

V_R	650V
I_F	6A
Q_C	9nC

●Features

- 1) Shorter recovery time
- 2) Reduced temperature dependence
- 3) High-speed switching possible

●Applications

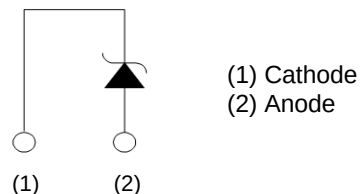
- PFC Boost Topology
- Secondary Side Rectification
- Data Center
- PV Power Conditioners

●Outline

TO-220FM-2LGE



●Inner circuit



●Packaging specifications

Type	Packaging	Tube
	Reel size (mm)	-
	Tape width (mm)	-
	Basic ordering unit (pcs)	50
	Packing code	C7G
	Marking	SCS206AM

●Absolute maximum ratings ($T_{vj} = 25^\circ\text{C}$ 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 ($T_c = 115^\circ\text{C}$)		I_F	6 *1	A
Surge non-repetitive forward current	PW=10ms sinusoidal, $T_{vj}=25^\circ\text{C}$	I_{FSM}	23	A
	PW=10ms sinusoidal, $T_{vj}=150^\circ\text{C}$		18	A
	PW=10μs square, $T_{vj}=25^\circ\text{C}$		90	A
Repetitive peak forward current		I_{FRM}	21 *2	A
i^2t value	PW=10ms, $T_{vj}=25^\circ\text{C}$	$\int i^2 dt$	2.6	A ² s
	PW=10ms, $T_{vj}=150^\circ\text{C}$		1.6	A ² s
Total power dissipation		P_D	31 *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 $T_c=100^\circ\text{C}$, $T_{vj}=150^\circ\text{C}$, Duty cycle=10% *3 $T_c=25^\circ\text{C}$

●Electrical characteristics ($T_{vj} = 25^{\circ}\text{C}$ unless otherwise specified)

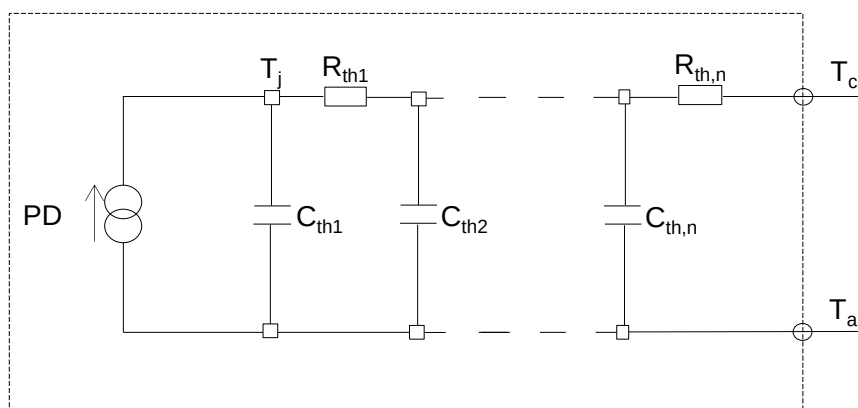
Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
DC blocking voltage	V_{DC}	$I_R = 1.2\text{mA}$	650	-	-	V
Forward voltage	V_F	$I_F = 6\text{A}, T_{vj} = 25^{\circ}\text{C}$	-	1.35	1.55	V
		$I_F = 6\text{A}, T_{vj} = 150^{\circ}\text{C}$	-	1.55	-	V
		$I_F = 6\text{A}, T_{vj} = 175^{\circ}\text{C}$	-	1.63	-	V
Reverse current	I_R	$V_R = 600\text{V}, T_{vj} = 25^{\circ}\text{C}$	-	1.2	120	μA
		$V_R = 600\text{V}, T_{vj} = 150^{\circ}\text{C}$	-	18	-	μA
		$V_R = 600\text{V}, T_{vj} = 175^{\circ}\text{C}$	-	42	-	μA
Total capacitance	C	$V_R = 1\text{V}, f = 1\text{MHz}$	-	220	-	pF
		$V_R = 600\text{V}, f = 1\text{MHz}$	-	22	-	pF
Total capacitive charge	Q_C	$V_R = 400\text{V}, di/dt = 350\text{A}/\mu\text{s}$	-	9	-	nC
Switching time	t_C	$V_R = 400\text{V}, di/dt = 350\text{A}/\mu\text{s}$	-	12	-	ns

●Thermal characteristics

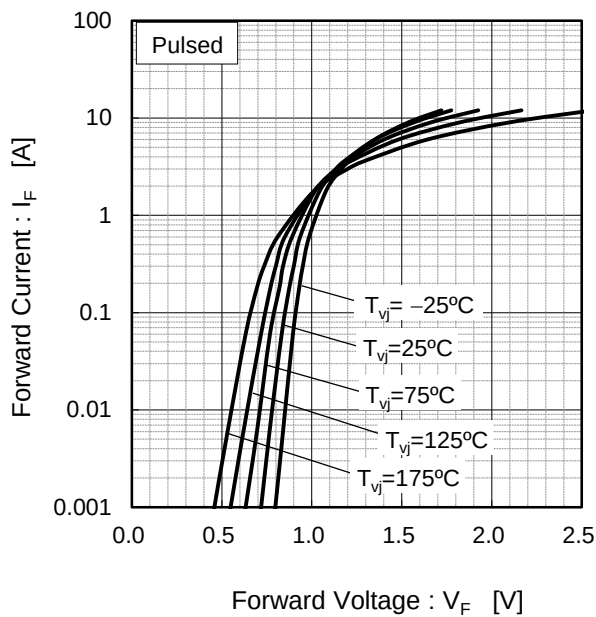
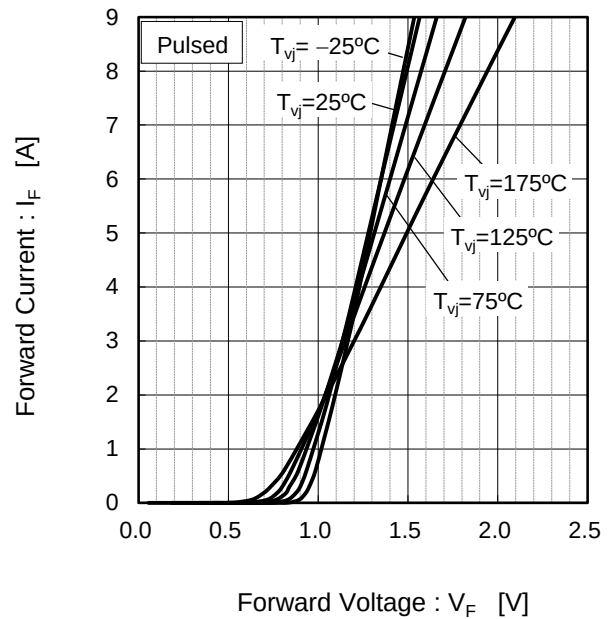
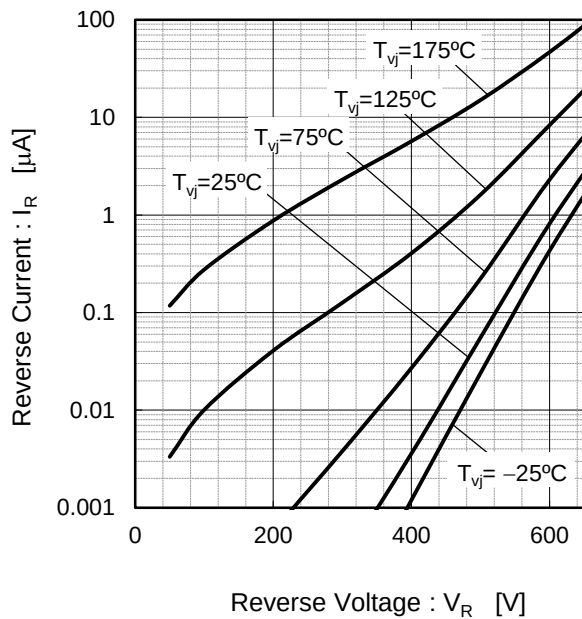
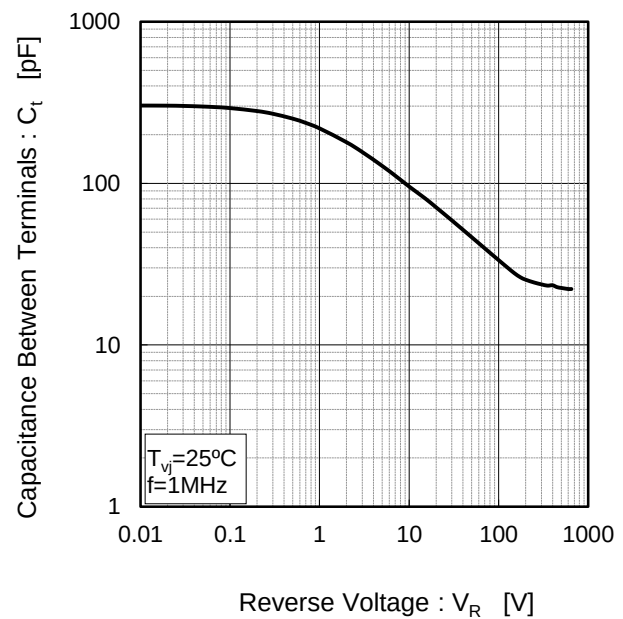
Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Thermal resistance	R_{thJC}	-	-	4.2	4.8	K/W

●Typical Transient Thermal Characteristics

Symbol	Value	Unit	Symbol	Value	Unit
R_{th1}	8.77E-01	K/W	C_{th1}	1.61E-03	Ws/K
R_{th2}	1.30E+00		C_{th2}	9.07E-03	
R_{th3}	2.04E+00		C_{th3}	6.05E-01	



●Electrical characteristic curves

Fig.1 $V_F - I_F$ CharacteristicsFig.2 $V_F - I_F$ CharacteristicsFig.3 $V_R - I_R$ CharacteristicsFig.4 $V_R - C_t$ Characteristics

●Electrical characteristic curves

Fig.5 Typical Transient Thermal Impedance vs. Pulse Width

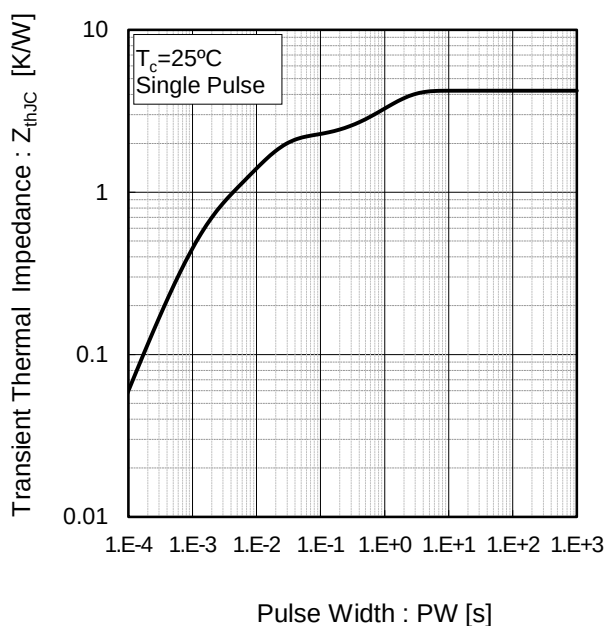


Fig.6 Power Dissipation

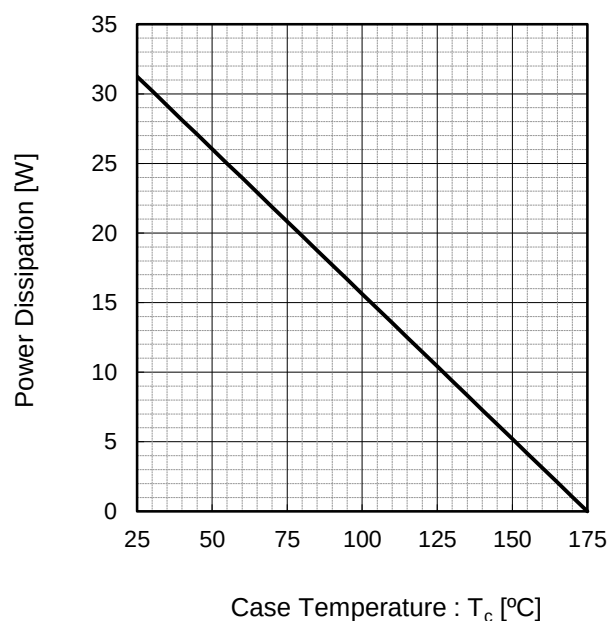
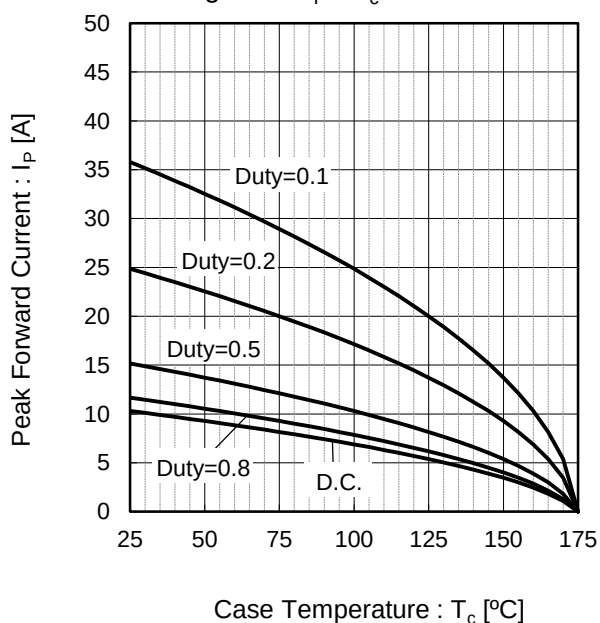
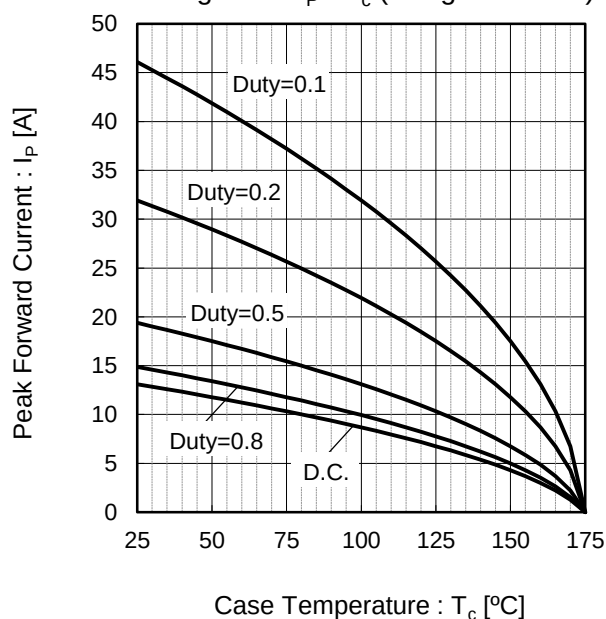


Fig.7*4 Maximum peak forward current derating curve $I_P - T_c$



*4 Based on max V_f , max Z_{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 V_f , typ Z_{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)

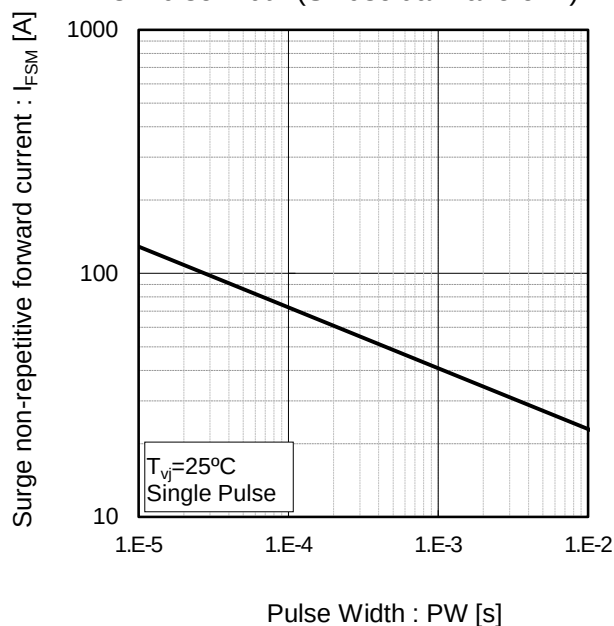
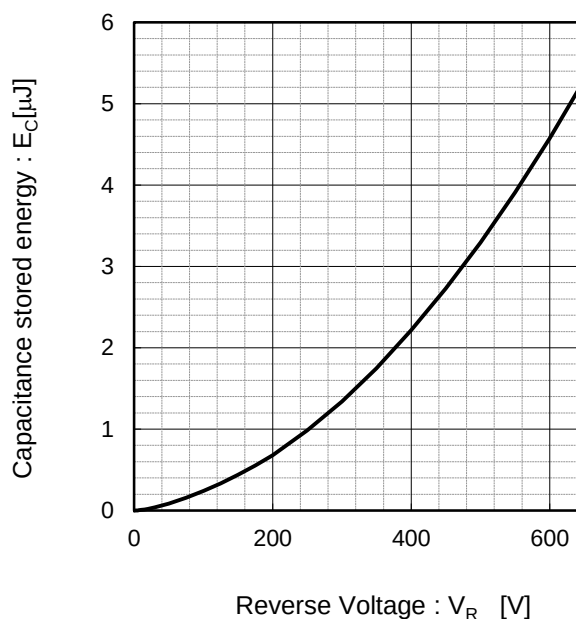
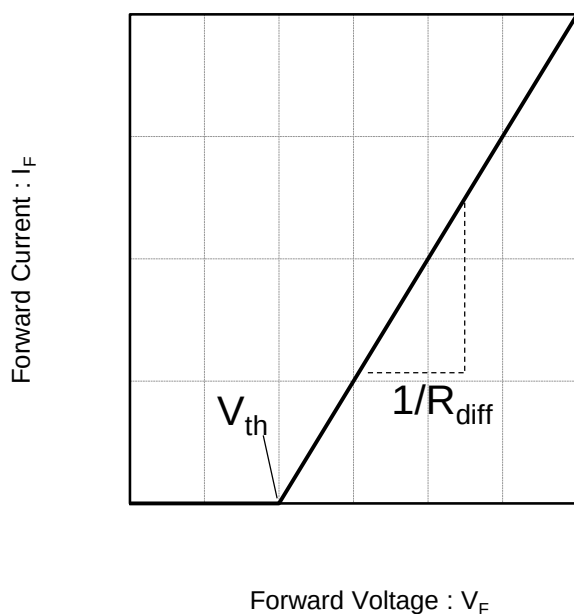


Fig.10 Typical capacitance store energy



●Simplified forward characteristic model

Fig.11 Equivalent forward current curve



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

$$V_{th}(T_{vj}) = a_0 + a_1 T_{vj}$$

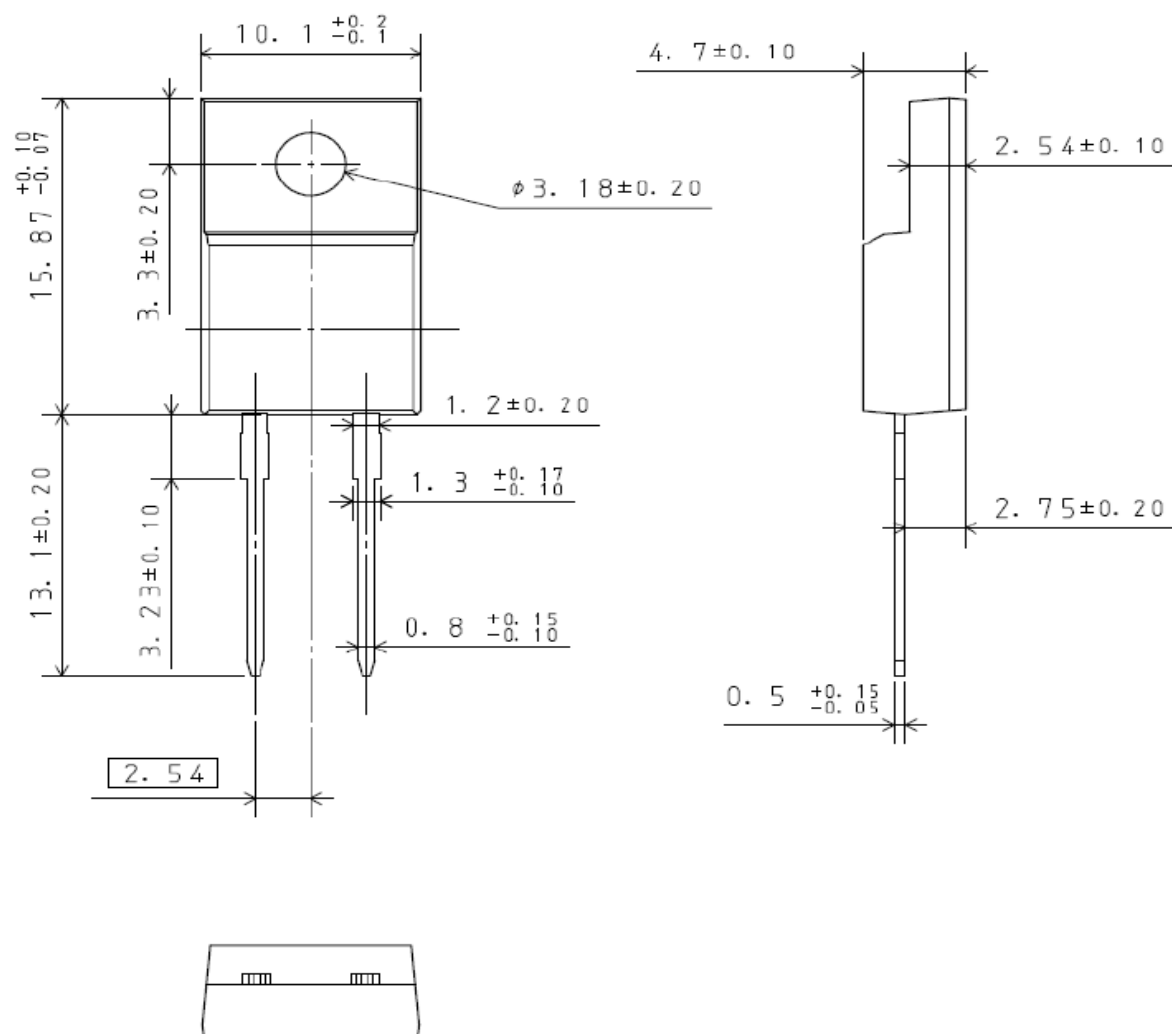
$$R_{diff}(T_{vj}) = b_0 + b_1 T_{vj} + b_2 T_{vj}^2$$

Symbol	Typical Value	Unit
a_0	9.35E-01	V
a_1	-1.12E-03	V/°C
b_0	6.63E-02	Ω
b_1	1.70E-04	Ω/°C
b_2	1.80E-06	Ω/°C ²

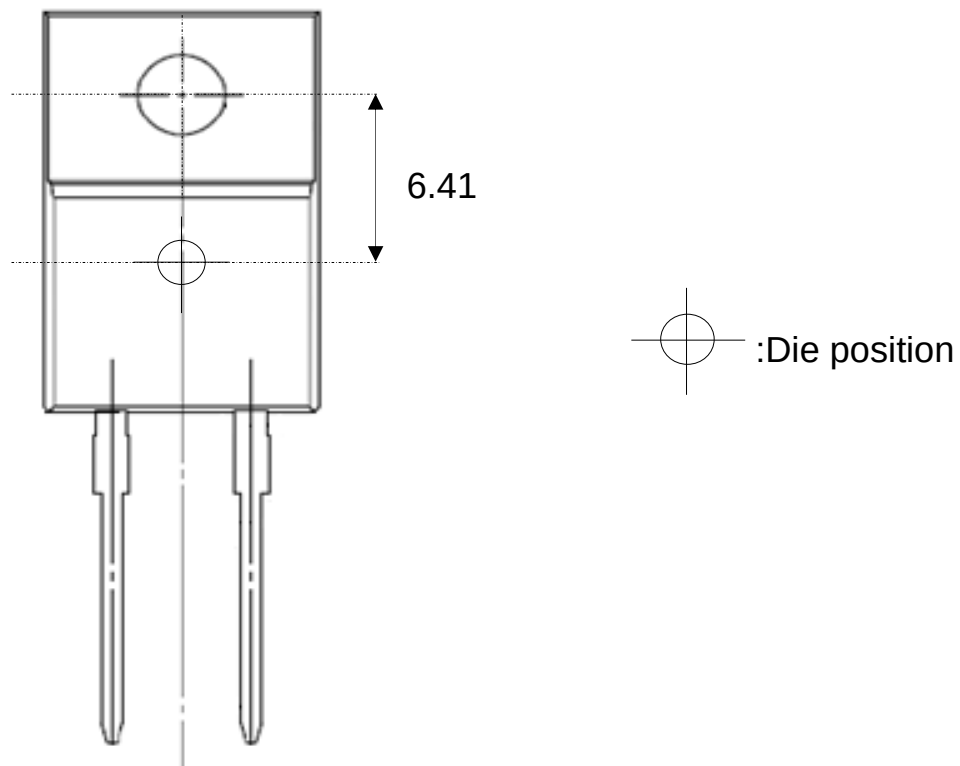
T_{vj} in °C; $-55^{\circ}\text{C} < T_{vj} < 175^{\circ}\text{C}$; $I_F < 12$ A

●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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