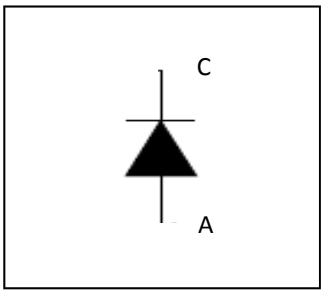
International
IOR Rectifier

# IRD3CH24DB6

Ultra Fast-Soft Recovery Diode

$V_{RRM}$ = 1200V
$I_{F\ (Nominal)}$ = 40A
$T_{J\ (max)}$ = 150°C
$V_F$ typ = 2.3V




| C | A |
|---|---|
| Cathode | Anode |

**Applications**

- Industrial Motor Drive
- Uninterruptible Power Supply
- Welding
- Solar Inverter

| Features | → | Benefits |
|---|---|---|
| Low $V_F$ | | High efficiency in a wide range of applications |
| Ultra Fast-Soft Recovery | | Performance optimized for IGBT anti parallel diode |

| Chip Type | $V_{RRM}$ | $I_{F(Nominal)}$ | Die Size | Package Type |
|---|---|---|---|---|
| IRD3CH24DB6 | 1200V | 40A | 4.293 x 5.588mm$^2$ | Wafer |

**Mechanical Parameters**

| | | |
|---|---|---|
| Die Size | 4.293 x 5.588 | mm$^2$ |
| Anode Pad Size | 2.844 x 4.135 | |
| Area Total / Active | 24.0/14.1 | |
| Thickness | 330 | µm |
| Wafer Size | 150 | mm |
| Minimum Street Width | 100 | µm |
| Flat Position | 0 | Degree |
| Maximum-Possible Chips per Wafer | 611pcs | |
| Passivation Frontside | Silicon Nitride | |
| Front Metal-Anode Pad | Al-1%Si (3µm) | |
| Backside Metal | Cr /Ni /Ag | |
| Die Bond | Electrically conductive epoxy or solder | |
| Reject Ink Dot Size | 0.25mm min (black, center) | |
| Recommended Storage Environment | Store in original container, in dry Nitrogen, | |
| | <6 months at an ambient temperature of 23°C | |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**Maximum Ratings**

| | Parameter | Max. | Units |
|---|---|---|---|
| $V_{RRM}$ | Reverse Voltage | 1200 | V |
| $T_J$, $T_{STG}$ | Operating Junction and Storage Temperature | -40 to +150 | °C |

**Static Characteristics (Tested on wafers) . $T_J$=25°C**

| | Parameter | Min. | Typ. | Max. | Units | Conditions |
|---|---|---|---|---|---|---|
| $V_{RRM}$ | Maximum Reverse Breakdown Voltage | 1200 | — | — | V | $I_{RRM}$= 150µA,$T_J$ = 25°C |
| $V_{FM}$ | Maximum Forward Voltage | — | — | 1.85 | | $T_J$ = 25°C, $I_F$ = 10A, |
| $I_{RM}$ | Maximum Reverse Leakage Current | — | — | 10 | µA | $T_J$ = 25°C, $V_{RRM}$ = 1200V |

**Electrical Characteristics (Not subject to production test)**

| | Parameter | Min. | Typ. | Max. | Units | $T_J$ | Conditions |
|---|---|---|---|---|---|---|---|
| $V_F$ | Forward Voltage | — | 2.3 | 2.7 | V | 25°C | $I_F$ = 40A , $T_J$ = 25°C |
| | | — | 2.5 | — | V | 150°C | $I_F$ = 40A , $T_J$ = 150°C |
| $I_R$ | Leakage Current | — | 1.9 | — | µA | 25°C | $V_R$ = 1200V, $T_J$ = 25°C |
| | | — | 1.0 | — | mA | 150°C | $V_R$ = 1200V, $T_J$ = 150°C |

**Switching Characteristics (Inductive Load-Not subject to production test)**

| | Parameter | Min. | Typ. | Max. | Units | $T_J$ | Conditions |
|---|---|---|---|---|---|---|---|
| $t_{rr}$ | Reverse Recovery Time | — | 250 | — | ns | 25°C | $I_F$ = 40A , di/dt=400A/µs, $V_{RR}$ = 600V |
| | | — | 255 | — | | 150°C | |
| $Q_{rr}$ | Reverse Recovery Charge | — | 3.6 | — | µC | 25°C | |
| | | — | 6.2 | — | | 150°C | |
| $I_{rr}$ | Peak Reverse Recovery Current | — | 24 | — | A | 25°C | |
| | | — | 38 | — | | 150°C | |
| $E_{rr}$ | Reverse Recovery Energy | — | 2.2 | — | mJ | 25°C | |
| | | — | 3.7 | — | | 150°C | |
| S | Softness ($t_b$/$t_a$) | — | 2.2 | — | | 25°C | |
| | | — | 1.2 | — | | 150°C | |

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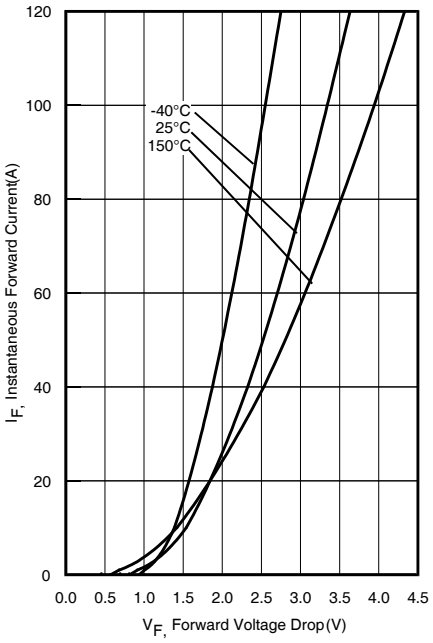


**Fig 1.** Typical Forward Charateristic

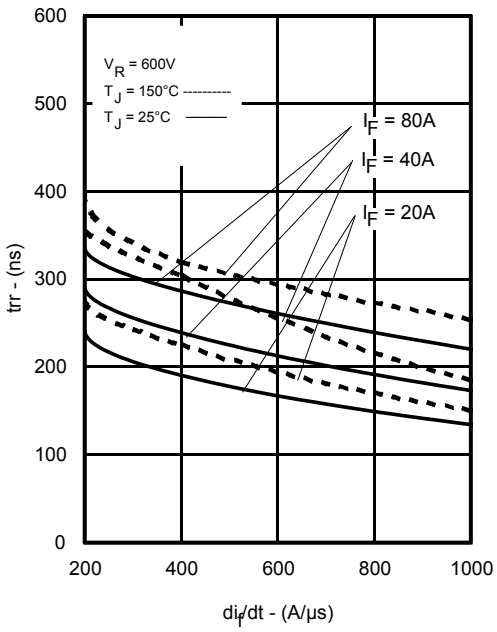


**Fig 2.** Typical $t_{rr}$ vs. di/dt

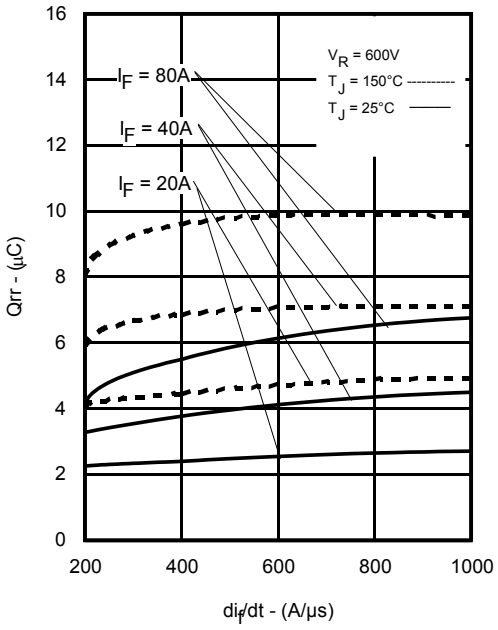


**Fig 3.** Typical $Q_{rr}$ vs. di/dt

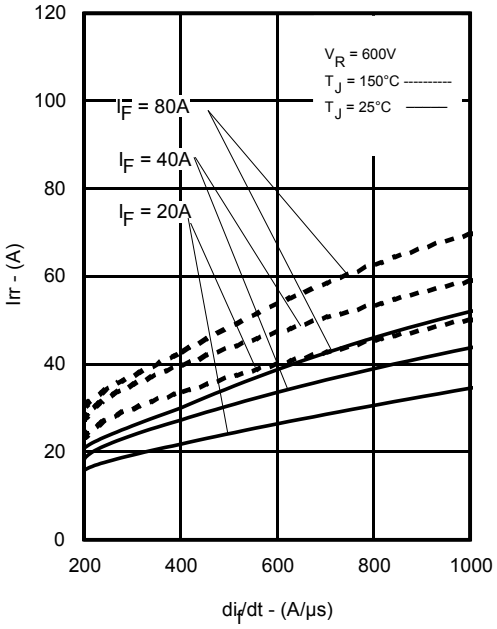


**Fig 4.** Typical $I_{rr}$ vs. di/dt

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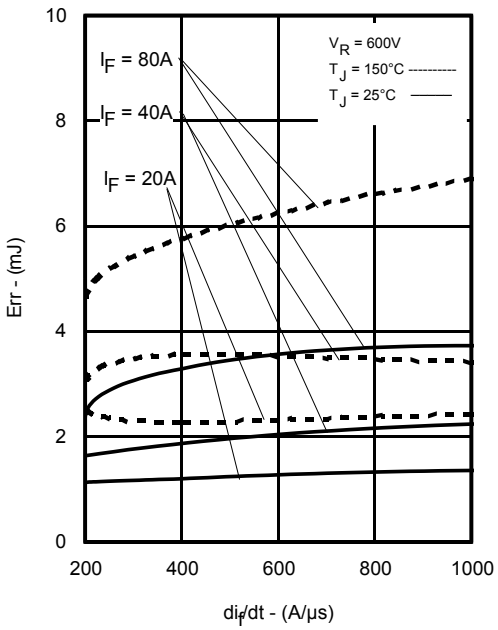


**Fig 5.** Typical Err vs. di/dt

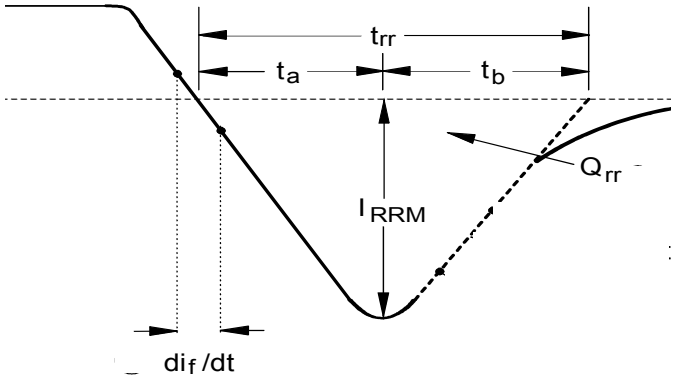


**Fig 6.** Reverse Recovery Waveform

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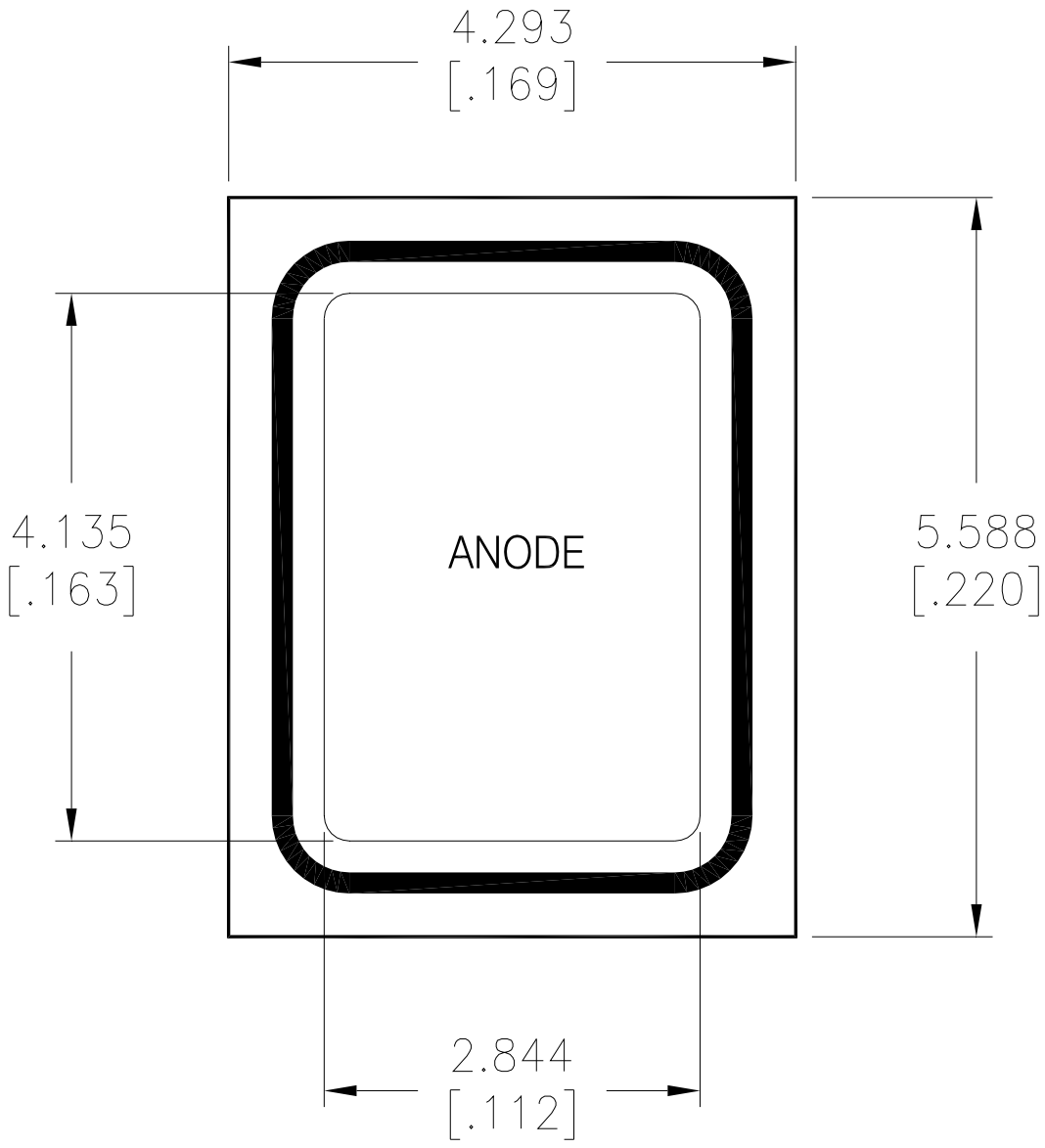
## Die Drawing




NOTES:

1. ALL DIMENSIONS ARE SHOWN IN MILLIMETERS [INCHES].
2. CONTROLLING DIMENSION: MILLIMETERS
3. DIE WIDTH AND LENGTH TOLERANCE: + 0/ -0.0508 [+ 0/ -.002]
4. DIE THICKNESS = 0.330 [.013]

REFERENCE: IRD3CH24DB6

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**Additional Testing and Screening**

For Customers requiring product supplied as Known Good Die (KGD) or requiring specific die level testing, please contact your local IR Sales.

**Shipping**

Three shipping options are offered.

- Un-sawn wafer
- Die in waffle pack (consult the IR Die Sales team for availability)
- Die on film (consult the IR Die Sales team for availability)

Tape and Reel is also available for some products. Please consult your local IR sales office or email http://die.irf.com for additional information.

Please specify your required shipping option when requesting prices and ordering Die product. If not specified, Un-sawn wafer will be assumed.

**Handling**

- Product must be handled only at ESD safe workstations. Standard ESD precautions and safe work environments are as defined in MIL-HDBK-263.
- Product must be handled only in a class 10,000 or better-designated clean room environment.
- Singulated die are not to be handled with tweezers. A vacuum wand with a non-metallic ESD protected tip should be used.

**Wafer/Die Storage**

- Proper storage conditions are necessary to prevent product contamination and/or degradation after shipment.
- Un-sawn wafers and singulated die can be stored for up to 12 months when in the original sealed packaging at room temperature (45% +/- 15% RH controlled environment).
- Un-sawn wafers and singulated die that have been opened can be stored when returned to their containers and placed in a Nitrogen purged cabinet, at room temperature (45% +/- 15% RH controlled environment).
- Note: To reduce the risk of contamination or degradation, it is recommended that product not being used in the assembly process be returned to their original containers and resealed with a vacuum seal process.
- Sawn wafers on a film frame are intended for immediate use and have a limited shelf life.
- Die in Surf Tape type carrier tape are intended for immediate use and have a limited shelf life. This is primarily due to the nature of the adhesive tape used to hold the product in the carrier tape cavity. This product can be stored for up to 30 days. This applies whether or not the material has remained in its original sealed container.

**Further Information**

For further information please contact your local IR Sales office or email your enquiry to

http://die.irf.com


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