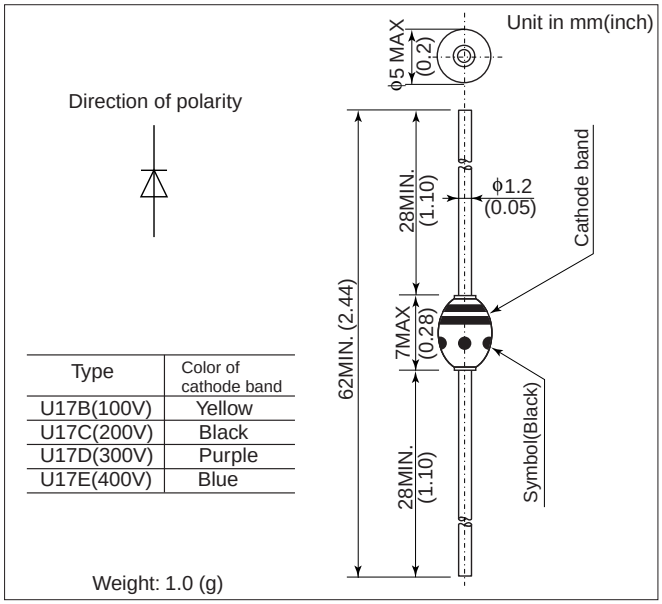
U17

FEATURES

- Transient surge voltage protection.
- Diffused-junction. Glass passivated and encapsulated.

OUTLINE DRAWING



Type	Color of cathode band
U17B(100V)	Yellow
U17C(200V)	Black
U17D(300V)	Purple
U17E(400V)	Blue

ABSOLUTE MAXIMUM RATINGS

Items	Type		U17B	U17C	U17D	U17E
Repetitive Peak Reverse Voltage	V_{RRM}	V	100	200	300	400
Peak Reverse Power	P_{RM}	kW	3(Tj = 25°C,Impulse duration 10μs Non-repetitive)			
Average Forward Current	$I_{F(AV)}$	A	2.5(Single-phase half sine wave 180° conduction, T_L=90°C, Lead length = 10mm)			
Surge(Non-Repetitive) Forward Current	I_{FSM}	A	100(Without PIV, 10ms conduction, Tj = 175°C start)			
I^2t Limit Value	I^2t	A^2s	40(Time = 2 ~ 10ms, I = RMS value)			
Operating Junction Temperature	T_j	°C	-40 ~ +175			
Storage Temperature	T_{stg}	°C	-40 ~ +175			

Notes (1) Lead mounting : Lead temperature 300°C max. to 3.2mm from body for 5sec. max..
(2) Mechanical strength : Bending 90°×2 cycles or 180°×1 cycle, Tensile 3kg, Twist 90°×1 cycle.

CHARACTERISTICS(T_L=25°C)

Items	Symbols	Units	Min.	Typ.	Max.	Test Conditions	
Peak Reverse Current	I_{RRM}	μA	—	4	50	B class	Rated V_{RRM}
				1.5	20	C,D class	
				0.6	10	E class	
Peak Forward Voltage	V_{FM}	V	—	—	1.1	I_{FM}=2.5Ap, Single-phase half sine wave 1 cycle	
Reverse Recovery Time	trr	μs	—	3.0	—	I_F=2mA, V_R=-15V	
Avalanche Voltage	V_{AVL}	V	Table.1 and 2			I_{RM}=1.0mA, Single-phase half sine wave 1 pps, Time ≤ 5s	
Avalanche Voltage Temperature Coefficient	α	%/°C	—	0.080	—	$\frac{\Delta VAVL}{VAVL} \times \frac{1}{175\text{-}25} \times 100$	
Steady State Thermal Impedance	$R_{th(j\text{-}a)}$	°C/W	—	—	60	Lead length = 10 mm	
	$R_{th(j\text{-}l)}$				30		

U17

TABLE.1 Standard voltage

V_{RRM} Class	B		C		D		E		Units
V_{AVL}	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	
Band	230	415	280	505	375	725	465	805	V

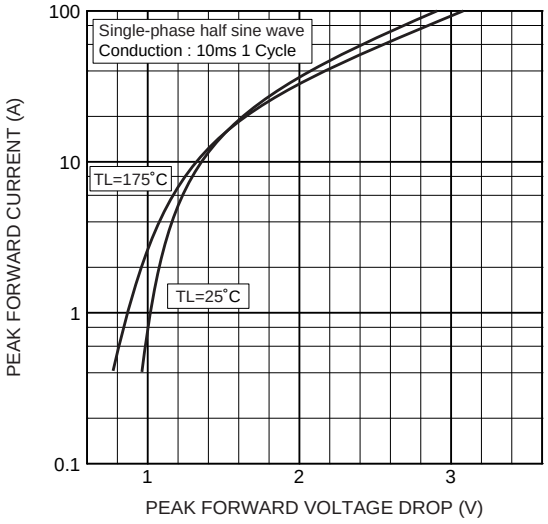
"example order type" U17C V_{RRM} : 200V / $IF_{(AV)}$: 2.5A / V_{AVL} : 280~505V

TABLE.2 Optional voltage : for Large order products

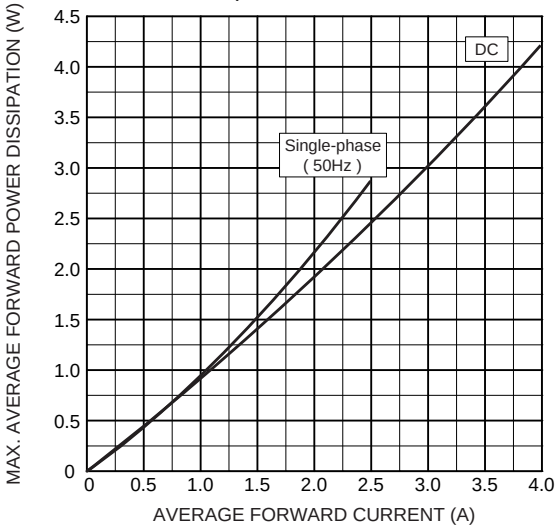
V_{RRM} Class			B				C				D				E			Units
V_{AVL} Symbols			27	30	33	36	33	36	39	44	44	50	55	63	55	63	70	
TYP. V_{AVL}			270	300	330	360	330	360	390	440	440	500	550	630	550	630	700	V
V_{AVL} Band	A	MIN	230	255	280	305	280	305	330	375	375	425	465	535	465	535	595	V
	±15%	MAX	310	345	380	415	380	415	450	505	505	575	635	725	635	725	805	
	B	MIN	250	280	305	330	305	330	360	405	405	460	505	580	505	580	645	
	±7.5%	MAX	290	320	355	390	355	390	420	475	475	535	590	680	590	680	750	

"example order type" U17C36A V_{RRM} : 200V / $IF_{(AV)}$: 2.5A / V_{AVL} : 305~415V

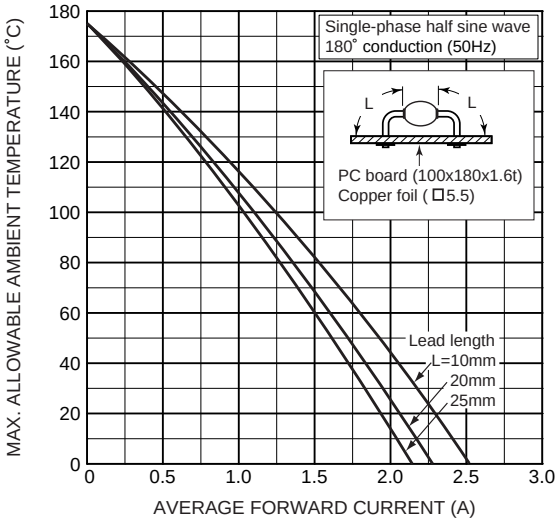
Forward characteristics



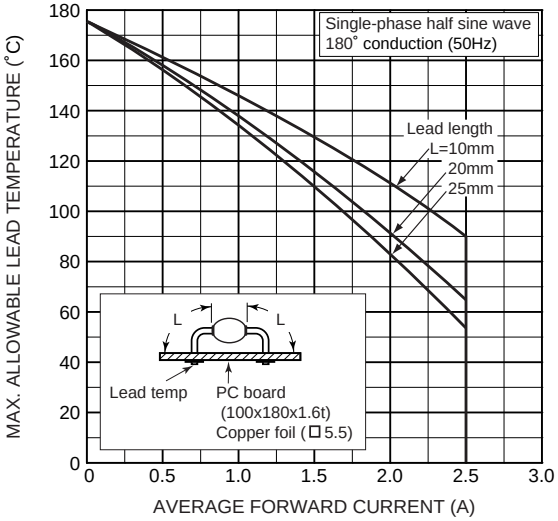
Max. average forward power dissipation
(Resistive or inductive load)



Max. allowable ambient temperature
(Resistive or inductive load)

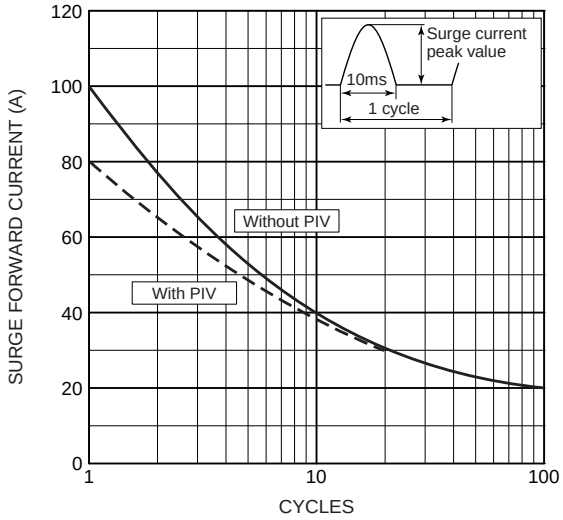


Max. allowable lead temperature
(Resistive or inductive load)

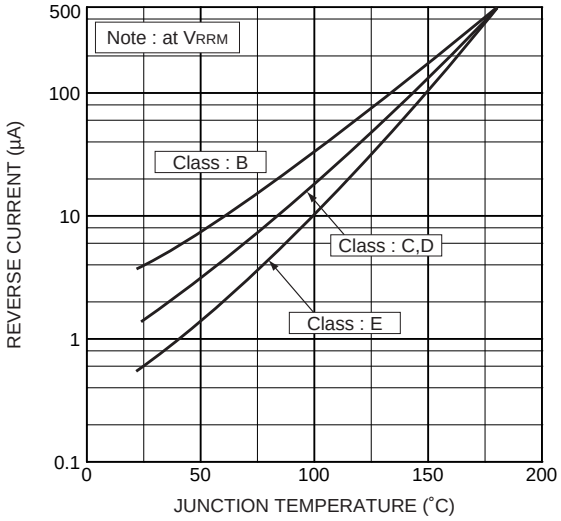


U17

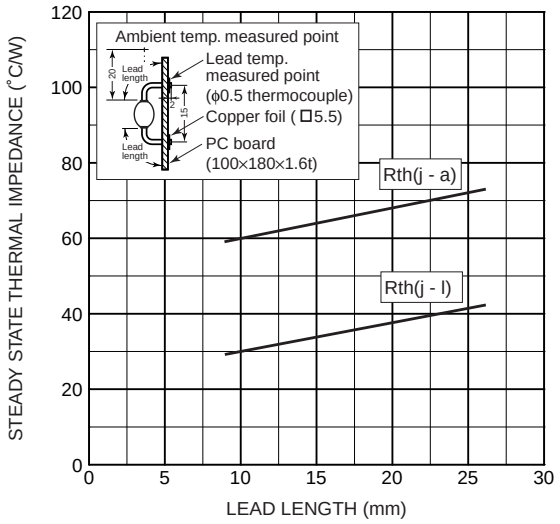
Surge forward current characteristics
(Non-repetitive)



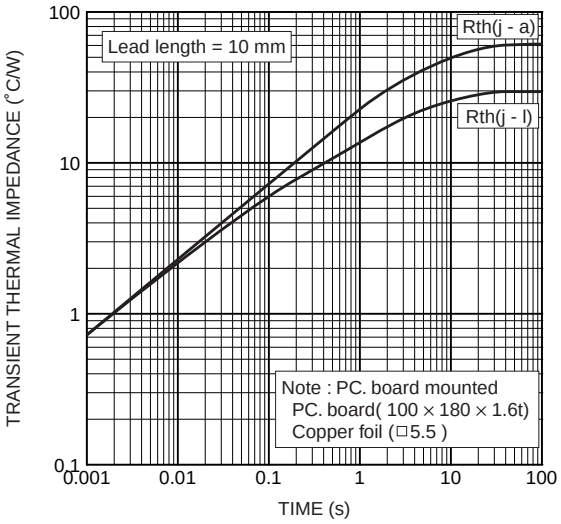
Typ. Reverse current vs. junction temperature



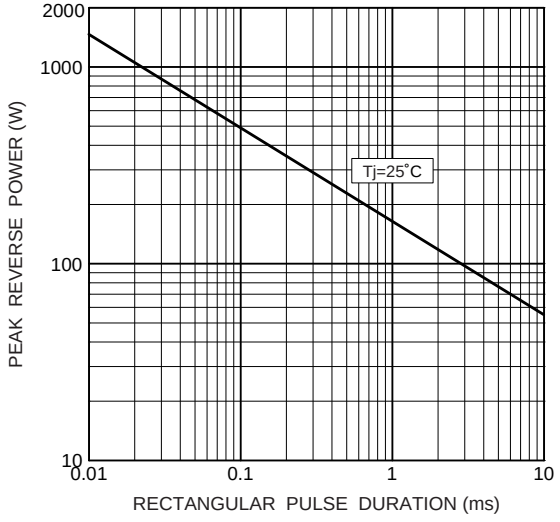
Steady-state thermal impedance



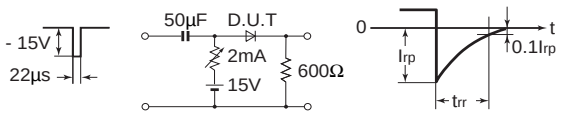
Transient thermal impedance



Typical reverse power characteristics
(Non-repetitive)



Reverse recovery time (trr) test circuit



Precautions for Safe Use and Notices

If semiconductor devices are handled inappropriate manner, failures may result.
For this reason, be sure to read “Precaution for Use” before use.

⚠ This mark indicates an item about which caution is required.

⚠ **CAUTION** This mark indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury and damage to property.

⚠ CAUTION

(1) Regardless of changes in external conditions during use “absolute maximum ratings” should never be exceed in designing electronic circuits that employ semiconductors.In the case of pulse use, furthermore,″safe operating area(SOA)”precautions should be observed.

(2) Semiconductor devices may experience failures due to accident or unexpected surge voltages. Accordingly, adopt safe design features, such as redundancy or prevention of erroneous action, to avoid extensive damage in the event of a failure.

(3) In cases where extremely high reliability is required (such as use in nuclear power control, aerospace and aviation, traffic equipment, life-support-related medical equipment, fuel control equipment and various kinds of safety equipment), safety should be ensured by using semiconductor devices that feature assured safety or by means of user’s fail-safe precautions or other arrangement. Or consult Hitachi’s sales department staff.

(If a semiconductor device fails, there may be cases in which the semiconductor device, wiring or wiring pattern will emit smoke or cause a fire or in which the semiconductor device will burst)

NOTICES

1. This Datasheet contains the specifications, characteristics(in figures and tables), dimensions and handling notes concerning power semiconductor products (hereinafter called “products”) to aid in the selection of suitable products.
2. The specifications and dimensions, etc. stated in this Datasheet are subject to change without prior notice to improve products characteristics. Before ordering, purchasers are advised to contact Hitachi’s sales department for the latest version of this Datasheet and specifications.
3. In no event shall Hitachi be liable for any damage that may result from an accident or any other cause during operation of the user’s units according to this Datasheet. Hitachi assumes to responsibility for any intellectual property claims or any other problems that may result from applications of information, products or circuits described in this Datasheet.
4. In no event shall Hitachi be liable for any failure in a semiconductor device or any secondary damage resulting from use at a value exceeding the absolute maximum rating.
5. No license is granted by this Datasheet under any patents or other rights of any third party or Hitachi Power Semiconductor Device, Ltd.
6. This Datasheet may not be reproduced or duplicated, in any form, in whole or in part, without the expressed written permission of Hitachi Power Semiconductor Device, Ltd.
7. The products (technologies) described in this Datasheet are not to be provided to any party whose purpose in their application will hinder maintenance of international peace and safety nor are they to be applied to that purpose by their direct purchasers or any third party. When exporting these products (technologies), the necessary procedures are to be taken in accordance with related laws and regulations.

Refer to the following website for the latest information. Consult Hitachi’s sales department staff if you have any questions.

http://www.hitachi-power-semiconductor-device.co.jp/en/