

# TRS24N65D

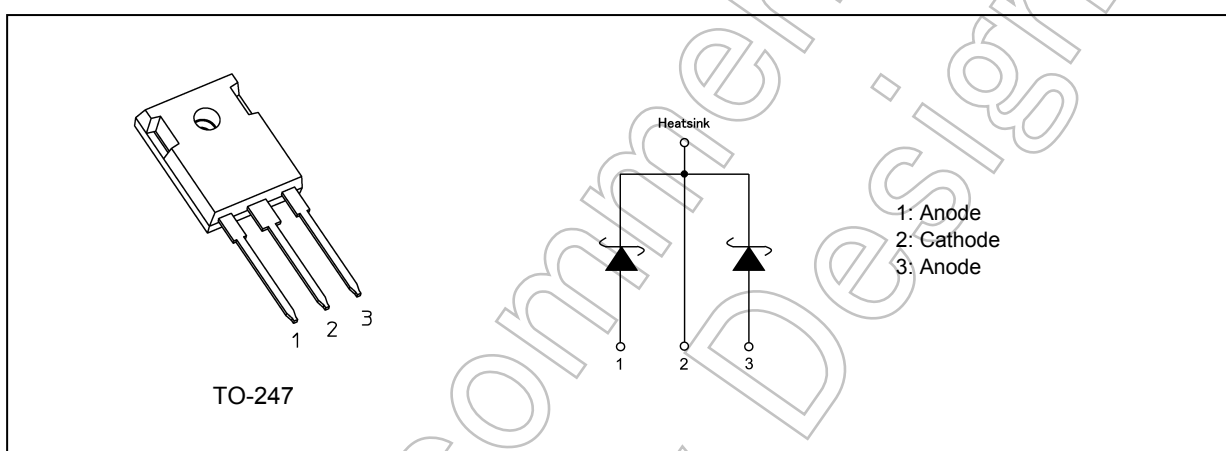
## 1. Applications

- Power Factor Correction
- Solar Inverters
- Uninterruptible Power Supplies
- DC-DC Converters

## 2. Features

- (1) Forward DC current(Per Leg/Both Legs)  $I_{F(DC)} = 12/24$  A
- (2) Repetitive peak reverse voltage  $V_{RRM} = 650$  V

## 3. Packaging and Internal Circuit Pin Assignment



## 4. Absolute Maximum Ratings (Note) (Unless otherwise specified, $T_a = 25$ °C)

| Characteristics                 | Symbol      | Note     | Rating     | Unit             |
|---------------------------------|-------------|----------|------------|------------------|
| Repetitive peak reverse voltage | $V_{RRM}$   |          | 650        | V                |
| Forward DC current              | $I_{F(DC)}$ |          | 12         | A                |
| Forward DC current              |             |          | 24         |                  |
| Forward pulse current           | $I_{FP}$    | (Note 1) | 110        |                  |
| Forward pulse current           |             |          | 220        |                  |
| $I^2t$ limit value              | $I^2t$      | (Note 2) | 18.0       | A <sup>2</sup> s |
| $I^2t$ limit value              |             |          | 72.0       |                  |
| Junction temperature            | $T_j$       |          | 175        | °C               |
| Storage temperature             | $T_{stg}$   |          | -55 to 175 |                  |
| Mounting torque                 | TOR         |          | 0.8        | N · m            |

Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings.

Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

Note 1:  $t = 100$   $\mu$ s

Note 2:  $f = 50$  Hz

Start of commercial production

2014-02

## 5. Thermal Characteristics

| Characteristics                          | Symbol        | Test Condition | Max  | Unit |
|------------------------------------------|---------------|----------------|------|------|
| Thermal resistance (junction-to-case)    | $R_{th(j-c)}$ | Per Leg        | 1.68 | °C/W |
|                                          |               | Both Legs      | 0.84 |      |
| Thermal resistance (junction-to-ambient) | $R_{th(j-a)}$ | —              | 50   |      |

## 6. Electrical Characteristics (Unless otherwise specified, $T_a = 25\text{ °C}$ )

| Characteristics                 | Symbol      | Test Condition                                       | Min | Typ. | Max | Unit |
|---------------------------------|-------------|------------------------------------------------------|-----|------|-----|------|
| Peak forward voltage            | $V_{FM(1)}$ | $I_F = 6\text{ A}$ Per Leg (pulse measurement)       | —   | 1.27 | —   | V    |
|                                 | $V_{FM(2)}$ | $I_F = 12\text{ A}$ Per Leg (pulse measurement)      | —   | 1.54 | 1.7 |      |
|                                 | $V_{FM(3)}$ | $I_F = 24\text{ A}$ Both Legs (pulse measurement)    | —   | 1.54 | 1.7 |      |
| Repetitive peak reverse current | $I_{RRM}$   | $V_{RRM} = 650\text{ V}$ Per Leg (pulse measurement) | —   | 0.43 | 90  | μA   |
| Junction capacitance            | $C_j$       | $V_R = 650\text{ V}$ , $f = 1\text{ MHz}$ Per Leg    | —   | 65   | —   | pF   |

## 7. Marking

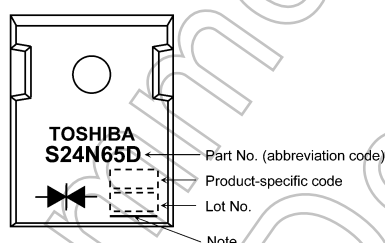


Fig. 7.1 Marking

Note: A line under a Lot No. identifies the indication of product Labels.

[[G]]/RoHS COMPATIBLE or [[G]]/RoHS [[Pb]]

Please contact your TOSHIBA sales representative for details as to environmental matters such as the RoHS compatibility of Product.

The RoHS is the Directive 2011/65/EU of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

| Abbreviation Code | Part Number |
|-------------------|-------------|
| S24N65D           | TRS24N65D   |

## 8. Usage Considerations

- The absolute maximum ratings are rated values that must not be exceeded during operation, even for an instant. The following are the recommended general derating methods for designing a circuit board using this device.

$V_{RRM}$ :  $V_{RRM}$  has a temperature coefficient of 0.1 %/°C.

Take this coefficient into account when designing a circuit board that will be operated in a low-temperature environment.

$I_{F(DC)}$ : We recommend that the worst-case current be no greater than 80 % of the absolute maximum rating of  $I_{F(DC)}$  and that the worst-case junction temperature,  $T_j$ , be kept below 140 °C.

$I_{FP}$ : We recommend that the worst-case current be no greater than 80 % of the absolute maximum rating of  $I_{FP}$  and that the worst-case junction temperature,  $T_j$ , be kept below 140 °C.

$I^2t$ : This rating specifies a non-repetitive limit value.

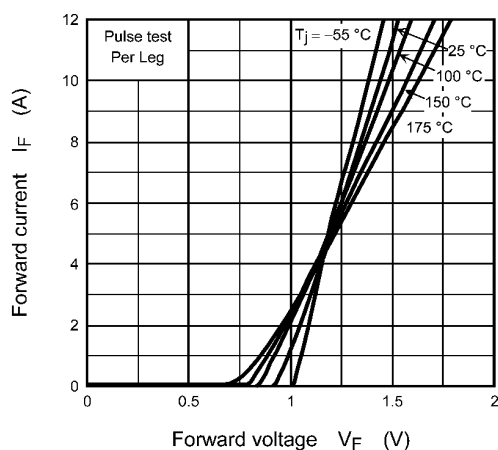
This only applies to an abnormal operation, which seldom occurs during the lifespan of a device.

$T_j$ : Derate device parameters in proportion to this rating in order to ensure high reliability.

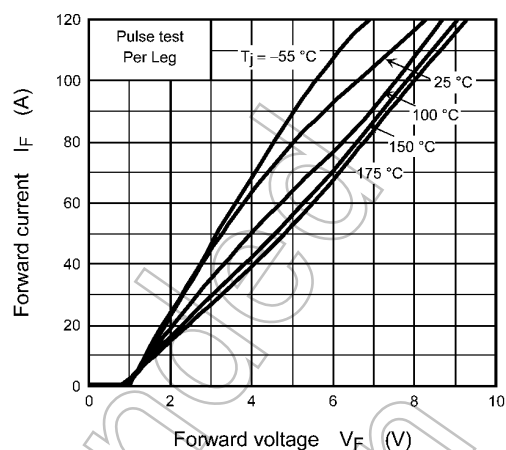
We recommend that the junction temperature ( $T_j$ ) of a device be kept below 140 °C.

- For other design considerations, see the Rectifiers databook or the Toshiba Semiconductor website.

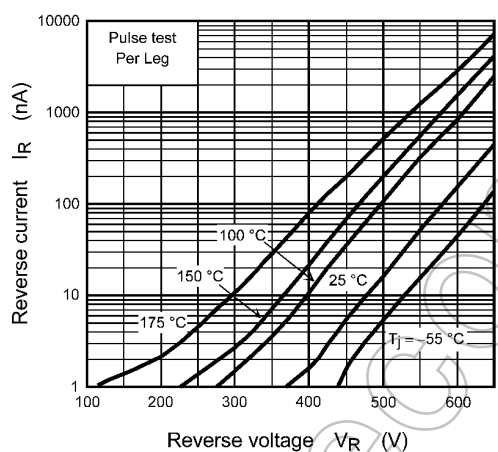
# 9. Characteristics Curves (Note)



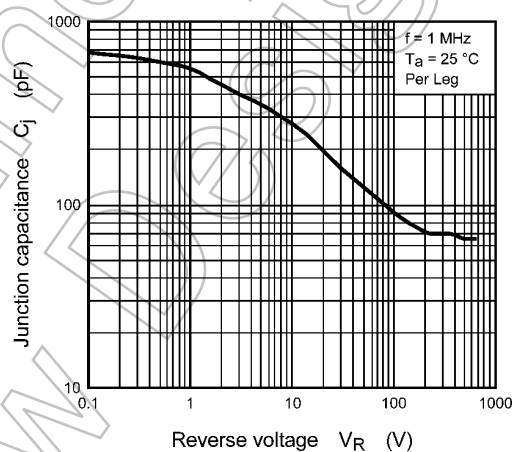
**Fig. 9.1  $I_F - V_F$**



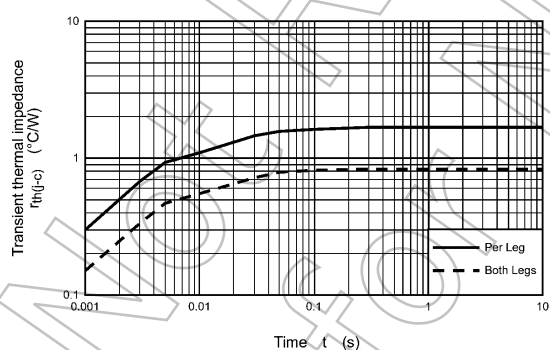
**Fig. 9.2  $I_F - V_F$**



**Fig. 9.3  $I_R - V_R$**



**Fig. 9.4  $C_j - V_R$**

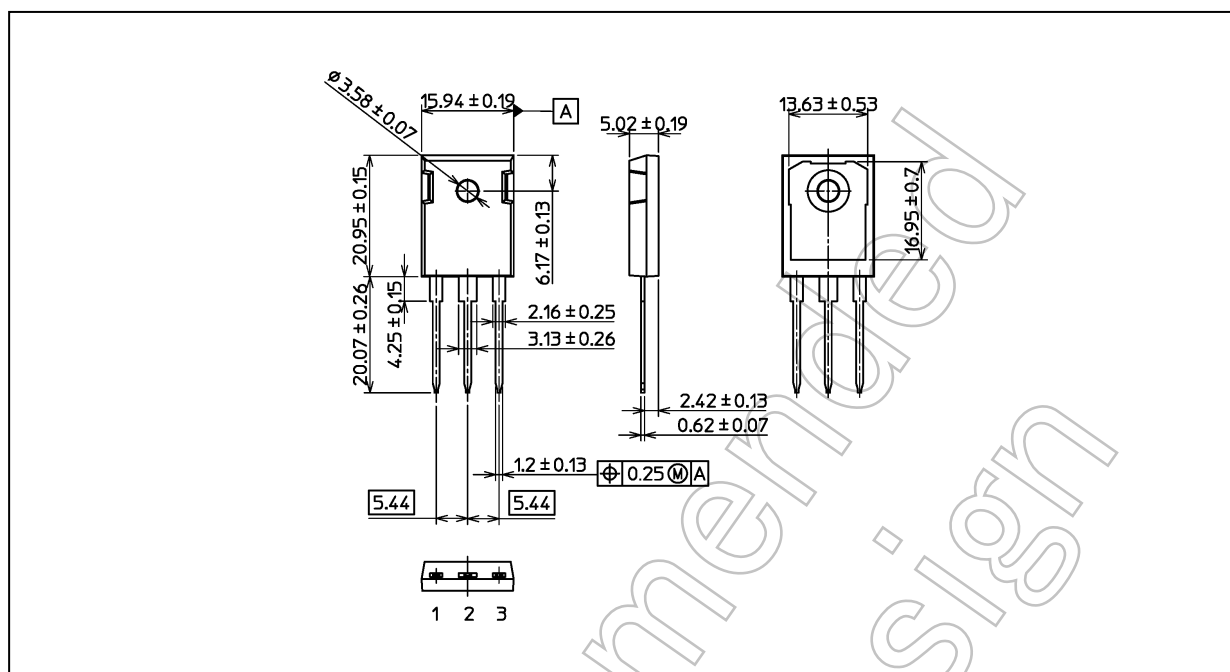


**Fig. 9.5  $r_{th(j-c)} - t$   
(Guaranteed Maximum)**

Note: The above characteristics curves are presented for reference only and not guaranteed by production test, unless otherwise noted.

Package Dimensions

Unit: mm



Weight: 6.15 g (typ.)

| Package Name(s)  |
|------------------|
| TOSHIBA: 2-16L1A |
| Nickname: TO-247 |

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