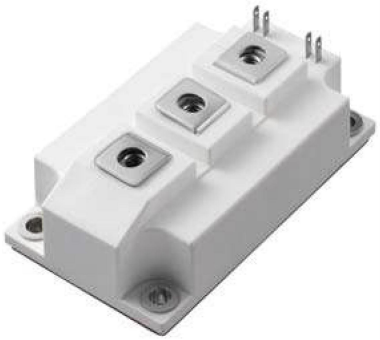
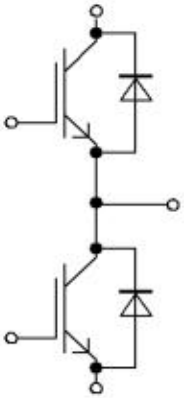
ESK150SH120AN

1200V 150A 2-Pack IGBT Module



Feature

- Planar IGBT technology
  - Low saturation voltage
  - 10us Short Circuit current
  - Low turn-off losses
  - Positive temperature coefficient
- Free wheeling diodes with fast and soft reverse recovery
- Industrial standard package with copper base plate



Applications

- Welders / Power supply
- UPS / Inverter
- Industrial motor driver

Absolute Maximum Ratings @Tc = 25℃

Symbol	Parameter	Conditions	Ratings	Unit
IGBT Inverter				
V_{CES}	Collector-emitter voltage		1200	V
I_C	Continuous collector current	Tc=25℃，Tvj(max)=175℃	200	A
		Tc=85℃，Tvj(max)=175℃	150	
I_{CM}	Repetitive peak collector current [1]	Tc=80℃，t_p=1ms	300	A
t_{SC}	Short circuit data [2]	V_{GE}=15V,V_{CC}=800V,V_{CE}<V_{CES}, Tvj=125℃	10	us
V_{GES}	Gate-emitter voltage		±20	V
P_{tot}	Total power dissipation	T_C=25℃。$T_{vj(max)}$=175℃	1250	W
		T_C=80℃。$T_{vj(max)}$=175℃	750	
T_{vj}	Junction temperature		-40~175	℃
Diode Inverter				
V_{RRM}	Repetitive peak reverse voltage		1200	V
I_{FRM}	Repetitive peak forward current	tp=1ms	300	A
I_F	Forward current		150	A
T_{vj}	Operation junction temperature		-40~150	℃
Module				
T_{stg}	Storage temperature		-40~175	℃

V_{isol}	Isolation test voltage	AC sinus 50HZ，t=1min	2500	V

1.Verified by design/characterization

2.Allowed number of short circuits:<1000;time between short circuit:>1S

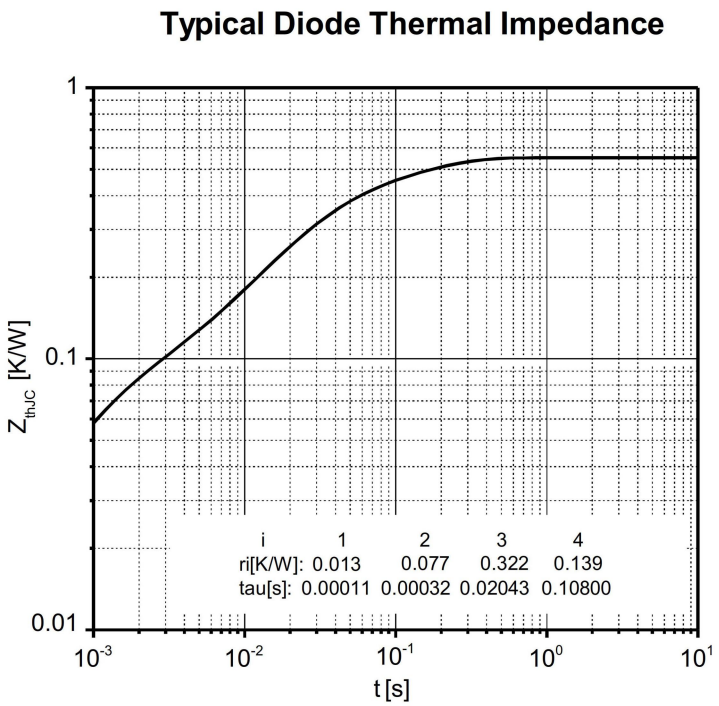
Electrical Characteristics @Tc = 25℃(unless otherwise specified）

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
IGBT, Inverter							
V_{CEsat}	Collector emitter saturation voltage	V_{GE}=15V，I_C=150A	T_{vj}=25℃		2.80	3.20	V
			T_{vj}=150℃		-	-	
$V_{GE(th)}$	Gate emitter threshold voltage	V_{CE}=V_{GE}，I_C=3mA		4.6	5.8	6.6	V
I_{CES}	Collector emitter cut-off voltage	V_{CE}=1200V,VGE=0V				1	mA
I_{GES}	Gate emitter cut-off voltage	V_{CE}=1200V,VGE=0V				±500	nA
C_{ies}	Input capacitance	VCE=25V VGE=0V f=1.0MHz Tj=25℃			12.6		nF
C_{oes}	Output capacitance				1.25		nF
C_{res}	Reverse transfer capacitance				0.43		nF
Qg	Gate charge	V_{GE}=0~+15V			1500		nC
$T_{d(on)}$	Turn-on delay time	I_C=150A V_{GE}=±15V RG(on)=10Ω RG(off)=5.1Ω T_{vj}=125℃			130		ns
t_r	Rise time				36		ns
$T_{d(off)}$	Turn-off delay time				300		ns
t_f	Fall time				120		ns
E_{on}	Turn-on energy				14.9		mJ
E_{off}	Turn-off energy				9.9		mJ
Diode Inverter							
V_F	Forward voltage	IF = 200A,V_{GE}=0V	T_{vj}=25℃		1.7	2.2	V
			T_{vj}=125℃		1.7		
IRRM	Reverse recovery current	VGE=±15V IC=150A RG(on)=10Ω RG(off)=5.1Ω	T_{vj}=25℃		145		A
			T_{vj}=125℃		173		
E_{rr}	Reverse recovery energy		T_{vj}=25℃		7.0		mJ
			T_{vj}=125℃		-		
Q_{rr}	Recovered charge		T_{vj}=25℃		12000		nC
			T_{vj}=125℃		28800		
Trr	Reverse Recovery Time		T_{vj}=25℃		120		ns
			T_{vj}=125℃		-		

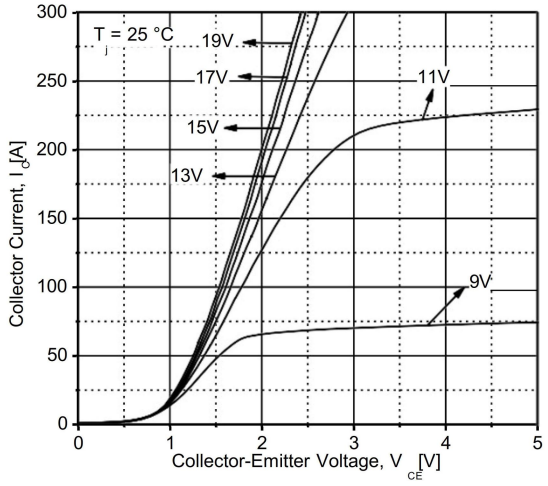
Thermal Characteristics

Symbol	Parameter	Conditions	Valu			Unit
			Min	Typ	Max	
$R_{(thjc)}I$	Thermal Resistance junction to case (IGBT)	Per IGBT	-	0.19		℃/W
$R_{(thjc)}D$	Thermal Resistance junction to case (Diode)	Per Diode	-	0.26		℃/W
Module						
M	Mounting torque	Fixing screw M6	2.5		6.0	N.m
G	Weight			310		g

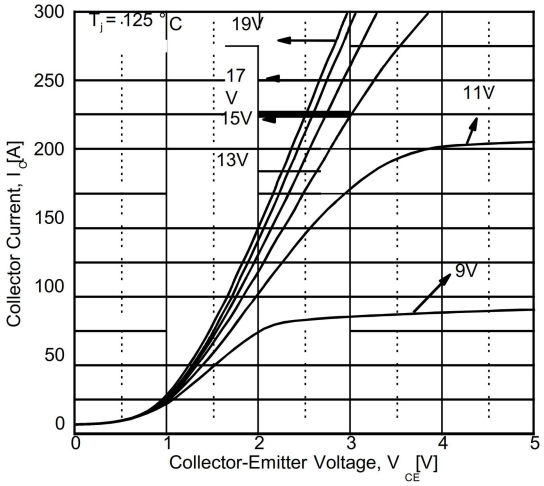
Thermal characteristics(Curves)



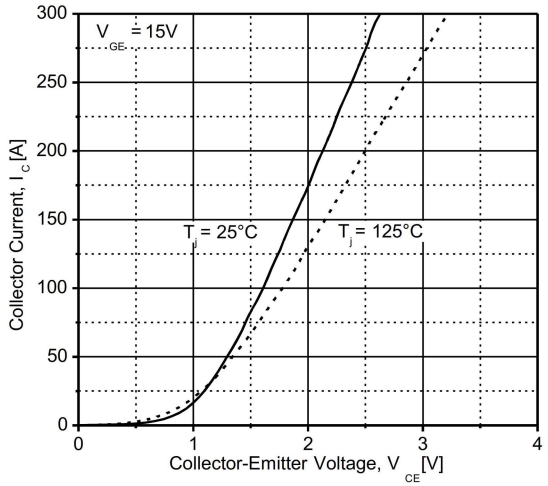
Typical IGBT Output Characteristics



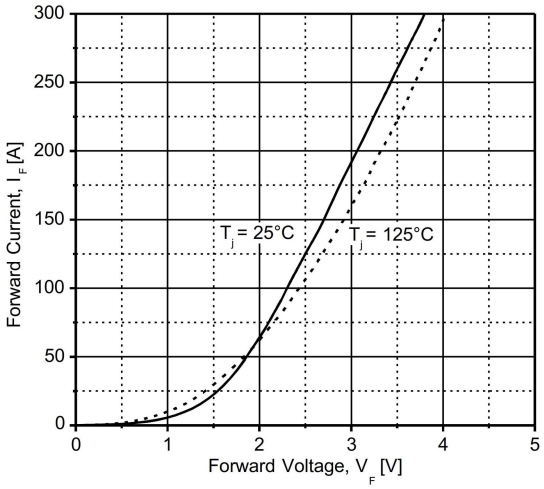
Typical IGBT Output Characteristics



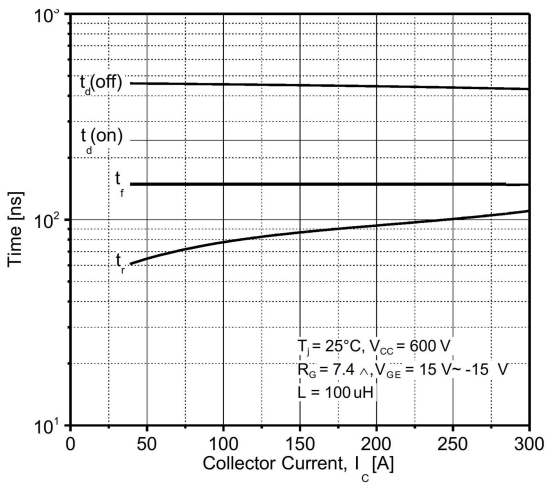
Typical IGBT Output Characteristics



Typical Diode Forward Characteristics



Typical Switching Time vs. Collector Current



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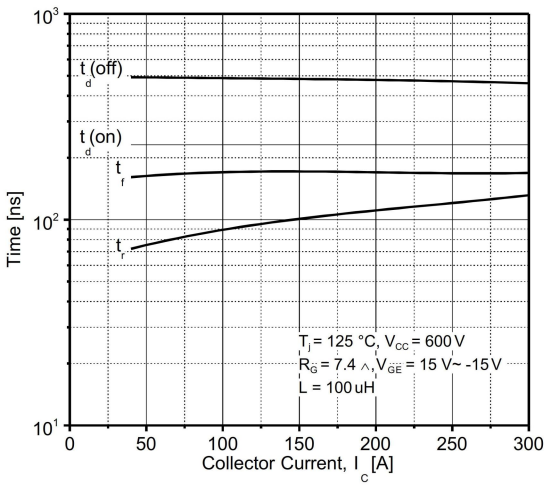
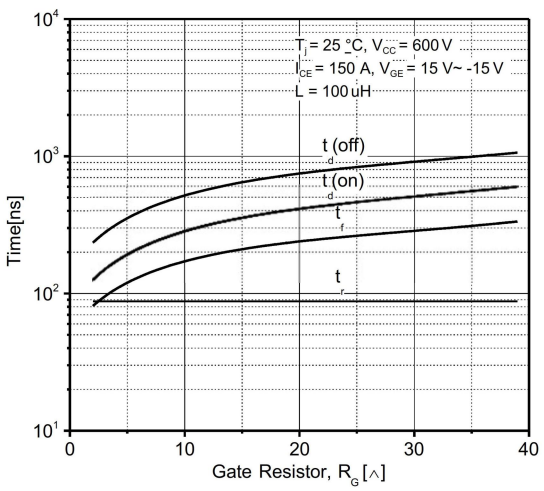
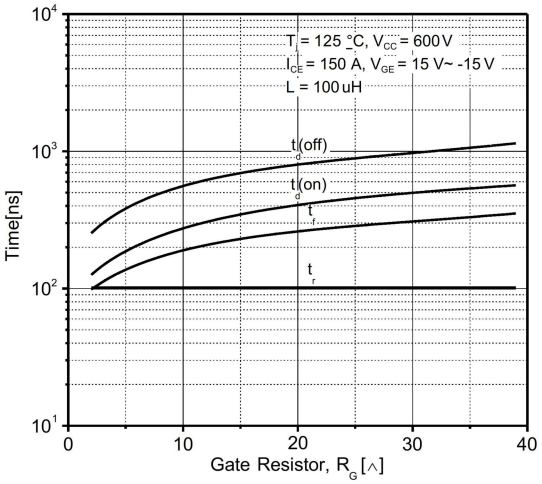


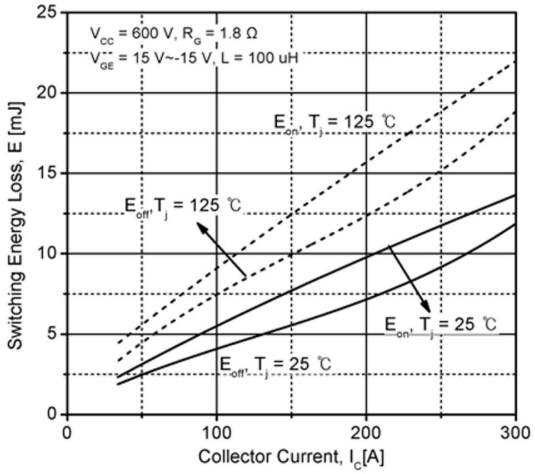
Typical Switching Time vs. Gate Resistor



Typical Switching Time vs. Gate Resistor



Typical IGBT Switching Loss



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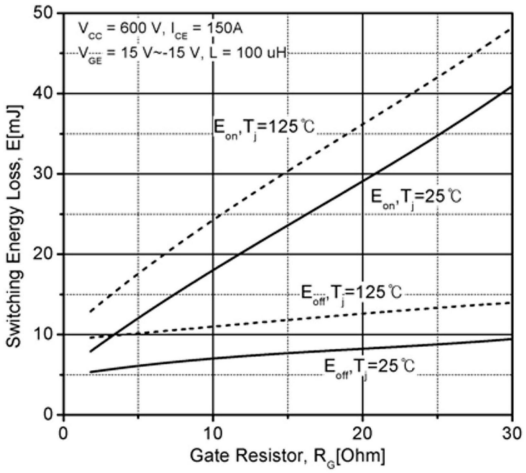
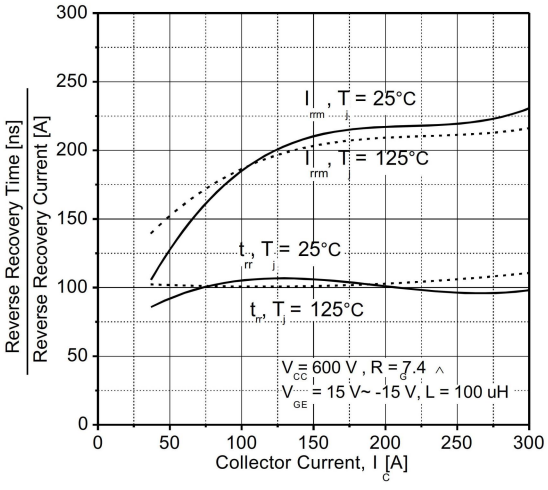
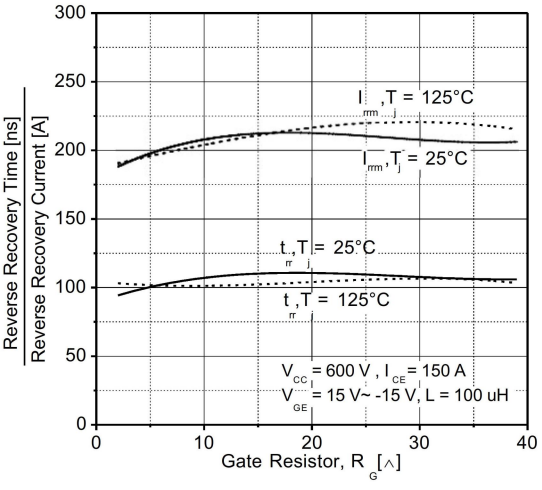


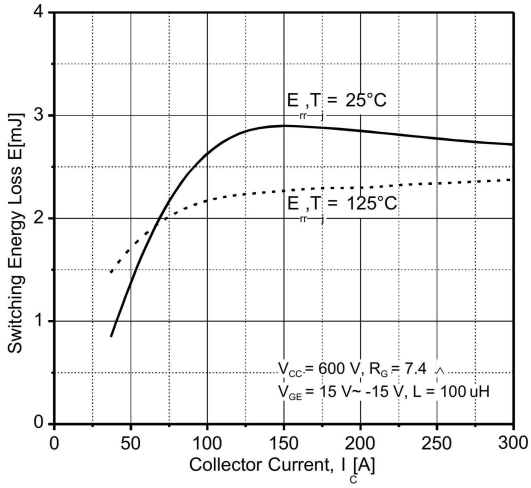
Typical Recovery Characteristics of Diode



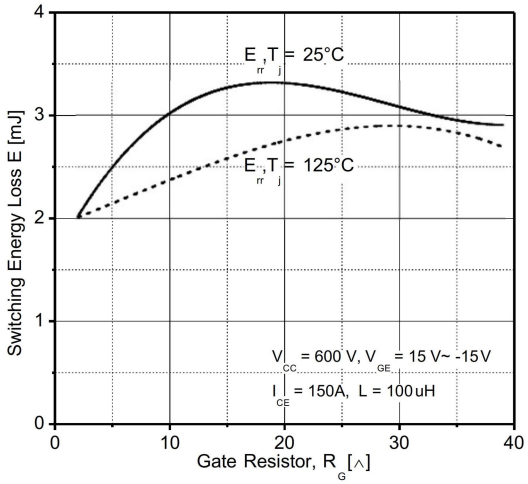
Typical Recovery Characteristics of Diode



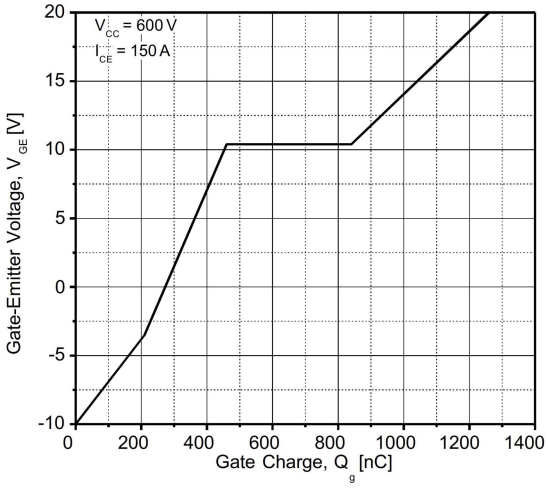
Typical Diode Switching Loss



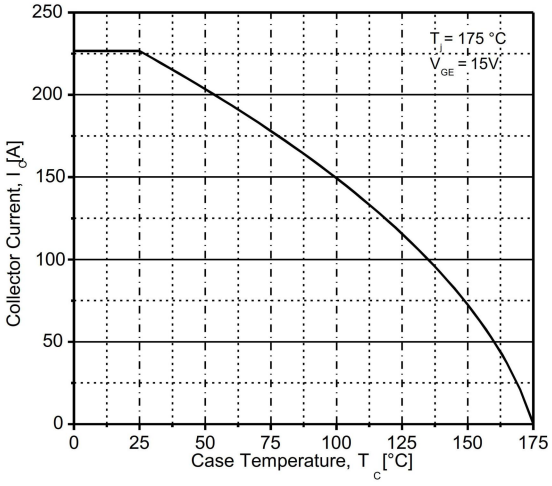
Typical Diode Switching Loss



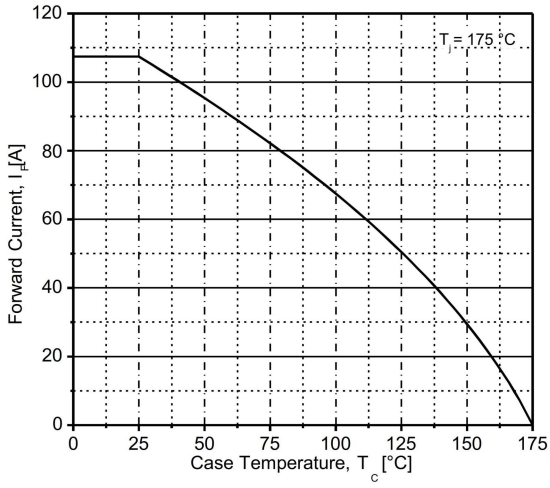
Typical Gate Charge Characteristics



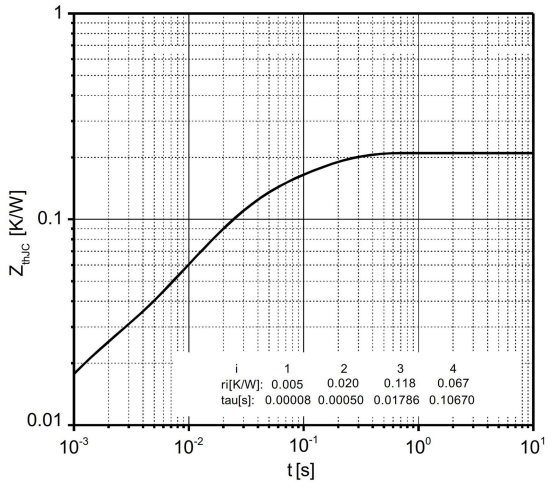
Case Temperature vs. Collector Current



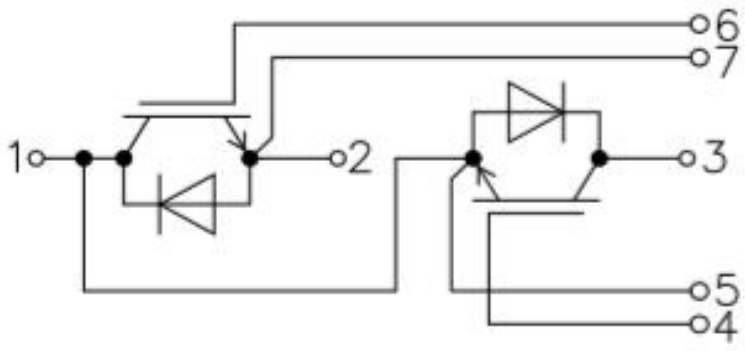
Case Temperature vs. Diode Current(TBD)



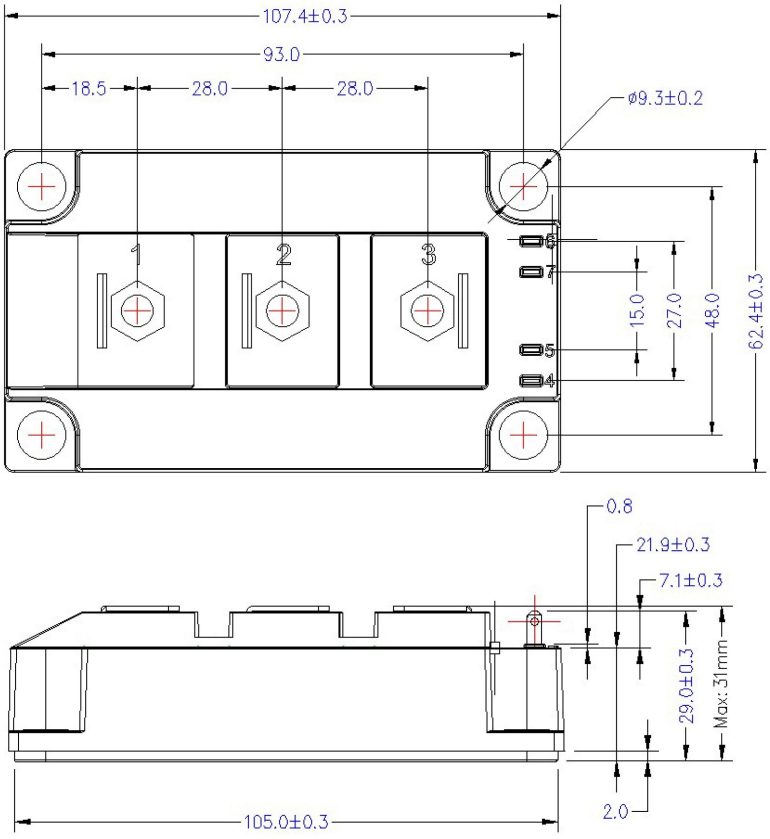
Typical IGBT Thermal Impedance



Circuit Diagram



Package Dimension



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