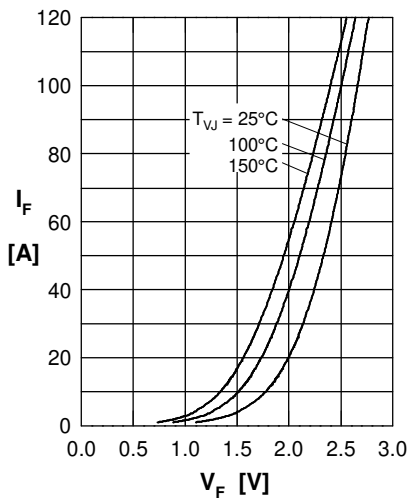
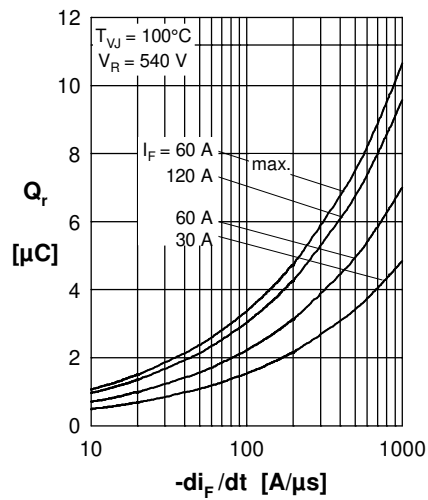
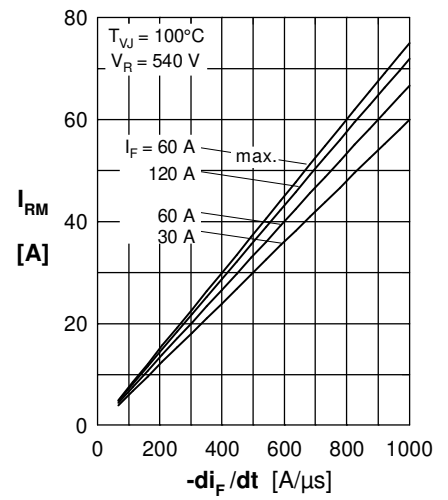
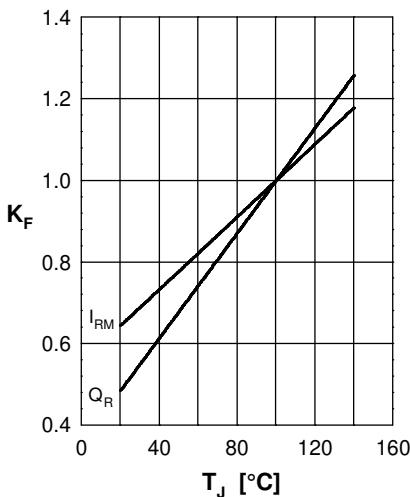
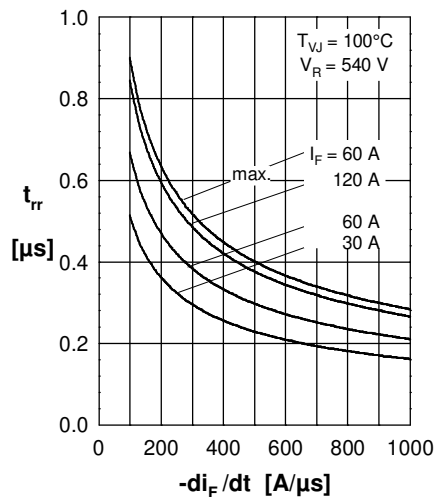
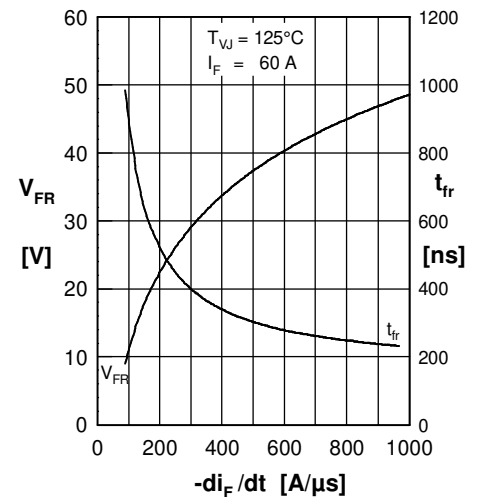
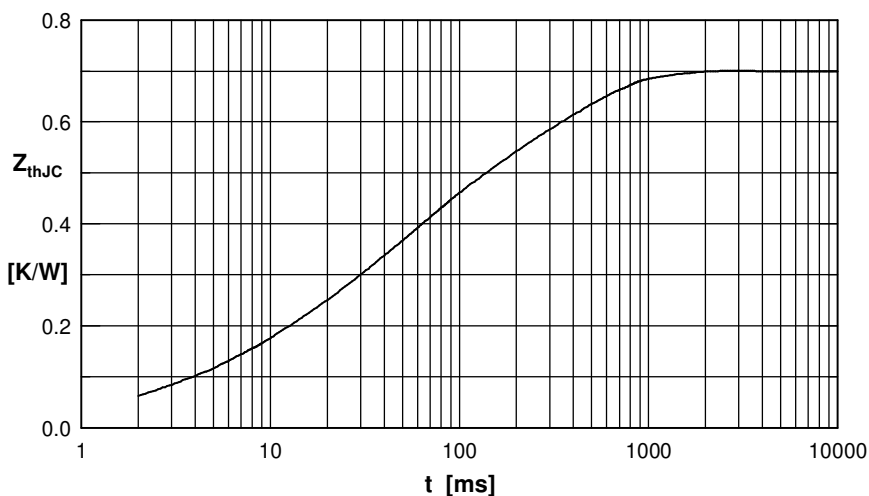
Fast Diode

 Fig. 1 Forward current I_F versus max. forward voltage drop 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 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_{rr} versus di_F/dt


Fig. 7 Transient thermal impedance junction to case

 Constants for Z_{thJC} calculation:

| i | R_{thi} (K/W) | t_i (s) |
|---|-----------------|-----------|
| 1 | 0.120 | 0.0100 |
| 2 | 0.045 | 0.0020 |
| 3 | 0.105 | 0.0500 |
| 4 | 0.160 | 0.0500 |
| 5 | 0.270 | 0.3500 |