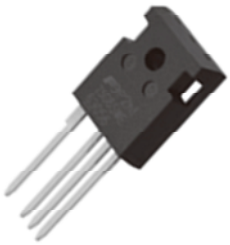
FGZ75XS120C

Discrete IGBT

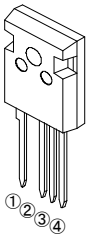
Discrete IGBT (XS-series)
1200V/75A



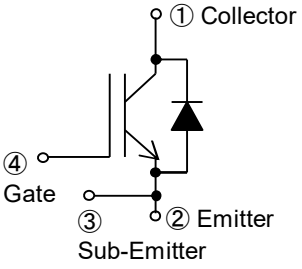
■ Features
Pb-free lead terminal ;RoHS compliant

■ Applications
For switching at Uniterruptible Power Supply,
PV Power Conditioner, Inverter welding machine

■ Equivalent Circuit



TO-247-4
• Weight : 6.0g



■ Maximum ratings and characteristics
●Absolute maximum ratings at T_{vj}=25℃ (unless otherwise specified)

Parameter	Symbol	Value	Unit	Remarks
Collector-Emitter voltage	V_{CES}	1200	V	
Gate-Emitter voltage	V_{GES}	±20	V	
Transient Gate-Emitter voltage		±30		t_p<1μs
DC collector current	$I_{C@25}$	117	A	T_c=25°C
	$I_{C@100}$	75	A	T_c=100°C
Pulsed collector current	I_{CP}	300	A	Note*1
Diode forward current	$I_{F@25}$	117	A	Tc=25°C
	$I_{F@100}$	75	A	Tc=100°C
Diode pulsed current	I_{FP}	300	A	Note*1
IGBT max. power dissipation	P_{tot_IGBT}	649	W	T_c=25°C
FWD max. power dissipation	P_{tot_FWD}	233	W	T_c=25°C
Operating junction temperature	T_{vj}	-40～+175	°C	
Storage temperature	T_{stg}	-55～+175	°C	

Note*1 : Pulse width limited by T_{vjmax}

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

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
Zero-gate voltage collector current	I_{CES}	V_{CE}=1200V	T_{vj}=25°C	-	-	250	μA
		V_{GE}=0V	T_{vj}=175°C	-	-	2	mA
Gate-Emitter leakage current	I_{GES}	V_{CE}=0V V_{GE}=±20V		-	-	200	nA
Gate-Emitter threshold voltage	$V_{GE(th)}$	V_{CE}=20V I_C=75mA		4.9	5.5	6.1	V
Collector-Emitter saturation voltage	$V_{CE(sat)}$	V_{GE}=15V I_C=75A	T_{vj}=25°C	-	1.60	1.90	V
			T_{vj}=125°C	-	2.05	-	
			T_{vj}=175°C	-	2.15	-	
Input capacitance	C_{ies}	V_{CE}=25V V_{GE}=0V f = 1MHz		-	8400	-	pF
Oputput capacitance	C_{oes}			-	114	-	
Reverse transfer capacitance	C_{res}			-	68	-	
Gate charge	Q_G	V_{CC}= 600V, I_C=75A, V_{GE}=15V		-	500	-	nC
Turn-on delay time	$t_{d(on)}$	T_{vj}=25°C, V_{CC}=600V, I_C=75A V_{GE}=15V, R_G=10Ω Energy loss include "tail" and FWD reverse recovery.		-	72	-	ns
Rise time	t_r			-	24	-	
Turn-off delay time	$t_{d(off)}$			-	450	-	
Fall time	t_f			-	58	-	
Turn-on energy	E_{on}			-	1.5	-	mJ
Turn-off energy	E_{off}			-	3.0	-	
Turn-on delay time	$t_{d(on)}$	T_{vj}=175°C, V_{CC}=600V, I_C=75A V_{GE}=15V, R_G=10Ω Energy loss include "tail" and FWD reverse recovery.		-	78	-	ns
Rise time	t_r			-	29	-	
Turn-off delay time	$t_{d(off)}$			-	500	-	
Fall time	t_f			-	108	-	
Turn-on energy	E_{on}			-	2.4	-	mJ
Turn-off energy	E_{off}			-	4.6	-	

● FWD characteristics

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
Forward voltage drop	V_F	I_F=75A	T_{vj}=25°C	-	2.90	3.30	V
			T_{vj}=125°C	-	3.2	-	
			T_{vj}=175°C	-	3.2	-	
Diode reverse recovery time	t_{rr}	V_{CC}=600V, I_F=75A -di_F/dt=1200A/μs, T_{vj}=25°C		-	240	-	ns
Diode reverse recovery charge	Q_{rr}			-	2.4	-	μc
Diode reverse recovery time	t_{rr}	V_{CC}=600V, I_F=75A -di_F/dt=1200A/μs, T_{vj}=175°C		-	450	-	ns
Diode reverse recovery charge	Q_{rr}			-	4.90	-	μc

■ Thermal resistance

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal resistance, junction-anbient	$R_{th(j-a)}$	-	-	50	°C/W
Thermal resistance, IGBT junction to case	$R_{th(j-c)_IGBT}$	-	-	0.231	°C/W
Thermal resistance, FWD junction to case	$R_{th(j-c)_FWD}$	-	-	0.644	°C/W

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Figure 1. IGBT power dissipation vs T_c

$T_{vj} \leq 175$ °C

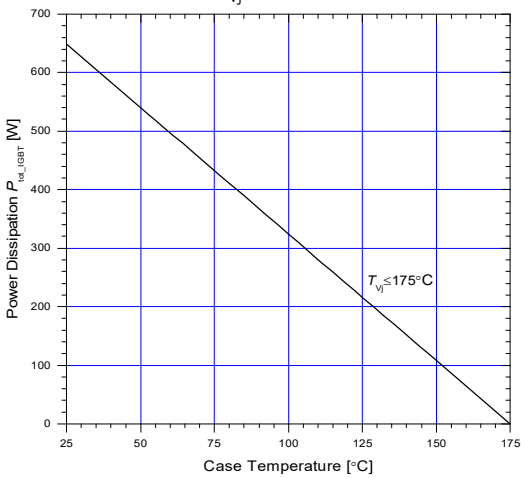

Figure 2. DC collector current vs T_c

$V_{GE} \geq +15$ V, $T_{vj} \leq 175$ °C

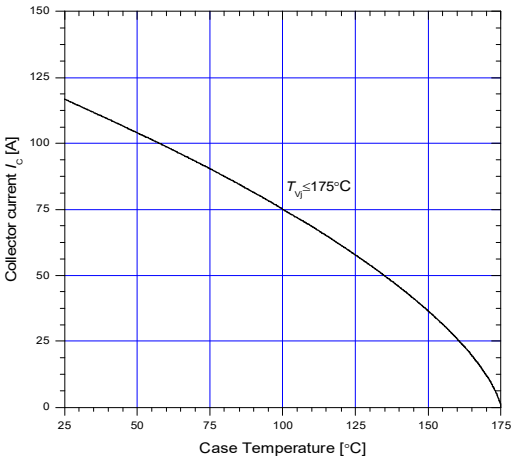

Figure 3. Typical output characteristics

T_{vj} = 25 °C

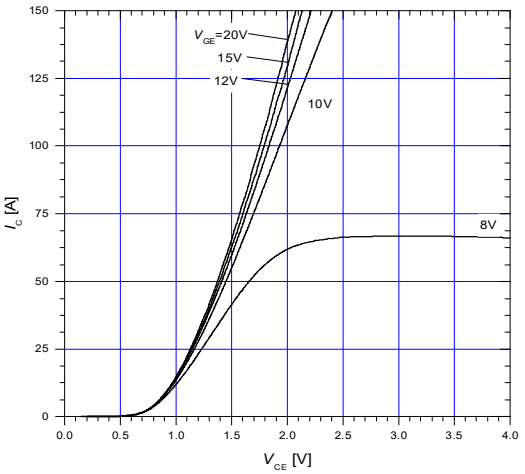

Figure 4. Typical output characteristics

T_{vj} = 175 °C

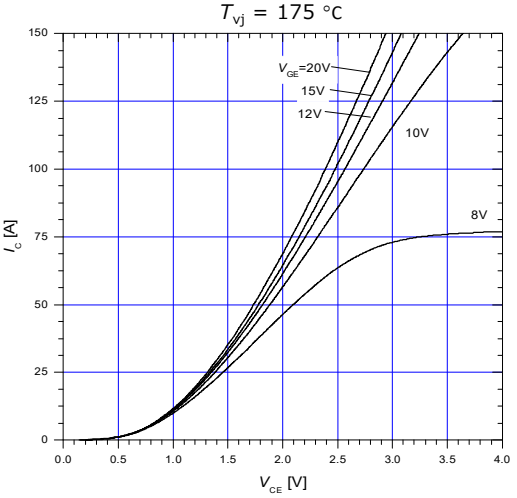

Figure 5. Typical transfer characteristics

V_{CE} = 20 V

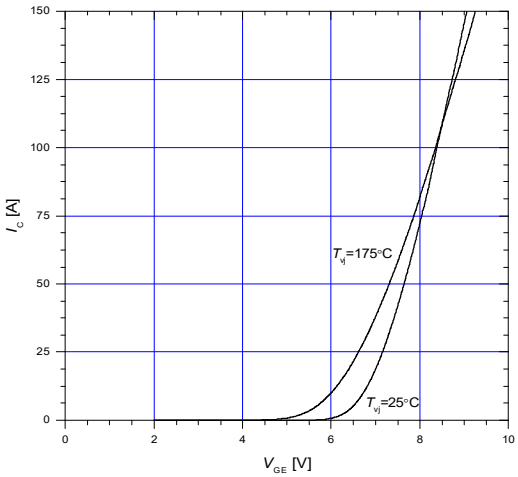

Figure 6. Gate threshold voltage

I_C = 75 mA, V_{CE} = 20 V

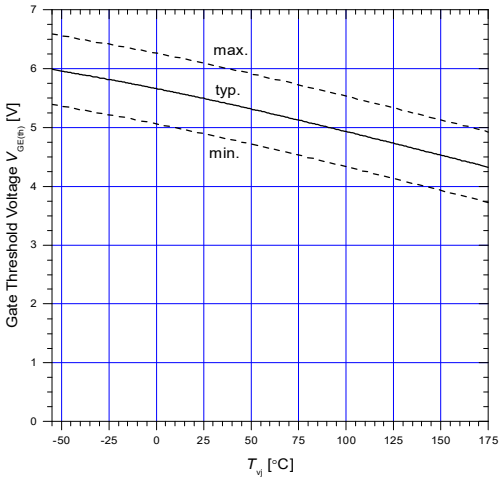

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Figure 7. Typical capacitance

V_{GE} = 0 V, f = 1 MHz

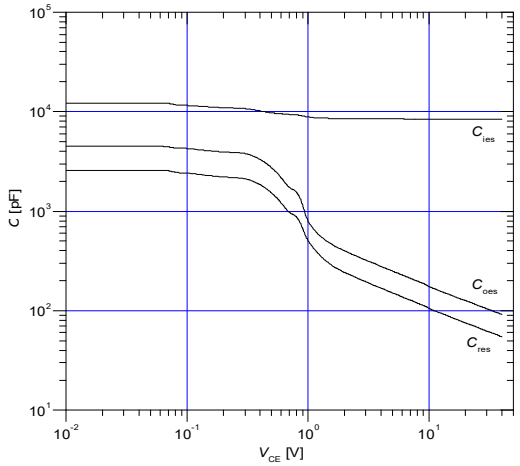

Figure 8. Typical gate charge

I_C = 75 A, V_{CC} = 600 V, T_{vj} = 25 °C

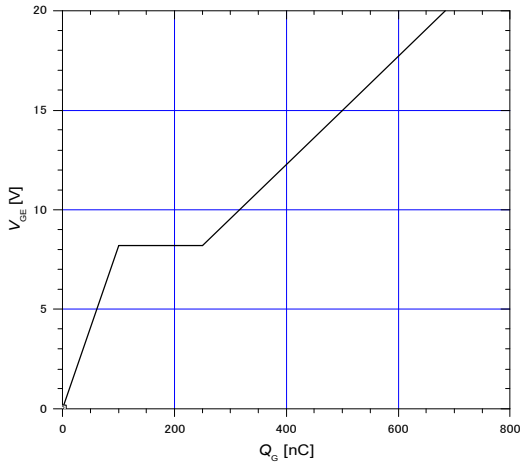

Figure 9. Typical switching times vs. I_C

V_{CC} = 600 V, V_{GE} = 15 V, R_G = 10 Ω, T_{vj} = 175 °C

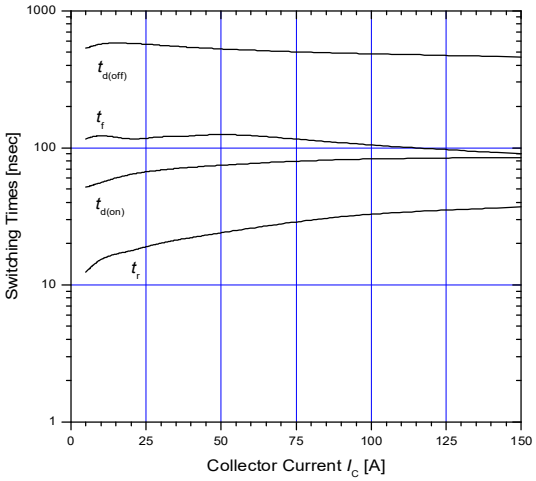

Figure 10. Typical switching times vs. R_G

V_{CC} = 600 V, V_{GE} = 15 V, I_C = 75 A, T_{vj} = 175 °C

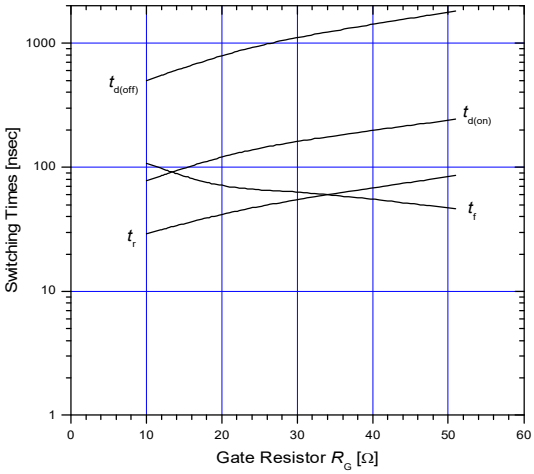

Figure 11. Typical switching losses vs. I_C

V_{CC} = 600 V, V_{GE} = 15 V, R_G = 10 Ω, T_{vj} = 175 °C

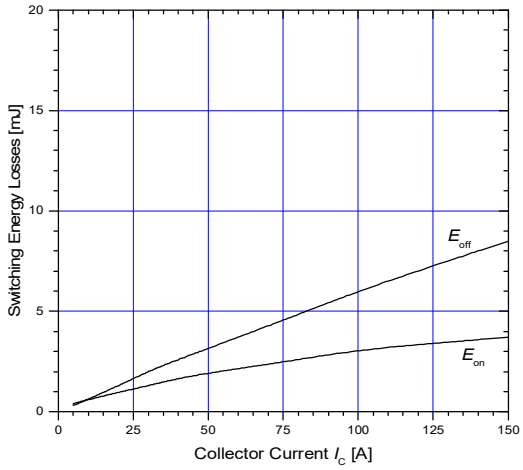

Figure 12. Typical switching losses vs. R_G

V_{CC} = 600 V, V_{GE} = 15 V, I_C = 75 A, T_{vj} = 175 °C

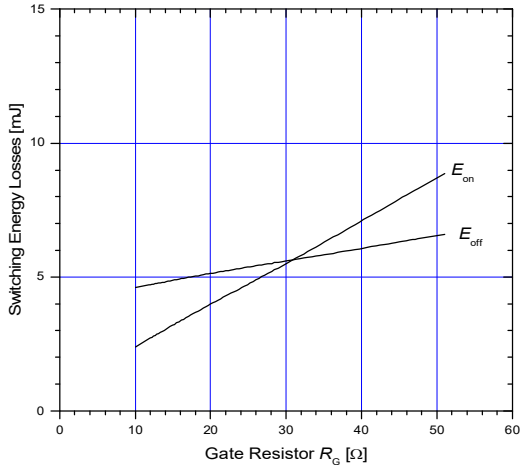

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Figure 13.
Typical forward characteristics of FWD

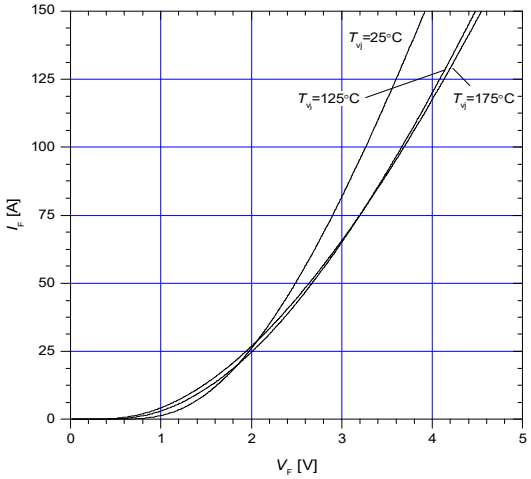


Figure 14.
Typical reverse recovery characteristics vs. I_F
V_{CC} = 600 V, V_{GE} = 15 V, R_G = 10 Ω, T_{vj} = 175 °C

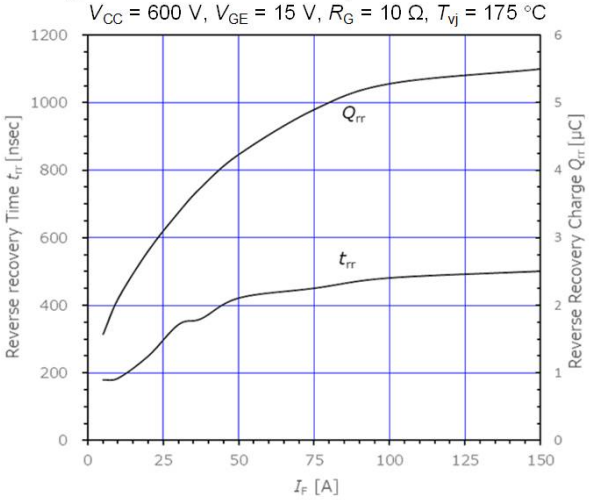


Figure 15.
Typical reverse recovery loss vs. I_F
V_{CC} = 600 V, V_{GE} = 15 V, R_G = 10 Ω, T_{vj} = 175 °C

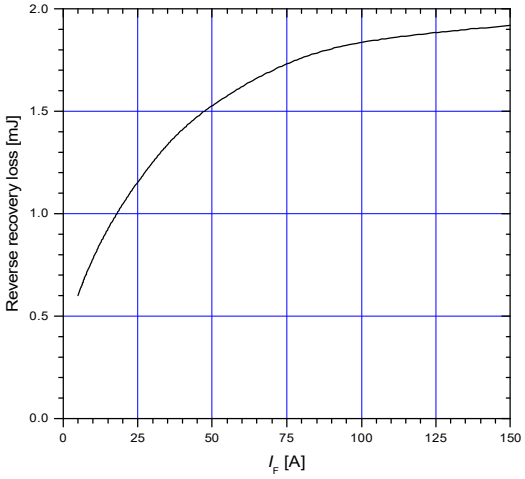


Figure 16.
Reverse biased safe operating area
V_{GE} = +15 V / -0 V, R_G = 20 Ω, T_{vj} ≤ 175 °C

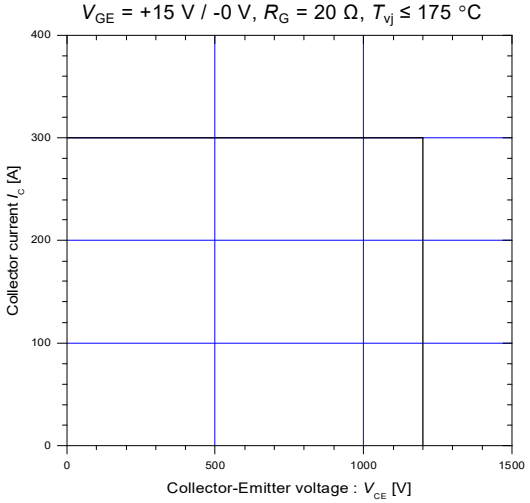


Figure 17.
Transient Thermal Impedance of IGBT
D = 0

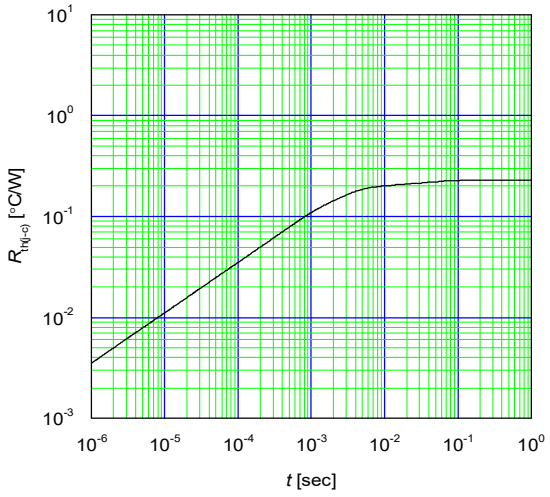
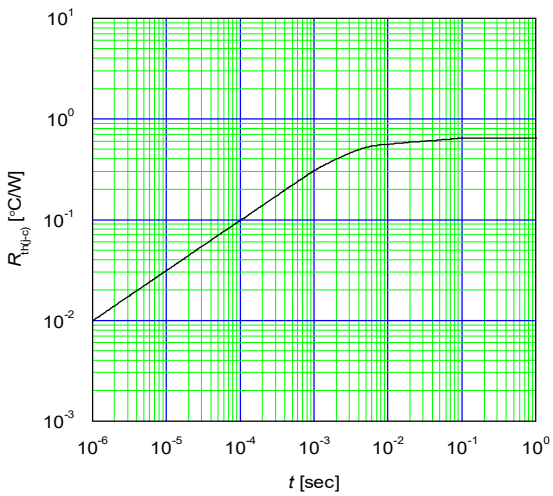


Figure 18.
Transient Thermal Impedance of FWD
D = 0



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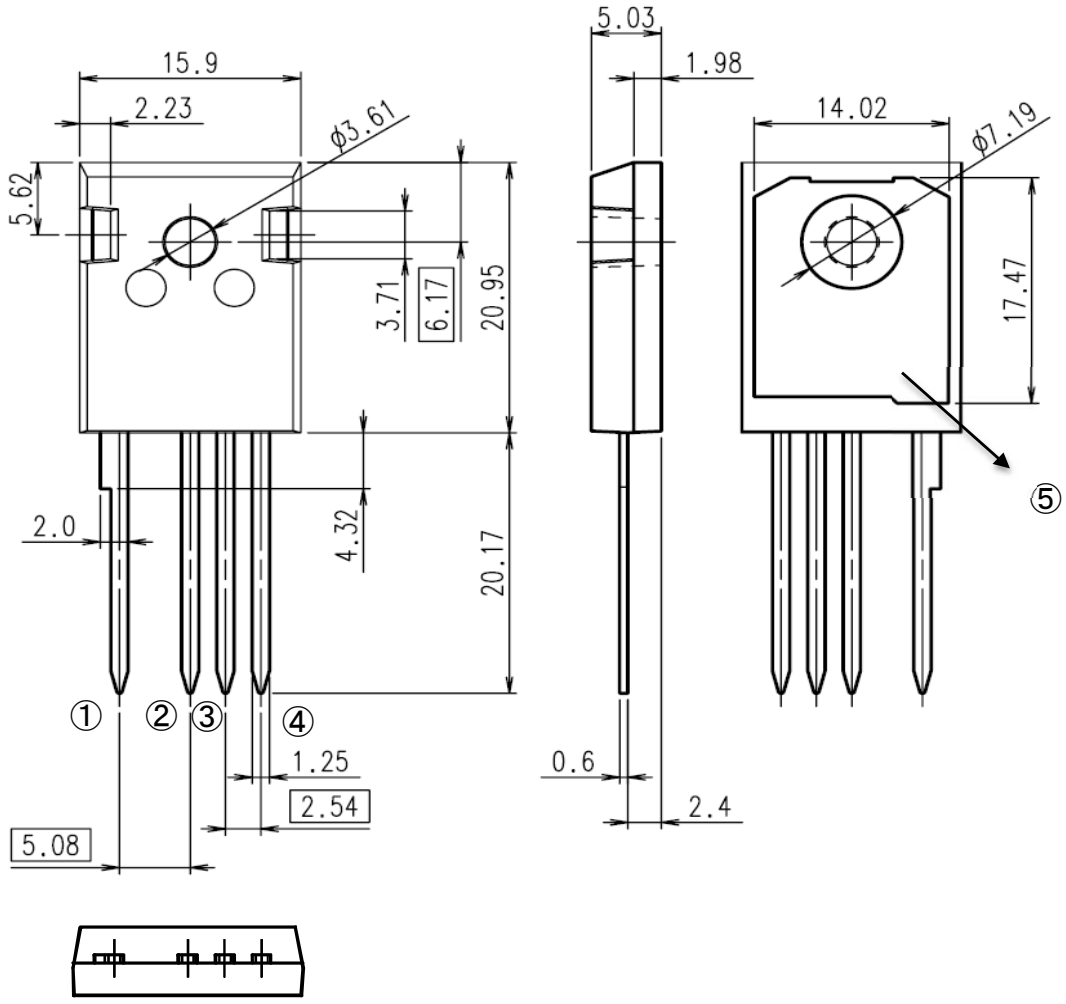
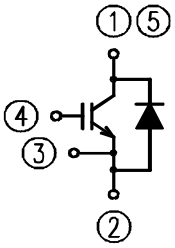
■ Outline drawings,mm



CONNECTION

① : Collector terminal
② : Emitter terminal
③ : Sub Emitter terminal
④ : Gate terminal
⑤ : Case (Collector potential)

DIMENSIONS ARE IN MILLIMETERS



Cautions

Please ensure insulation between the heat sink and the product before use. The collector potential on the backside of the products is not intended to be used as a conduction path.

Warnings

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   - Industrial robots
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   - Nuclear control equipment etc.
   - Submarine repeater equipment

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IGBT Modules

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