

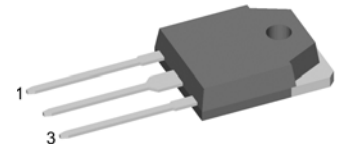
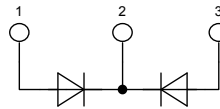
HiPerFRED

High Performance Fast Recovery Diode
Low Loss and Soft Recovery
Common Cathode

$V_{RRM} = 300\text{ V}$
 $I_{FAV} = 2 \times 30\text{ A}$
 $t_{rr} = 35\text{ ns}$

Part number

DSEC59-03AQ



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:

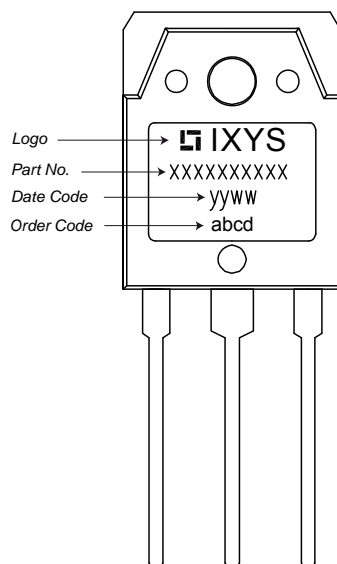
- Housing: TO-3P
- Industry standard outline compatible with TO-247
- Epoxy meets UL 94V-0
- RoHS compliant

Ratings

| Symbol | Definition | Conditions | Ratings | | | Unit | |
|------------|-------------------------------------|---|------------------------------|------|------|------------------|---|
| | | | min. | typ. | max. | | |
| V_{RRM} | max. repetitive reverse voltage | $T_{VJ} = 25^\circ\text{C}$ | | | 300 | V | |
| I_R | reverse current | $V_R = 300\text{ V}$ | | | 1 | μA | |
| | | $V_R = 300\text{ V}$ | | | 0.1 | mA | |
| V_F | forward voltage | $I_F = 30\text{ A}$ | | | 1.34 | V | |
| | | $I_F = 60\text{ A}$ | | | 1.63 | V | |
| | | $I_F = 30\text{ A}$ | $T_{VJ} = 150^\circ\text{C}$ | | | 1.06 | V |
| | | $I_F = 60\text{ A}$ | $T_{VJ} = 150^\circ\text{C}$ | | | 1.39 | V |
| I_{FAV} | average forward current | rectangular $d = 0.5$ | | | 30 | A | |
| V_{F0} | threshold voltage | $T_{VJ} = 175^\circ\text{C}$ | | | 0.69 | V | |
| r_F | slope resistance | | | | 10.5 | $\text{m}\Omega$ | |
| R_{thJC} | thermal resistance junction to case | | | | 0.95 | K/W | |
| T_{VJ} | virtual junction temperature | | -55 | | 175 | $^\circ\text{C}$ | |
| P_{tot} | total power dissipation | $T_C = 25^\circ\text{C}$ | | | 160 | W | |
| I_{FSM} | max. forward surge current | $t = 10\text{ ms}$ (50 Hz), sine | | | 340 | A | |
| I_{RM} | max. reverse recovery current | $T_{VJ} = 25^\circ\text{C}$ | | | 3 | A | |
| | | $I_F = 30\text{ A}; V_R = 200\text{ V}$ | | | 7 | A | |
| t_{rr} | reverse recovery time | $-di_F/dt = 200\text{ A}/\mu\text{s}$ | | | 35 | ns | |
| | | $T_{VJ} = 125^\circ\text{C}$ | | | 55 | ns | |
| C_J | junction capacitance | $V_R = 150\text{ V}; f = 1\text{ MHz}$ | | | 50 | pF | |

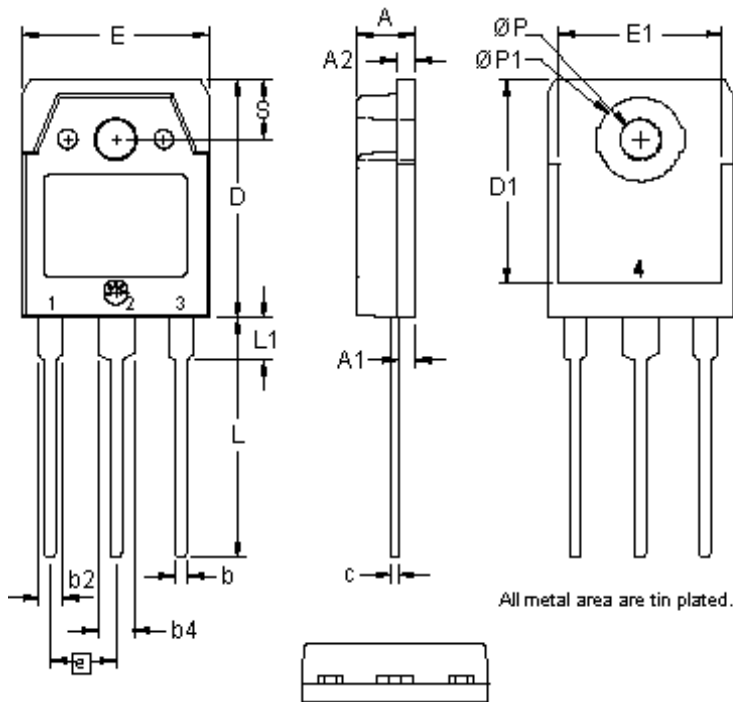
| Symbol | Definition | Conditions | Ratings | | | Unit |
|---------------|-------------------------------------|-----------------------|---------|------|------|------|
| | | | min. | typ. | max. | |
| I_{RMS} | RMS current | per pin ¹⁾ | | | 50 | A |
| R_{thCH} | thermal resistance case to heatsink | | | 0.25 | | K/W |
| T_{stg} | storage temperature | | -55 | | 150 | °C |
| Weight | | | | 5 | | g |
| M_D | mounting torque | | 0.8 | | 1.2 | Nm |
| F_C | mounting force with clip | | 20 | | 120 | N |

¹⁾ I_{RMS} is typically limited by: 1. pin-to-chip resistance; or by 2. current capability of the chip.
 In case of 1, a common cathode/anode configuration and a non-isolated backside, the whole current capability can be used by connecting the backside.

Product Marking


| Ordering | Part Name | Marking on Product | Delivering Mode | Base Qty | Code Key |
|----------|-------------|--------------------|-----------------|----------|----------|
| Standard | DSEC59-03AQ | DSEC59-03AQ | Tube | 30 | 500959 |

| Similar Part | Package | Voltage Class |
|--------------|----------------|---------------|
| DSEC60-03AQ | TO-3P (3) | 300 |
| DSEC60-03A | TO-247AD (3) | 300 |
| DSEC60-03AR | ISOPLUS247 (3) | 300 |

Outlines TO-3P


| SYM | INCHES | | MILLIMETERS | |
|-----|----------|------|-------------|-------|
| | MIN | MAX | MIN | MAX |
| A | .185 | .193 | 4.70 | 4.90 |
| A1 | .051 | .059 | 1.30 | 1.50 |
| A2 | .057 | .065 | 1.45 | 1.65 |
| b | .035 | .045 | .090 | 1.15 |
| b2 | .075 | .087 | 1.90 | 2.20 |
| b4 | .114 | .126 | 2.90 | 3.20 |
| c | .022 | .031 | .055 | .080 |
| D | .780 | .791 | 19.80 | 20.10 |
| D1 | .665 | .677 | 16.90 | 17.20 |
| E | .610 | .622 | 15.50 | 15.80 |
| E1 | .531 | .539 | 13.50 | 13.70 |
| e | .215 BSC | | .545 BSC | |
| L | .779 | .795 | 19.80 | 20.20 |
| L1 | .134 | .142 | 3.40 | 3.60 |
| ØP | .126 | .134 | 3.20 | 3.40 |
| ØP1 | .272 | .280 | 6.90 | 7.10 |
| S | .193 | .201 | 4.90 | 5.10 |

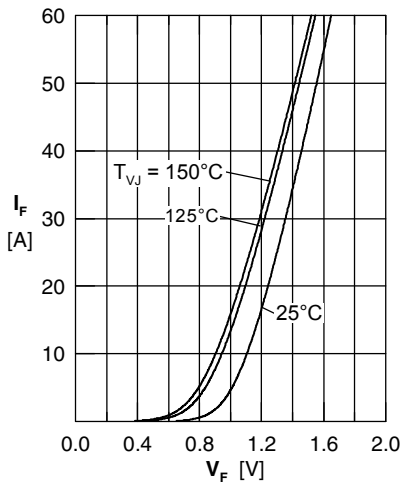


Fig. 1 Forward current I_F versus forward voltage V_F

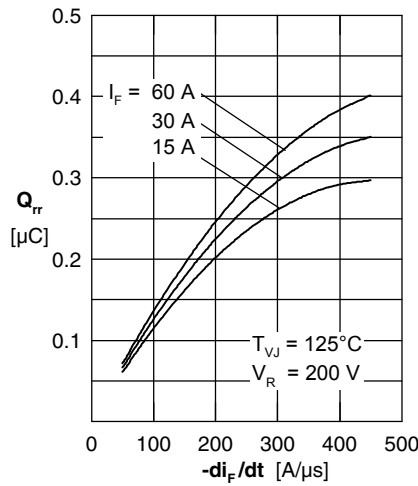


Fig. 2 Typ. reverse recovery charge Q_{rr} versus $-di_F/dt$

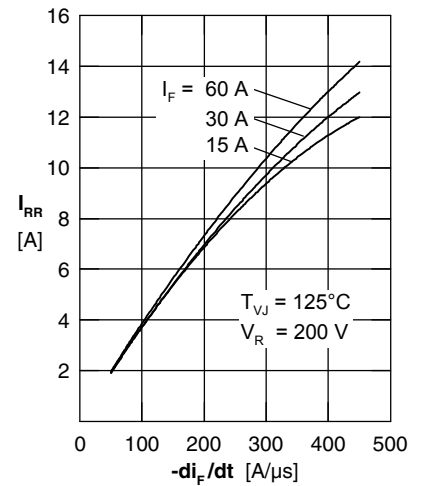


Fig. 3 Typ. reverse recovery current I_{RR} versus $-di_F/dt$

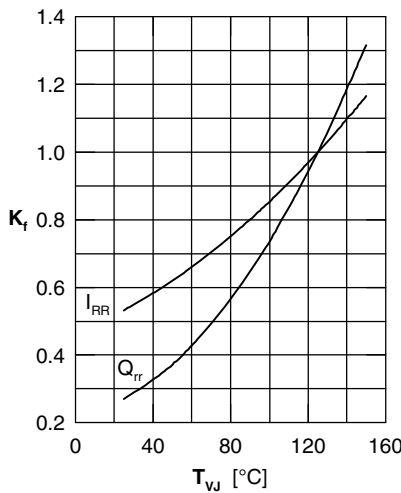


Fig. 4 Dynamic parameters Q_{rr} , I_{RR} versus T_{VJ}

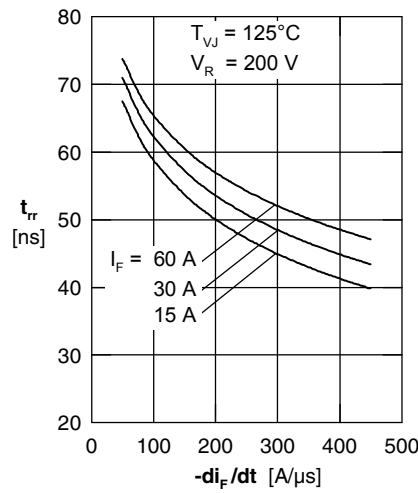


Fig. 5 Typ. reverse recovery time t_{rr} versus $-di_F/dt$

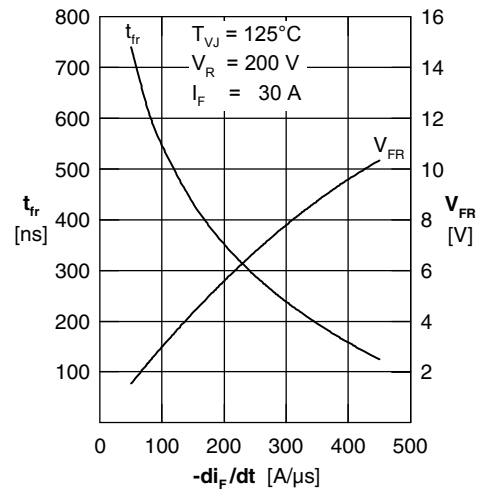


Fig. 6 Typ. forward recovery voltage V_{FR} & forward recovery time t_{fr} vs. di_F/dt

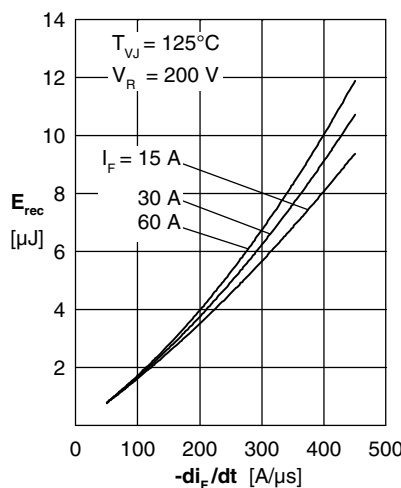


Fig. 7 Typ. recovery energy E_{rec} versus $-di_F/dt$

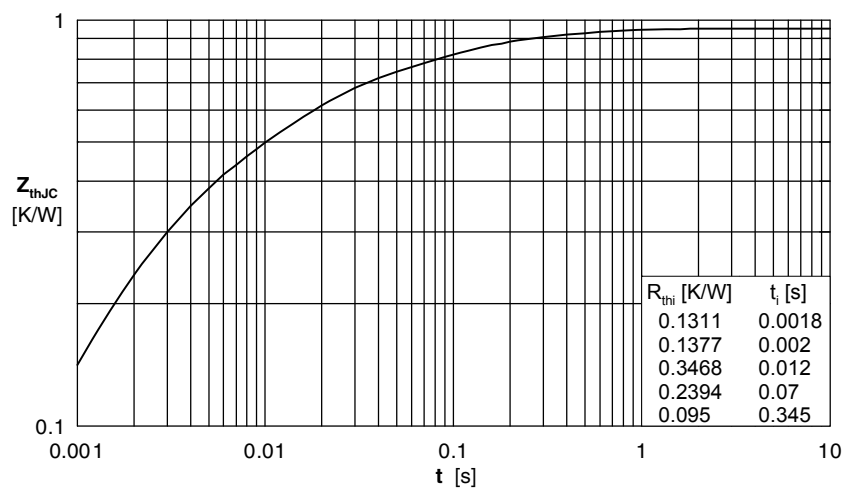


Fig. 8 Transient thermal impedance junction to case