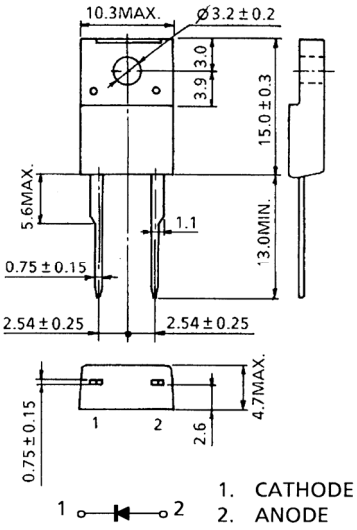
TOSHIBA SUPER FAST RECOVERY DIODE SILICON EPITAXIAL TYPE

5JUZ47

SWITCHING MODE POWER SUPPLY APPLICATION
CONVERTER & CHOPPER APPLICATION

- Repetitive Peak Reverse Voltage : V_{RRM} = 600 V
- Average Forward Current : $I_{F\ (AV)}$ = 5 A
- Ultra Fast Reverse-Recovery Time : t_{rr} = 100 ns
- Low Switching Losses and Low Output Noise

Unit: mm



JEDEC	—
JEITA	—
TOSHIBA	3-10C3A

Weight: 2.0 g (typ.)

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

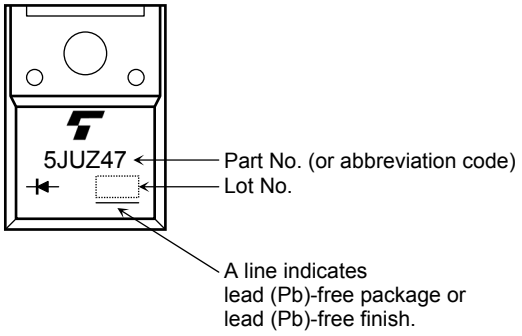
CHARACTERISTIC	SYMBOL	RATING	UNIT
Repetitive Peak Reverse Voltage	V_{RRM}	600	V
Average Forward Current	$I_{F\ (AV)}$	5	A
Peak One Cycle Surge Forward Current (Non−Repetitive)	I_{FSM}	50 (50Hz)	A
		60 (60Hz)	
Junction Temperature	T_j	−40~150	°C
Storage Temperature Range	T_{stg}	−40~150	°C

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).

ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN	MAX	UNIT
Peak Forward Voltage	V_{FM}	I_{FM} = 5A	—	1.5	V
Repetitive Peak Reverse Current	I_{RRM}	V_{RRM} = 600V	—	100	μA
Reverse Recovery Time	t_{rr}	I_F = 2A, di / dt = −20A / μs	—	100	ns
Forward Recovery Time	t_{fr}	I_F = 1A	—	200	ns
Thermal Resistance	$R_{th\ (j-c)}$	DC	—	4.0	°C/ W

MARKING



Abbreviation Code	Part No.
5JUZ47	5JUZ47

Handling Precaution

The absolute maximum ratings denote the absolute maximum ratings, which are rated values and must not be exceeded during operation, even for an instant. The following are the general derating methods that we recommend when you design a circuit with a device.

V_{RRM}: We recommend that the worst case voltage, including surge voltage, be no greater than 80% of the absolute maximum rating of V_{RRM} for a DC circuit and be no greater than 50% of that of V_{RRM} for an AC circuit. V_{RRM} has a temperature coefficient of 0.1%/°C. Take this temperature coefficient into account designing a device at low temperature.

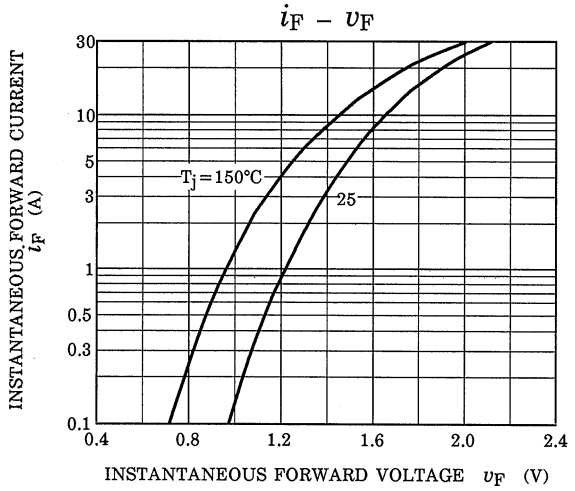
$I_{F(AV)}$: We recommend that the worst case current be no greater than 80% of the absolute maximum rating of $I_{F(AV)}$. Carry out adequate heat design. If you can't design a circuit with excellent heat radiation, set the margin by using an allowable Tamax-$I_{F(AV)}$ curve.

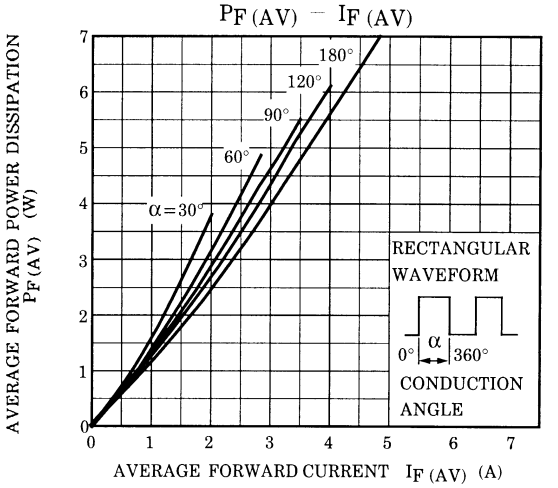
This rating specifies the non-repetitive peak current in one cycle of a 50-Hz sine wave, condition angle 180. Therefore, this is only applied for an abnormal operation, which seldom occurs during the lifespan of the device.

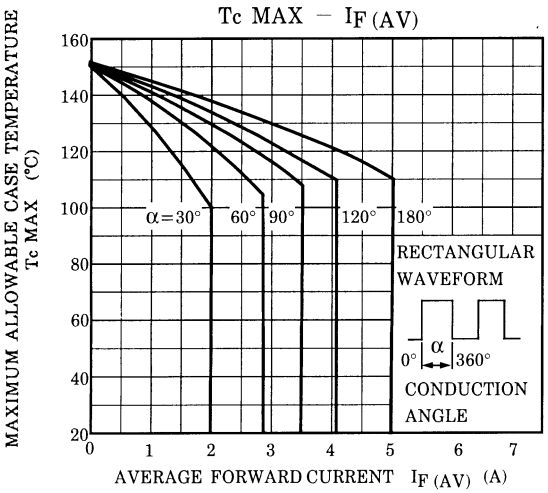
We recommend that a device be used at a Tj of below 120°C under the worst load and heat radiation conditions.

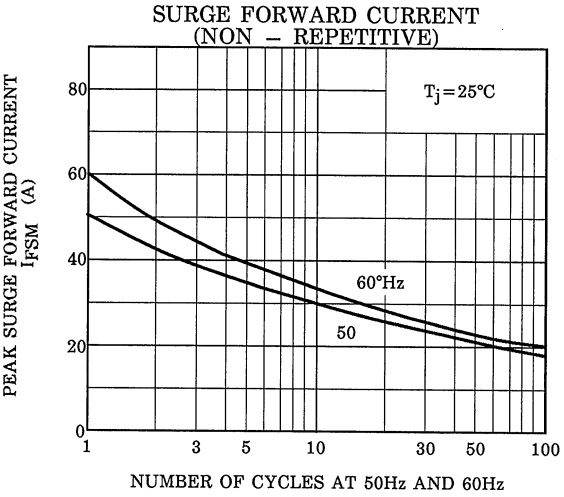
Thermal resistance between junction and ambient fluctuates depending on the device's mounting condition. When using a device, design a circuit board and a soldering land size to match the appropriate thermal resistance value.

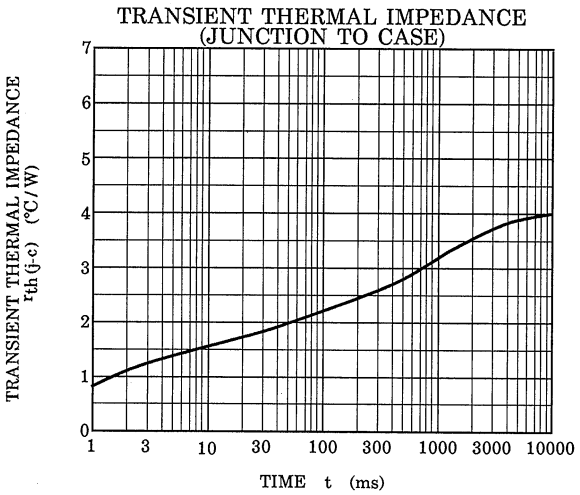
Please refer to the Rectifiers databook for further information.

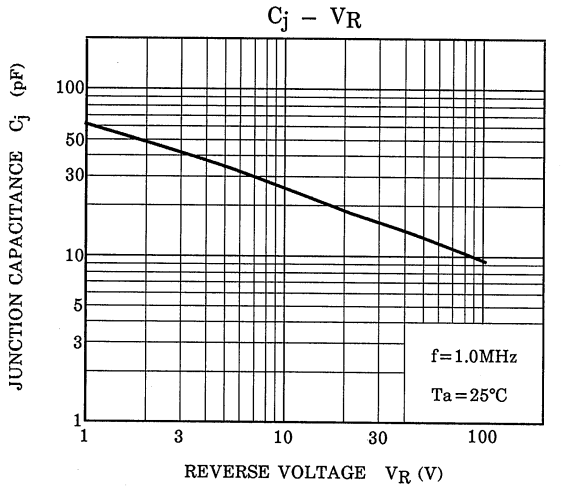

$i_F - v_F$
INSTANTANEOUS FORWARD CURRENT i_F (A)
30
10
5
3
1
0.5
0.3
0.1
T_j = 150°C
25
0.4
0.8
1.2
1.6
2.0
2.4
INSTANTANEOUS FORWARD VOLTAGE v_F (V)


$P_{F(AV)} - I_{F(AV)}$
AVERAGE FORWARD POWER DISSIPATION $P_{F(AV)}$ (W)
180°
120°
90°
60°
α = 30°
RECTANGULAR WAVEFORM
0°
α
360°
CONDUCTION ANGLE
0
1
2
3
4
5
6
7
AVERAGE FORWARD CURRENT $I_{F(AV)}$ (A)


Tc MAX − $I_{F(AV)}$
MAXIMUM ALLOWABLE CASE TEMPERATURE Tc MAX (°C)
160
140
120
100
80
60
40
20
α = 30°
60°
90°
120°
180°
RECTANGULAR WAVEFORM
0°
α
360°
CONDUCTION ANGLE
0
1
2
3
4
5
6
7
AVERAGE FORWARD CURRENT $I_{F(AV)}$ (A)


SURGE FORWARD CURRENT
(NON − REPETITIVE)
PEAK SURGE FORWARD CURRENT I_{FSM} (A)
80
60
40
20
0
T_j = 25°C
60°Hz
50
1
3
5
10
30
50
100
NUMBER OF CYCLES AT 50Hz AND 60Hz


TRANSIENT THERMAL IMPEDANCE
(JUNCTION TO CASE)
TRANSIENT THERMAL IMPEDANCE $r_{th(j-c)}$ (°C/W)
7
6
5
4
3
2
1
0
1
3
10
30
100
300
1000
3000
10000
TIME t (ms)


$C_j - V_R$
JUNCTION CAPACITANCE C_j (pF)
100
50
30
10
5
3
1
f = 1.0MHz
Ta = 25°C
1
3
10
30
100
REVERSE VOLTAGE V_R (V)

RESTRICTIONS ON PRODUCT USE

20070701-EN

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