General Description

This product family offers state of the art performance. It is designed for high frequency applications where high efficiency and high reliability are required.

TO-247-2L

Features

- Low conduction loss due to low V_F
- Extremely low switching loss by tiny Q_C
- Highly rugged due to better surge current
- Industrial standard quality and reliability

Applications

- UPS
- Power Inverter
- High performance SMPS
- Power factor correction

Ordering Part Number	Package	Marking
C3D50170H	TO-247-2L	HC3D50170H

Absolute Maximum Ratings (T_j = 25°C)

Parameter		Symbol	Value	Unit
Reverse voltage (repetitive peak)		V_{RM}	1700	V
Reverse voltage (DC)		V_R	1700	V
Continuous forward current (T_c=145°C)		I_F	50 *1	A
Surge non-repetitive forward current	PW=10ms sinusoidal, T_j=25°C	I_{FSM} *2	150	A
	PW=10ms sinusoidal, T_j=150°C		110	A
	PW=10μs square, T_j=25°C		630	A
i^2t value	1≦PW≦10ms, T_j=25°C	$\int i^2dt$ *2	120	A^2s
	1≦PW≦10ms, T_j=150°C		60	A^2s
Junction temperature		T_j	175	°C
Range of storage temperature		T_{stg}	−55 to +175	°C

*1 Limited by T_j *2 Assumes $Z_{th(j-a)}$ of 0.16 °C/W or less. (Pulse Width = 8.3ms)

Electrical characteristics (T_j = 25°C)

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
DC blocking voltage	V_{DC}	I_R =0.3mA	1700	-	-	V
Forward voltage	V_F	I_F=50A,T_j=25°C	-	1.65	1.95	V
		I_F=50A,T_j=150°C	-	2.5	-	V
		I_F=50A,T_j=175°C	-	2.8	-	V
Reverse current	I_R	V_R=1700V,T_j=25°C	-	5	300	μA
		V_R=1700V,T_j=150°C	-	110	-	μA
		V_R=1700V,T_j=175°C	-	250	-	μA
Total capacitance	C	V_R=1V,f=1MHz	-	3100	-	pF
		V_R=1700V,f=1MHz	-	170	-	pF
Total capacitive charge	Q_C	V_R=800V,di/dt=500A/μs	-	158	-	nC
Switching time	t_C	V_R=800V,di/dt=500A/μs	-	39	-	ns

Electrical characteristic curves

Fig.1 V_F - I_F Characteristics

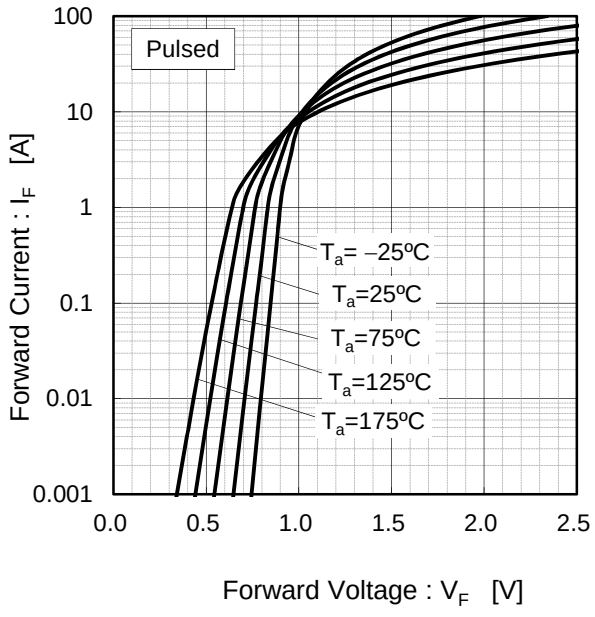


Fig.2 V_F - I_F Characteristics

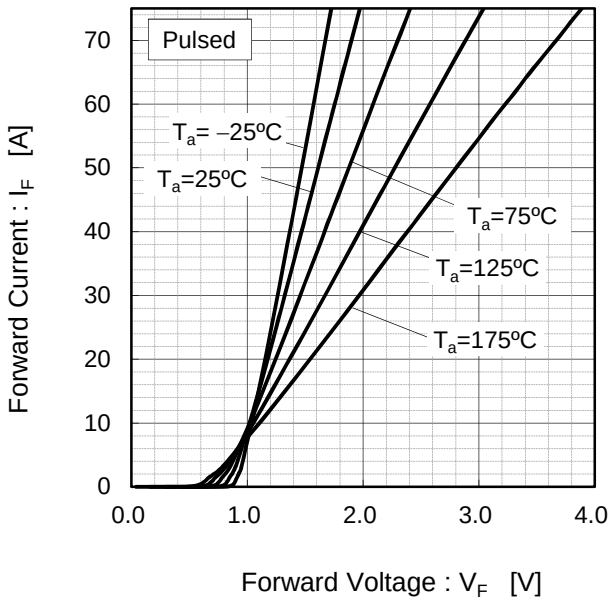


Fig.3 V_R - I_R Characteristics

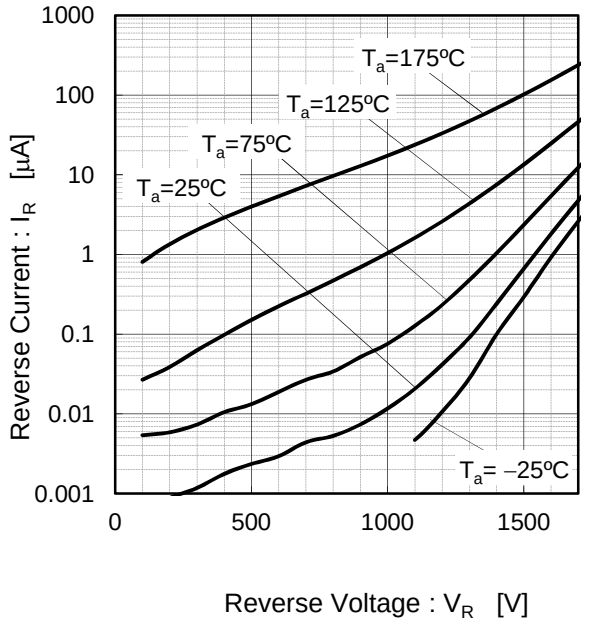


Fig.4 V_R-C_t Characteristics

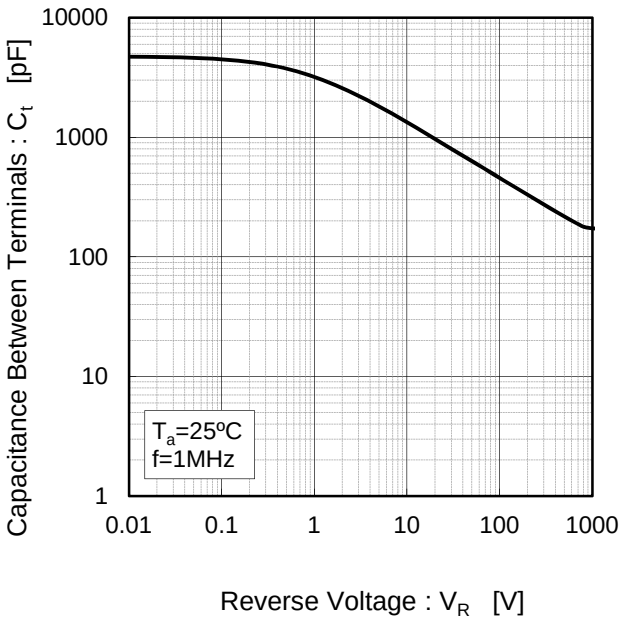
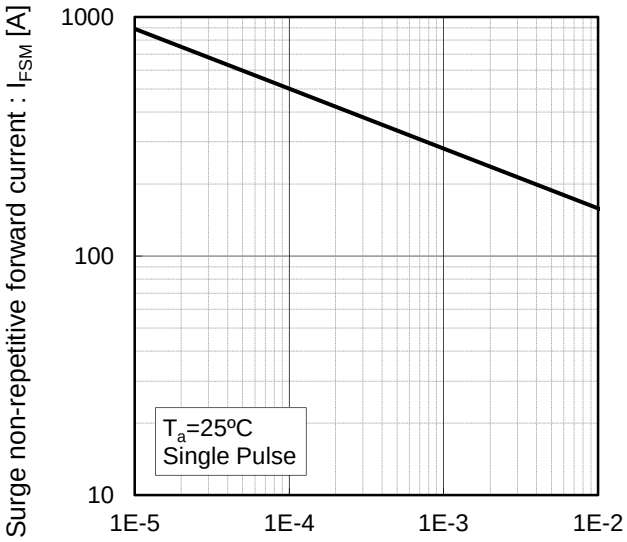


Fig.5 Surge non-repetitive forward current vs. Pulse width (Sinusoidal waveform)*



* Assumes $Z_{th(j-a)}$ of 0.38 °C/W or less.
(Pulse Width = 8.3ms)

Fig.6 Typical capacitance store energy

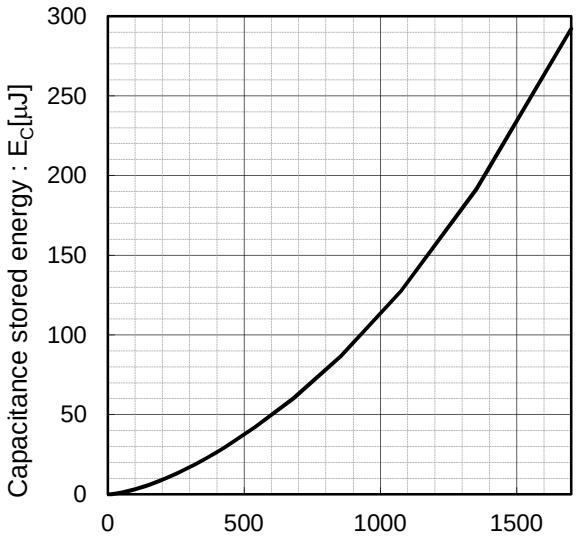
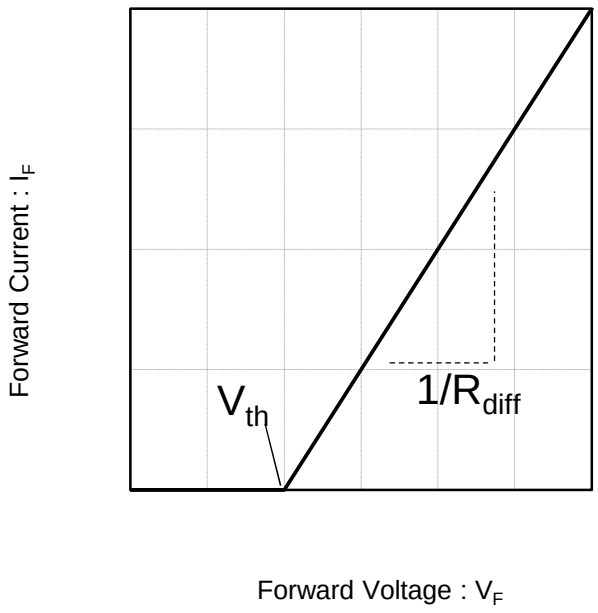


Fig.7 Equivalent forward current curve



$$V_F = V_{th} + R_{diff} I_F$$

$$V_{th}(T_j) = a_0 + a_1 T_j$$
$$R_{diff}(T_j) = b_0 + b_1 T_j + b_2 T_j^2$$

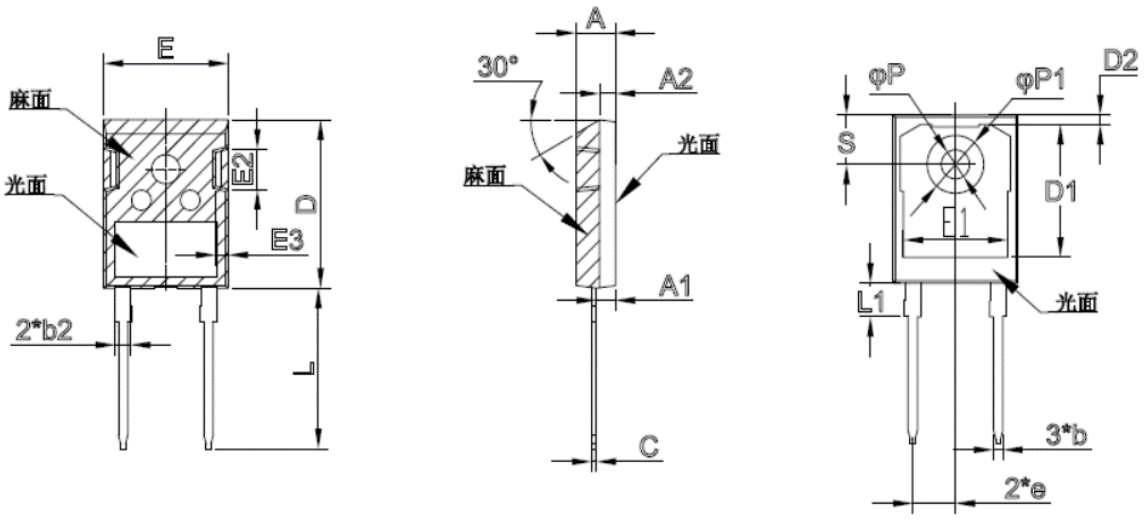
Symbol	Typical Value	Unit
a_0	9.21E-01	V
a_1	– 1.52E-03	V/°C
b_0	1.20E-02	Ω
b_1	8.13E-05	Ω/°C
b_2	5.64E-07	$\Omega/°C^2$

T_j in ºC; -55 ºC < T_j < ºC ; I_F < 100A

Package Dimensions

Package TO-247-2L

Unit:mm



	Min	Nom	Max		Min	Nom	Max
A	4.70	5.00	5.20	E1	13.06	13.26	13.56
A1	2.30		2.50	E2	4.90	5.00	5.10
A2	1.90	2.00	2.10	E3	1.50	1.60	1.70
b	1.10	1.20	1.30	e	5.34	5.44	5.54
b2		2.00		L	19.80	20.00	20.32
				L1		4.17	4.50
C	0.5	0.6	0.7	P	3.50	3.60	3.70
D	20.8	20.95	21.1	P1	7.00	7.19	7.40
D1		16.55		S	6.04	6.15	6.3
D2	0.95	1.17	1.35				
E	15.48	15.88	16.28				

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