SCS320AM

SiC Schottky Barrier Diode Datasheet

V_R	650V
I_F	20A
Q_C	47nC

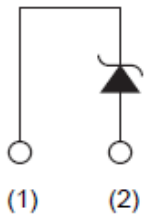
●Outline

TO-220FM-2LGE

●Features

1) Shorter recovery time
2) Reduced temperature dependence
3) High-speed switching possible
4) High surge current capability

●Inner circuit



(1) Cathode
(2) Anode

●Packaging specifications

Type	Packaging	Tube
	Reel size (mm)	-
	Tape width (mm)	-
	Basic ordering unit (pcs)	50
	Packing code	C7G
	Marking	SCS320AM

●Applications

- PFC Boost Topology
- Secondary Side Rectification
- Data Center
- PV Power Conditioners

●Absolute maximum ratings (T_{vj}=25°C unless otherwise specified)

Parameter		Symbol	Value	Unit
Reverse voltage (repetitive peak)		V_{RM}	650	V
Reverse voltage (DC)		V_R	650	V
Continuous forward current (T_c= 40°C) *1		I_F	20	A
Surge non-repetitive forward current	PW=10ms sinusoidal, T_{vj}=25°C	I_{FSM}	123	A
	PW=10ms sinusoidal, T_{vj}=150°C		104	A
	PW=10μs square, T_{vj}=25°C		450	A
Repetitive peak forward current		I_{FRM}	46 *2	A
i^2t value	1 ≦ PW ≦ 10ms, T_{vj}=25°C	$\int i^2dt$	75	A^2s
	1 ≦ PW ≦ 10ms, T_{vj}=150°C		54	A^2s
Total power disspation		P_D	41 *3	W
Virtual Junction temperature		T_{vj}	175	°C
Range of storage temperature		T_{stg}	−55 to +175	°C

*1 Limited by maximum T_{vj} and for Max. R_{thJC}. *2 T_c=100°C, T_{vj}=150°C, Duty cycle=10% *3 T_c=25°C

●Electrical characteristics (T_{vj}=25°C unless otherwise specified)

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
DC blocking voltage	V_{DC}	I_R =100μA	650	-	-	V
Forward voltage	V_F	I_F=20A,T_{vj}=25°C	-	1.35	1.50	V
		I_F=20A,T_{vj}=150°C	-	1.44	1.71	V
		I_F=20A,T_{vj}=175°C	-	1.50	-	V
Reverse current	I_R	V_R=650V,T_{vj}=25°C	-	0.06	100	μA
		V_R=650V,T_{vj}=150°C	-	4	400	μA
		V_R=650V,T_{vj}=175°C	-	12	-	μA
Total capacitance	C	V_R=1V,f=1MHz	-	1000	-	pF
		V_R=650V,f=1MHz	-	91	-	pF
Total capacitive charge	Q_C	V_R=400V,di/dt=350A/μs	-	47	-	nC
Switching time	t_C	V_R=400V,di/dt=350A/μs	-	25	-	ns
Non-repetetive Avaranche Energy	E_{ava}	L=1mH	-	220	-	mJ

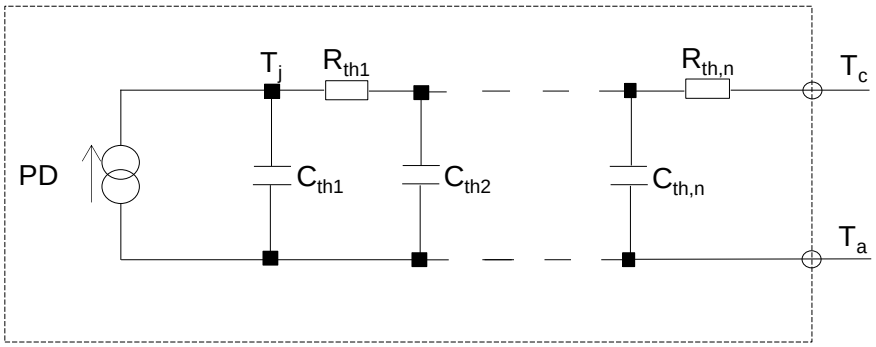
●Thermal characteristics

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Thermal resistance	R_{thJC}	-	-	3.1	3.6	K/W

●Typical Transient Thermal Characteristics

Symbol	Value	Unit
R_{th1}	1.26E-01	K/W
R_{th2}	7.51E-01	
R_{th3}	2.17E+00	

Symbol	Value	Unit
C_{th1}	7.42E-04	Ws/K
C_{th2}	5.97E-03	
C_{th3}	4.40E-01	



●Electrical characteristic curves

Fig.1 V_F - I_F Characteristics

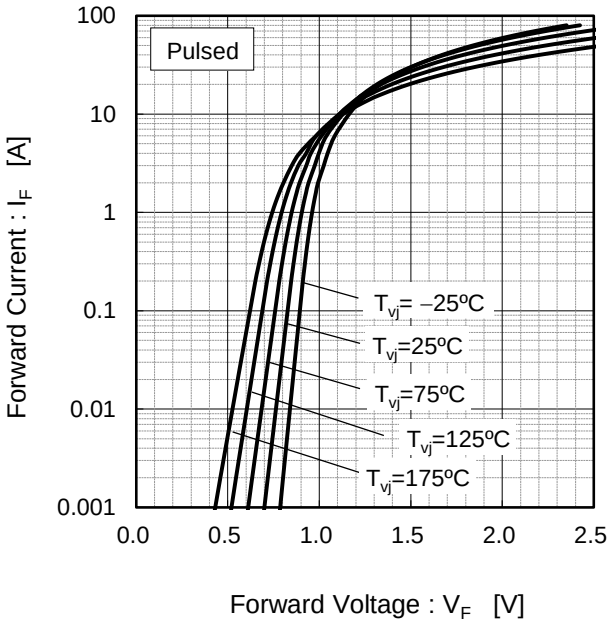


Fig.2 V_F - I_F Characteristics

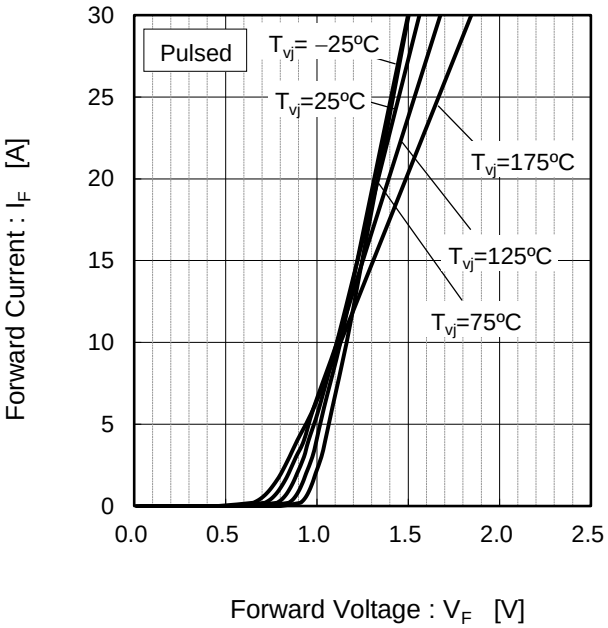


Fig.3 V_R - I_R Characteristics

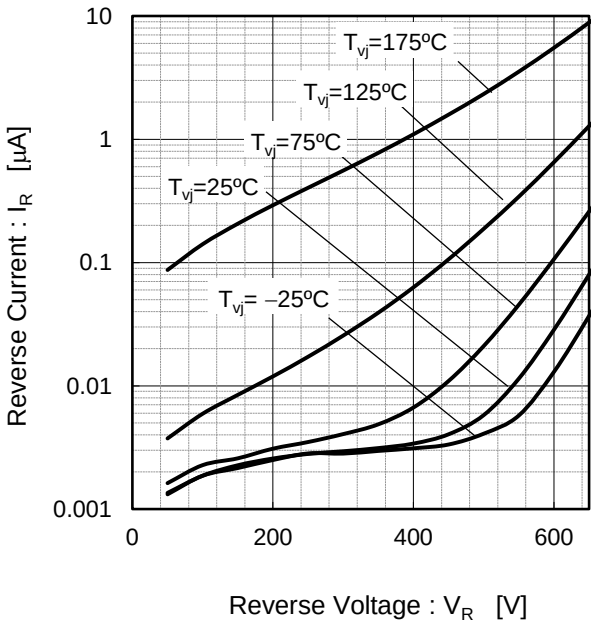
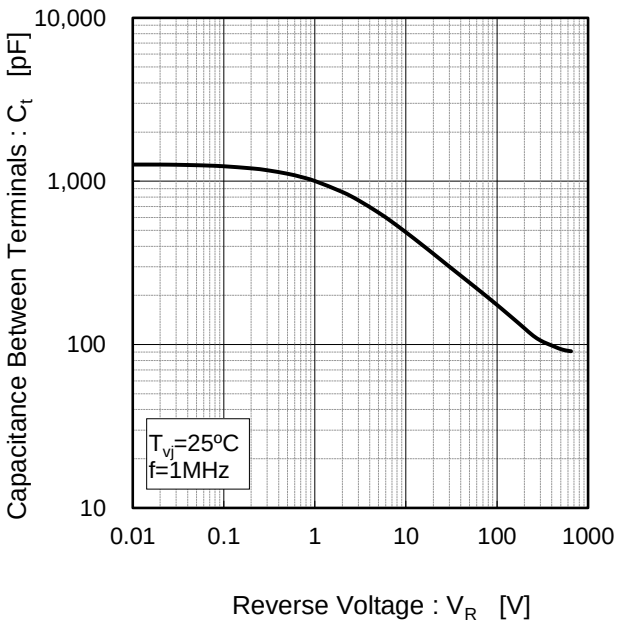


Fig.4 V_R-C_t Characteristics



●Electrical characteristic curves

Fig.5 Typical Transient Thermal Impedance vs. Pulse Width

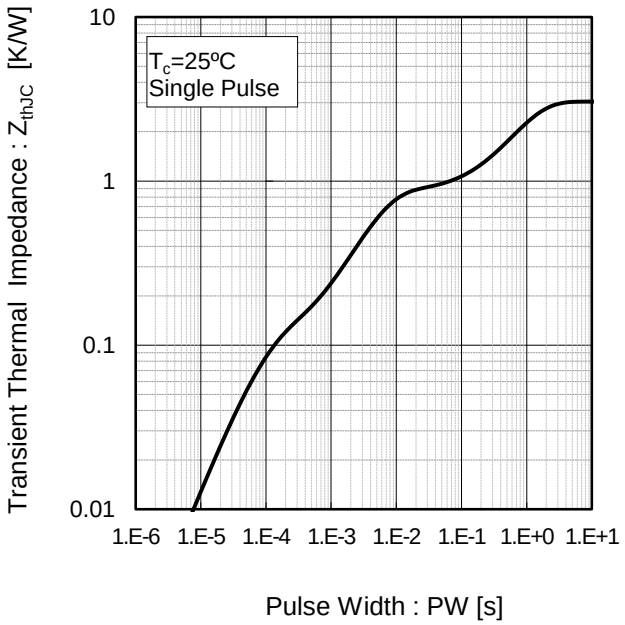


Fig.6 Power Dissipation

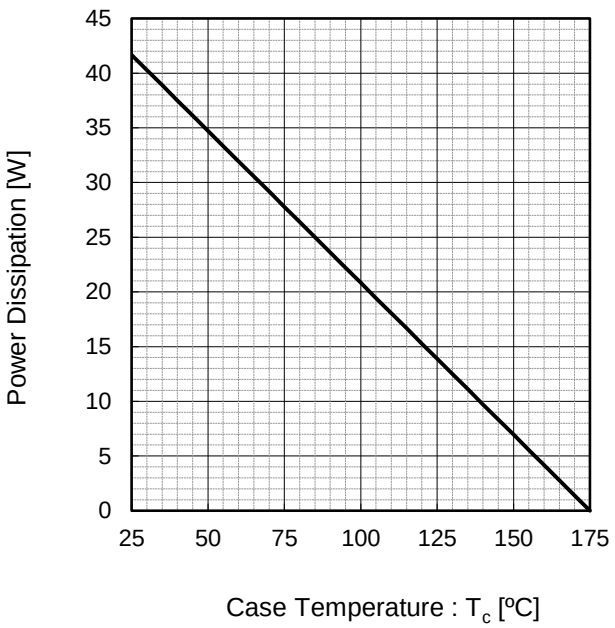
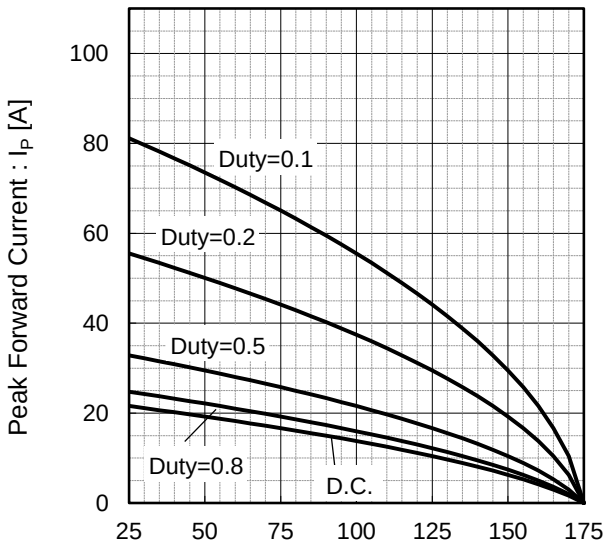
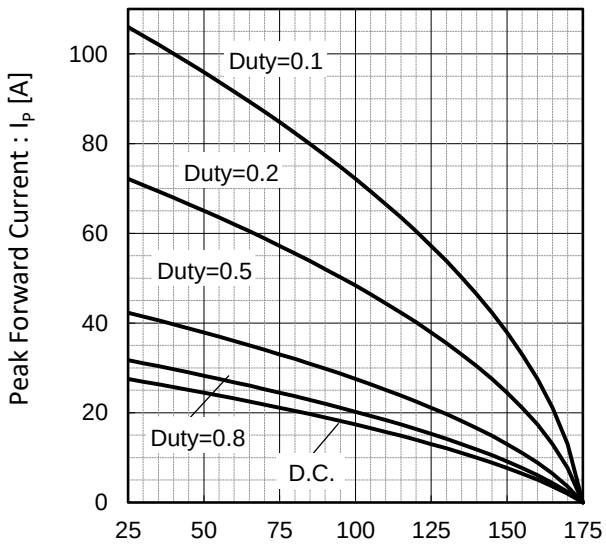


Fig.7*4 Maximum peak forward current derating curve I_P - T_c



*4 Based on max Vf, max R_{thJC}
Valid for switching of above 10kHz, excluding D.C. curve.

Fig.8*5 Typical peak forward current derating curve I_P - T_c (Not guaranteed)



*5 Based on typ Vf, typ R_{thJC}
Typical value, not guaranteed
Valid for switching of above 10kHz, excluding D.C. curve

●Electrical characteristic curves

Fig.9 Surge non-repetitive forward current vs. Pulse width (Sinusoidal waveform)

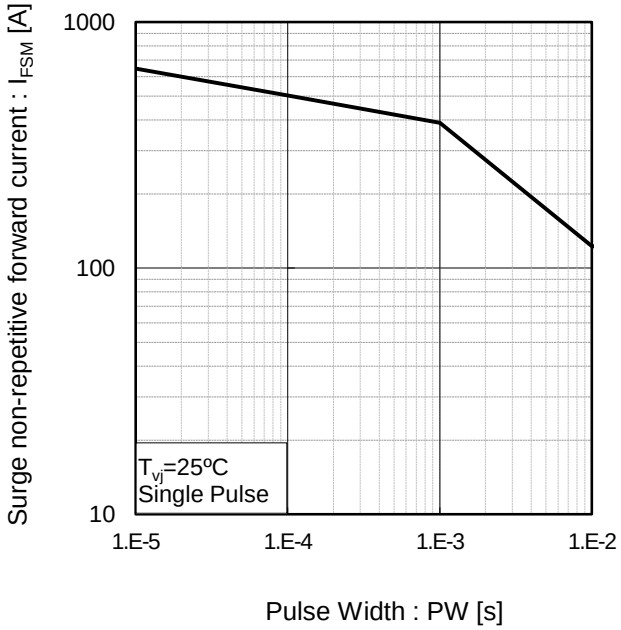
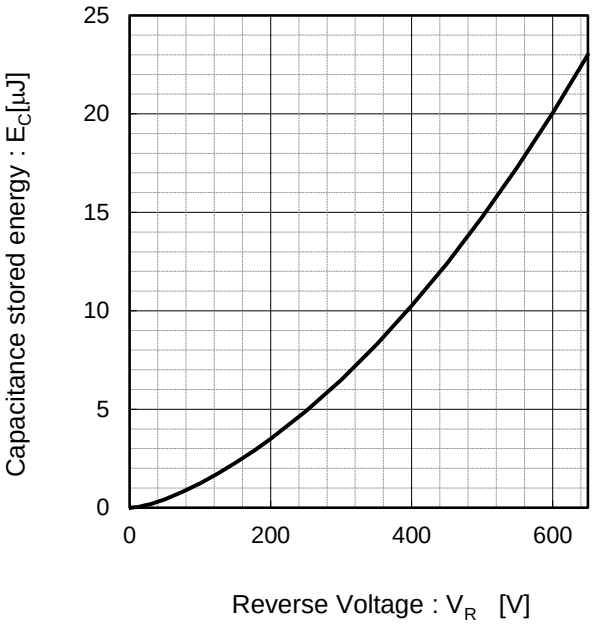
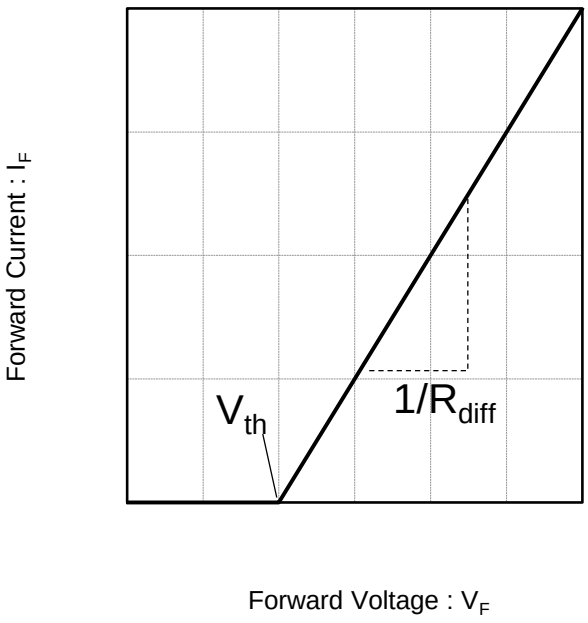


Fig.10 Typical capacitance store energy



●Symplified forward characteristic model

Fig.11 Equivalent forward current curve



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

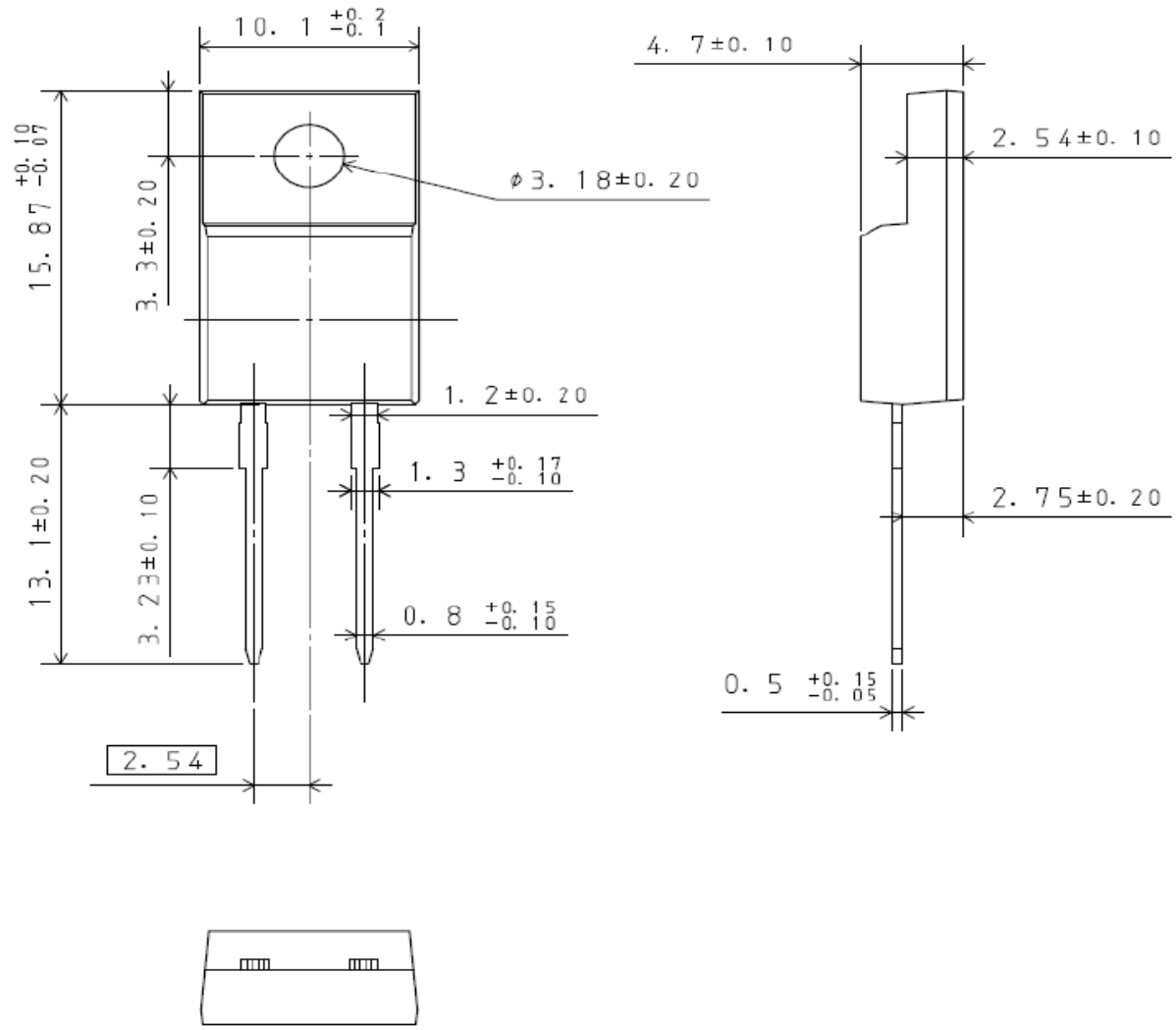
$$V_{th}(T_{vj}) = a_0 + a_1 T_{vj}$$
$$R_{diff}(T_{vj}) = b_0 + b_1 T_{vj} + b_2 T_{vj}^2$$

Symbol	Typical Value	Unit
a_0	9.66E-01	V
a_1	-1.10E-03	V/°C
b_0	1.76E-02	Ω
b_1	3.73E-05	Ω/°C
b_2	3.84E-07	Ω/°C^2

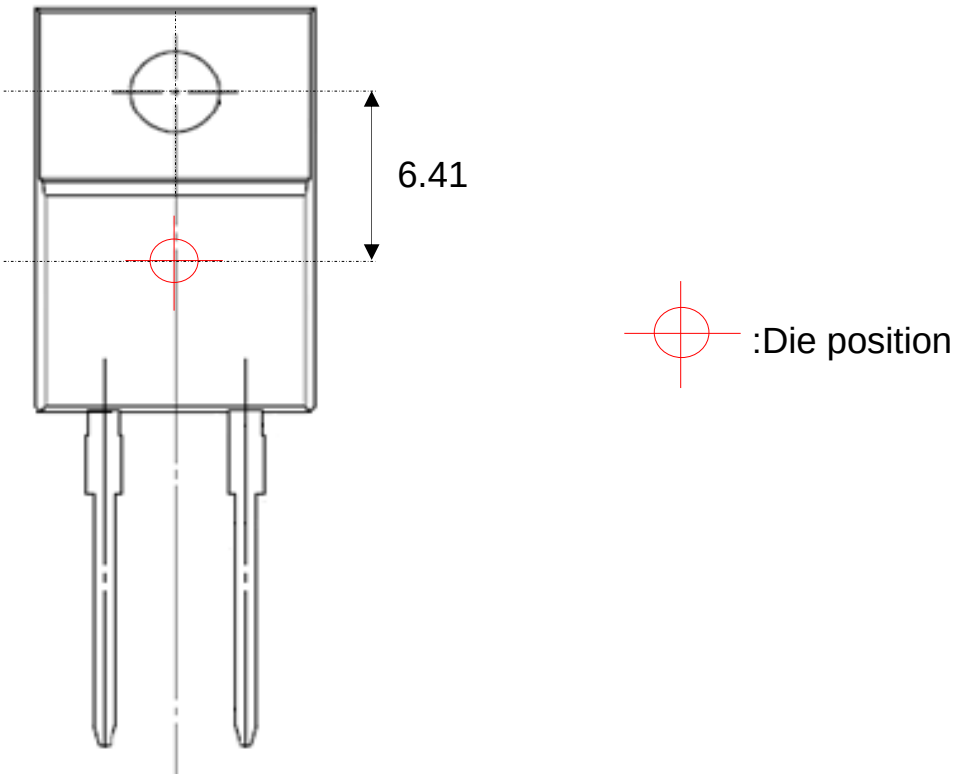
T_{vj} in ºC; -55 ºC < T_{vj} < 175ºC ; I_F < 40 A

●**Dimensions** (Unit : mm)

TO-220FM-2LGE



●**Die Bonding Layout** (Unit : mm)



・Front view of the packaging.

・Dimensions are design values.

・If the heat sink is to be installed, it should be in contact with the die bonding point.

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