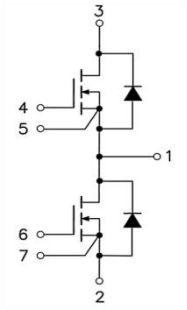
62mm Half Bridge SiC Module

Parameter	Value	Unit
V_{DS}	1700	V
I_D	400	A
$R_{DS(ON)}$	4.3	mΩ
Q_G	1030	nC



Features:

- Low Switching Losses
- High-frequency Operation
- Zero Reverse Recovery from Diodes
- Zero Turn-off Tail Current from MOSFET

Applications:

- DC/DC Converter
- Solar and Wind Inverters
- Uninterruptible Power Supply(UPS)
- Switched Mode Power Supply(SMPS)

Absolute Maximum Ratings (T_C=25°C unless otherwise specified)

Symbol	Parameter	Value	Unit
V_{DS}	Drain-source Voltage	1700	V
V_{GS}	Gate-source Voltage	-10/+20	V
I_D	Drain Current (continuous) (T_C=25°C);V_{GS}=+15V	500	A
I_D	Drain Current (continuous) (T_C=80°C);V_{GS}=+15V	400	
I_{DM}	Drain Current (pulsed)	800	A
P_{tot}	Total Power Dissipation	2020	W
T_{op};T_{stg}	Operating and Storage Temperature Range	-40 to +125	°C
T_J	Junction Temperature	175	°C
$R_{th(j-c)}$	Thermal Resistance,Junction-to- heat sink	0.074	°C/W

MOSFET Characteristics

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
Static characteristics (at TC=25°C unless otherwise specified)						
B_{VDS}	Drain-source Breakdown Voltage	1700	-	-	V	V_{GS}=0V; I_D=400uA
I_{DSS}	Zero Gate Voltage Drain Current	-	4	-	μA	V_{DS}=1200V; V_{GS}=0V
I_{GSS}	Gate-body Leakage Current	-	25	-	nA	V_{GS}=20V; V_{DS}=0V
$V_{GS(th)}$	Gate Threshold Voltage	1.8	2.7	-	V	V_{DS}=V_{GS} ; I_D=240mA;T_j=25°C
		-	1.9	-	V	V_{DS}=V_{GS} ; I_D=240mA;T_j=175°C
$R_{DS(on)}$	Static Drain-source on Resistance	-	4.3	-	mΩ	V_{GS}=15V; I_D=400A;T_j=25°C
		-	7.1	-	mΩ	V_{GS}=15V; I_D=400A ;T_j=175°C

$V_{GS(on)}$	Static drain-source On-state Voltage	-	1.72	-	V	V_{GS}=15V; I_D=400A;T_j=25°C
		-	2.84	-	V	V_{GS}=15V; I_D=400A;T_j=175°C
R_G	Gate Resistance	-	1.7	-	Ω	V_{GS}=0V; f=1MHz
Dynamic characteristics (at TC=25°C unless otherwise specified)						
C_{iss}	Input Capacitance	-	30.48	-	nF	V_{DS}=1000V; f=1MHz; V_{AC}=25mV
C_{oss}	Output Capacitance	-	0.82	-		
C_{rss}	Reverse Transfer Capacitance	-	151	-	pF	
Q_G	Total Gate Charge	-	1030	-	nC	V_{DD}=1000V; V_{GS}=-4/+15V I_D=300A
$t_{d(on)}$	Turn-on Delay Time	-	118	-	ns	V_{DD}=900V, I_D=400A V_{GS}=+15V/-4V R_{gon}/R_{goff}=2.2Ω/2.2Ω Inductive load switching operation
t_r	Rise Time	-	68	-		
$t_{d(off)}$	Turn-off Delay Time	-	232	-		
t_f	Fall Time	-	60	-		
E_{on}	Turn-on Switching Energy	-	27.9	-	mJ	
E_{off}	Turn-off Switching Energy	-	12.9	-		

Body Diode Characteristics (T_J =25°C unless otherwise specified)

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
V_{FSD}	Forward Voltage	-	1.65	-	V	V_{GS}=0V; I_F=400A
T_{RR}	Reverse Recovery Time	-	27	-	ns	(Switch side) V_{DD}=900V, I_D=400A V_{GS}=+15V/-4V R_{gon}/R_{goff}=2.2Ω/2.2Ω (FRD side) V_R=900V, I_F=400A V_{GE}=+15V/-4V Inductive load switching operation
Q_{RR}	Reverse Recovery Charge	-	1180	-	nC	
I_{RRM}	Peak Reverse Recovery Current	-	77	-	A	
E_{RR}	Reverse recovered energy	-	0.4	-	mJ	

Module Physical Characteristics

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
W	Weight	-	340	-	g	
M	Mounting Torque	4.0	-	5.5	N·m	M6
V_{ISOL}	Isolation Test Voltage	-	4.0	-	kV	
-	Clearance Distance	-	12.5	-	mm	Terminal to Terminal
		-	10	-	mm	Terminal to Baseplate
-	Creepage Distance	-	14.5	-	mm	Terminal to Terminal
		-	10	-	mm	Terminal to Baseplate

Typical Characteristics

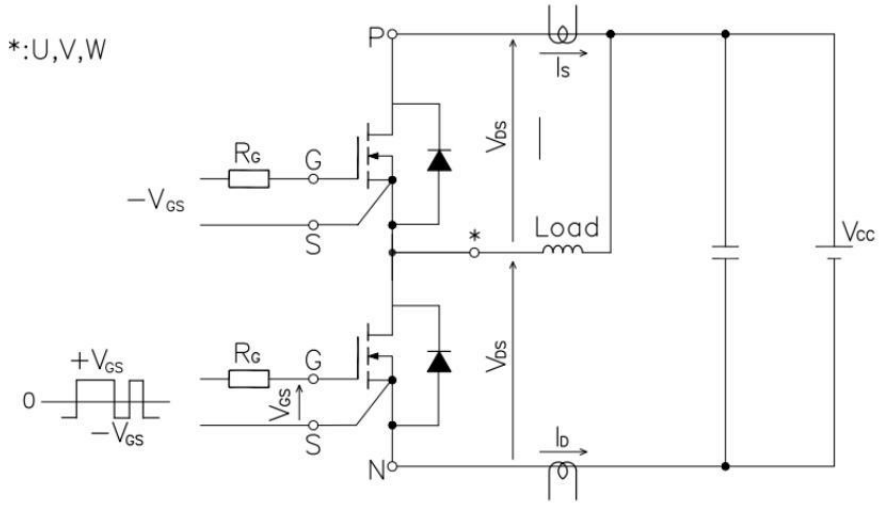


Figure 1 . Switching time measure circuit

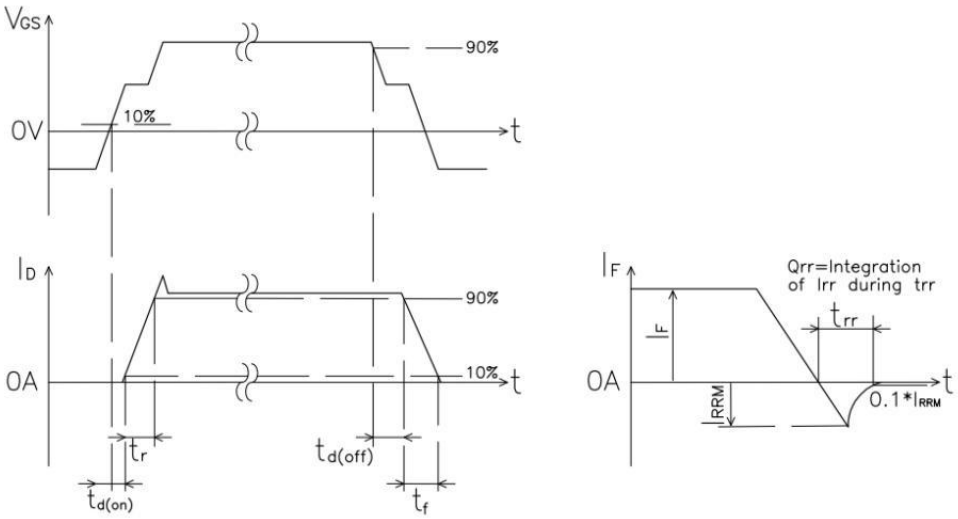


Figure 2 . Switching time definition

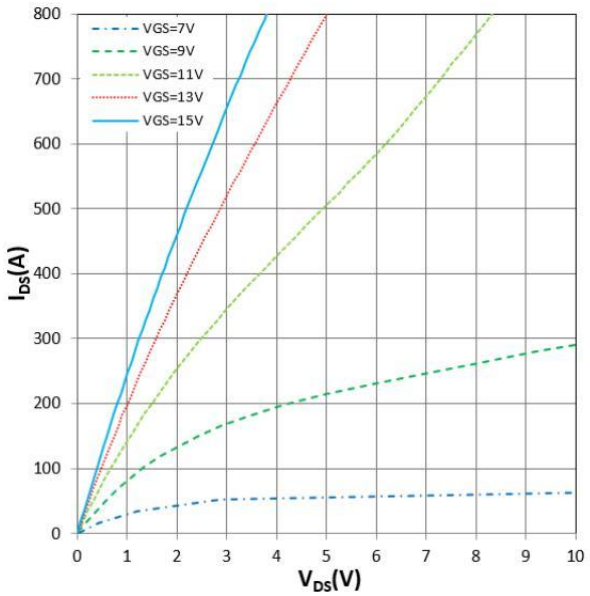


Figure 3 . I_{DS} vs V_{DS}

T_j =25°C

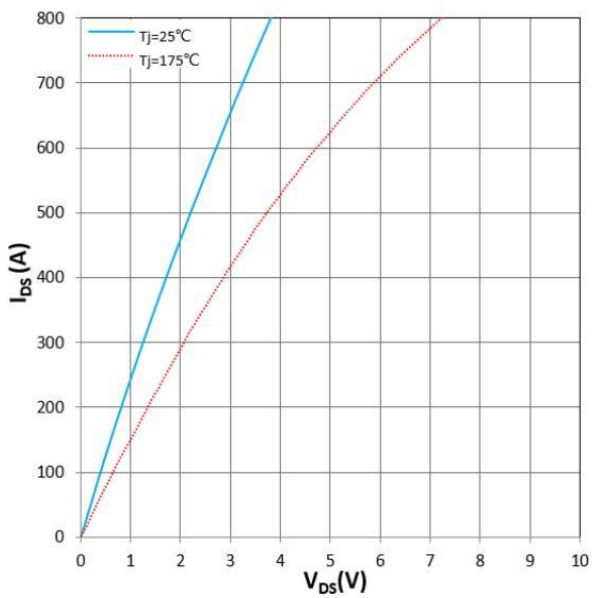


Figure 4. I_{DS} vs V_{DS}

V_{GS} =+15V

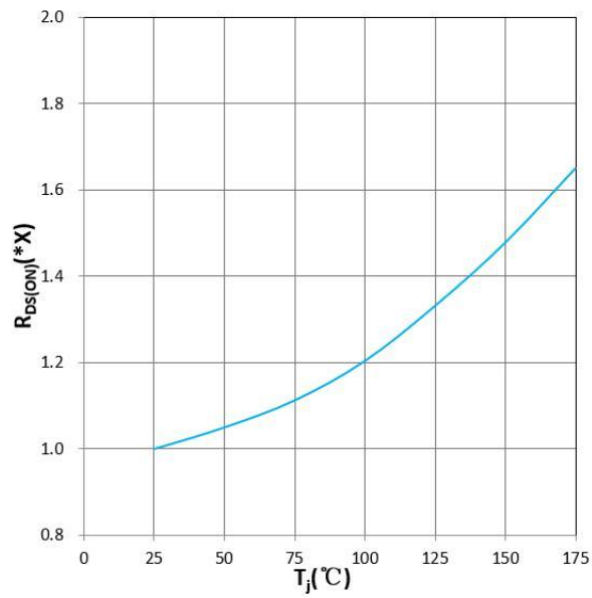


Figure 5. $R_{DS(ON)}$ vs T_j

V_{GS} =+15V, I_D =400A, 1.0X =4.3mΩ

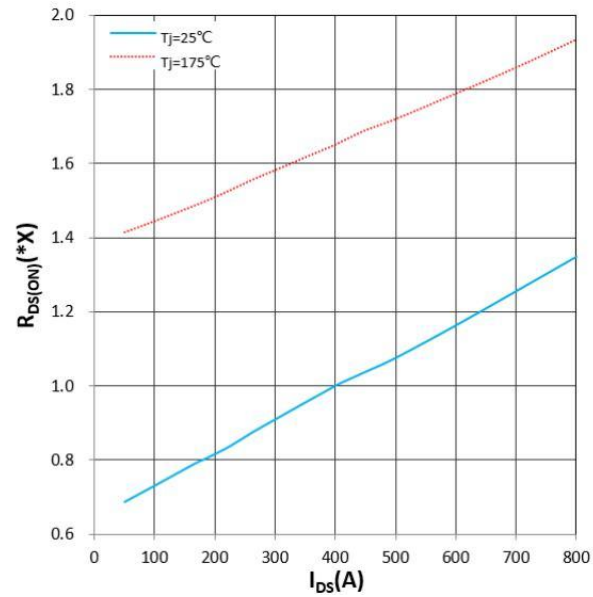


Figure 6 . $R_{DS(ON)}$ vs I_{DS}

V_{GS} =+15V, 1.0X =4.3mΩ

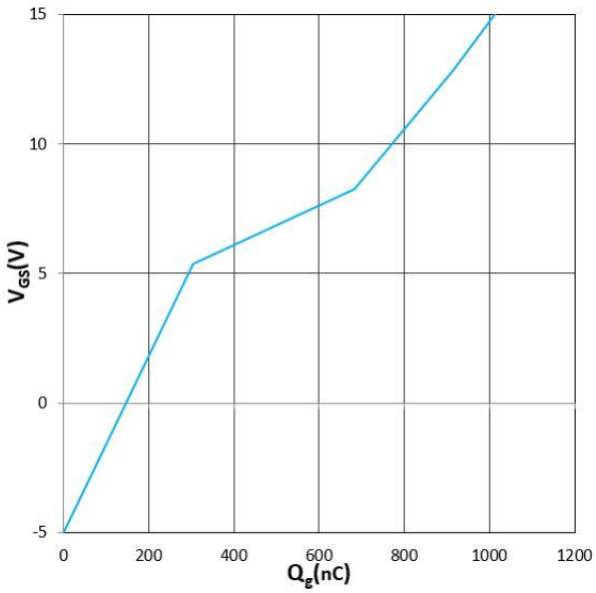


Figure 7 . V_{GS} vs Q_g

V_{DS} =1000V, I_D =300A, T_j =25℃

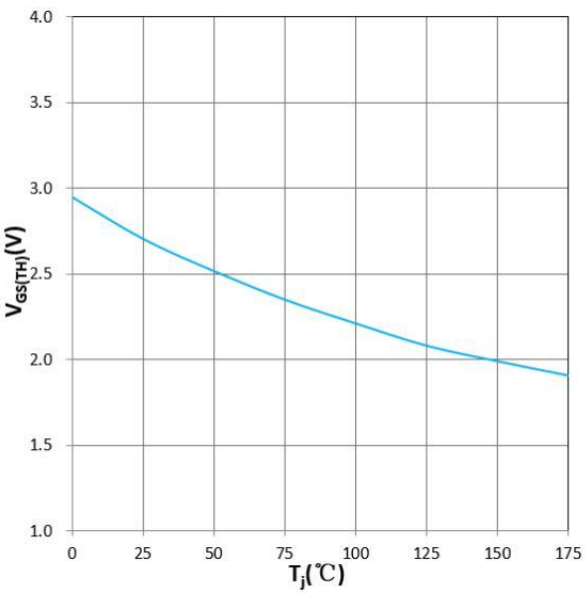


Figure 8 . $V_{GS(TH)}$ vs T_j

V_{GS} =V_{DS}, I_D =240mA

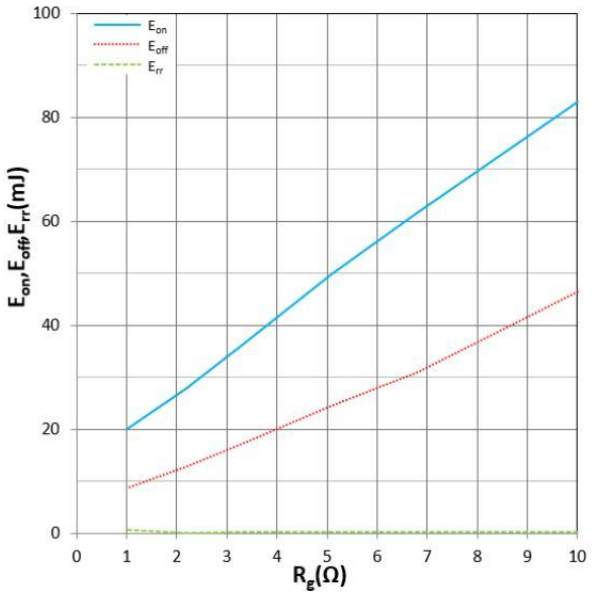


Figure 9 . E_{on}, E_{off}, E_{rr} vs R_g

T_j=25°C, V_{DD} =900V, V_{GS} =+15V/-4V, I_D =400A

Inductive Load

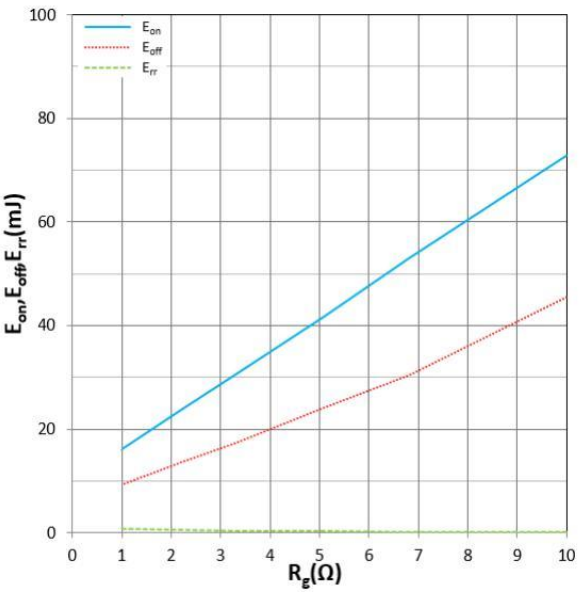


Figure 10. E_{on}, E_{off}, E_{rr} vs R_g

T_j=150°C, V_{DD} =900V, V_{GS} =+15V/-4V, I_D =400A

Inductive Load

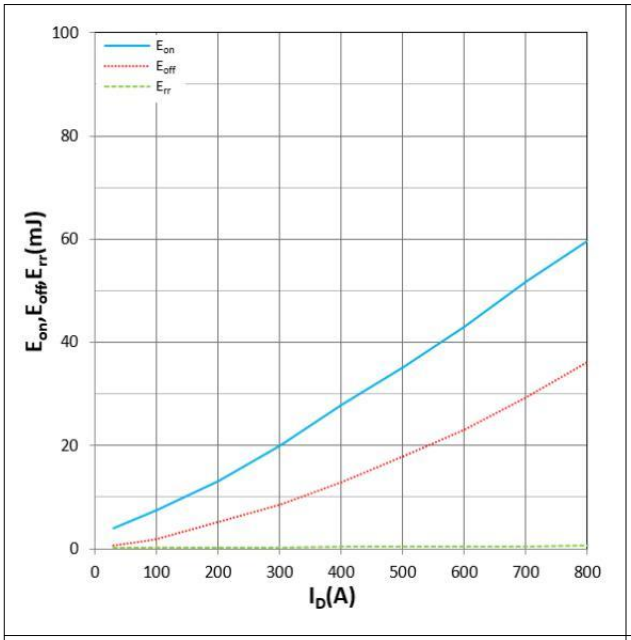


Figure 11. E_{on}, E_{off}, E_{rr} vs I_{DS}

T_j=25°C, V_{DD} =900V, V_{GS} =+15V/-4V
R_{gon}/R_{goff} =2.2Ω/2.2Ω, Inductive Load

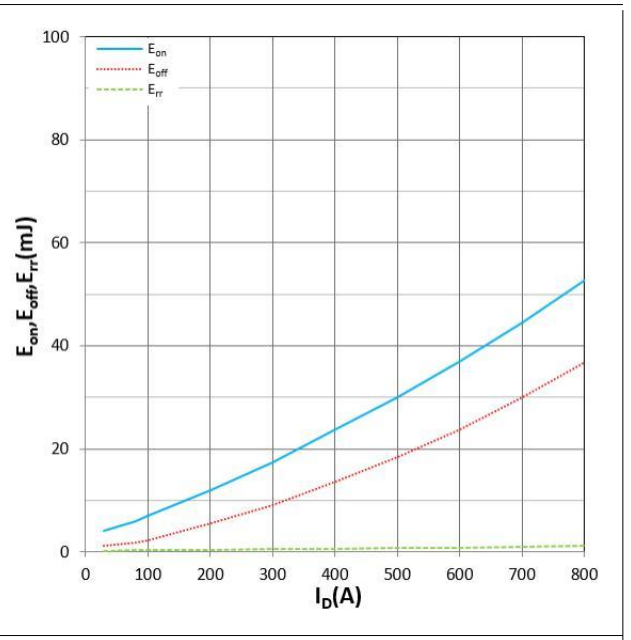


Figure 12. E_{on}, E_{off}, E_{rr} vs I_{DS}

T_j=150°C, V_{DD}=900V, V_{GS} =+15V/-4V
R_{gon}/R_{goff} =2.2Ω/2.2Ω, Inductive Load

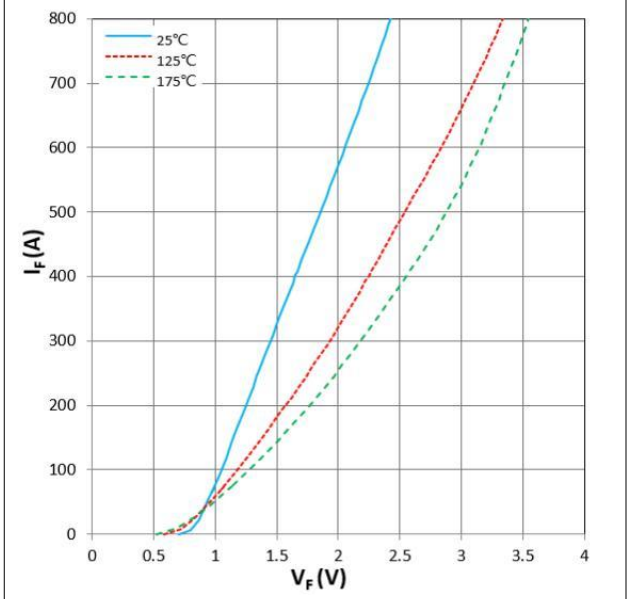
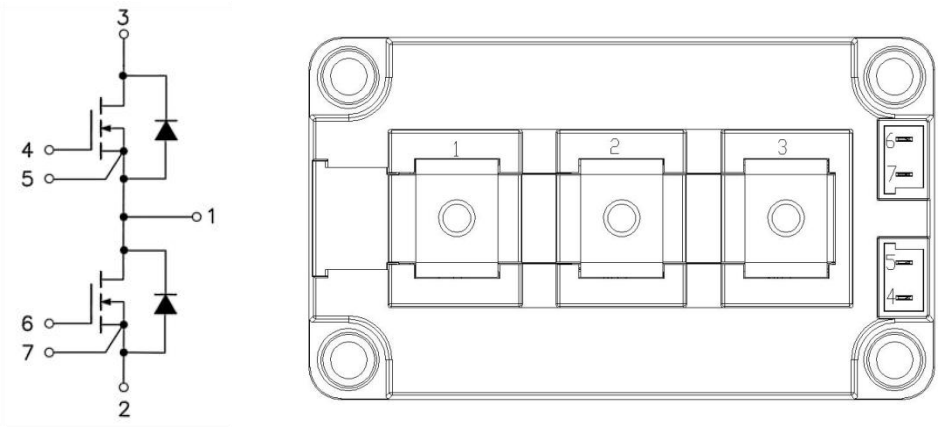


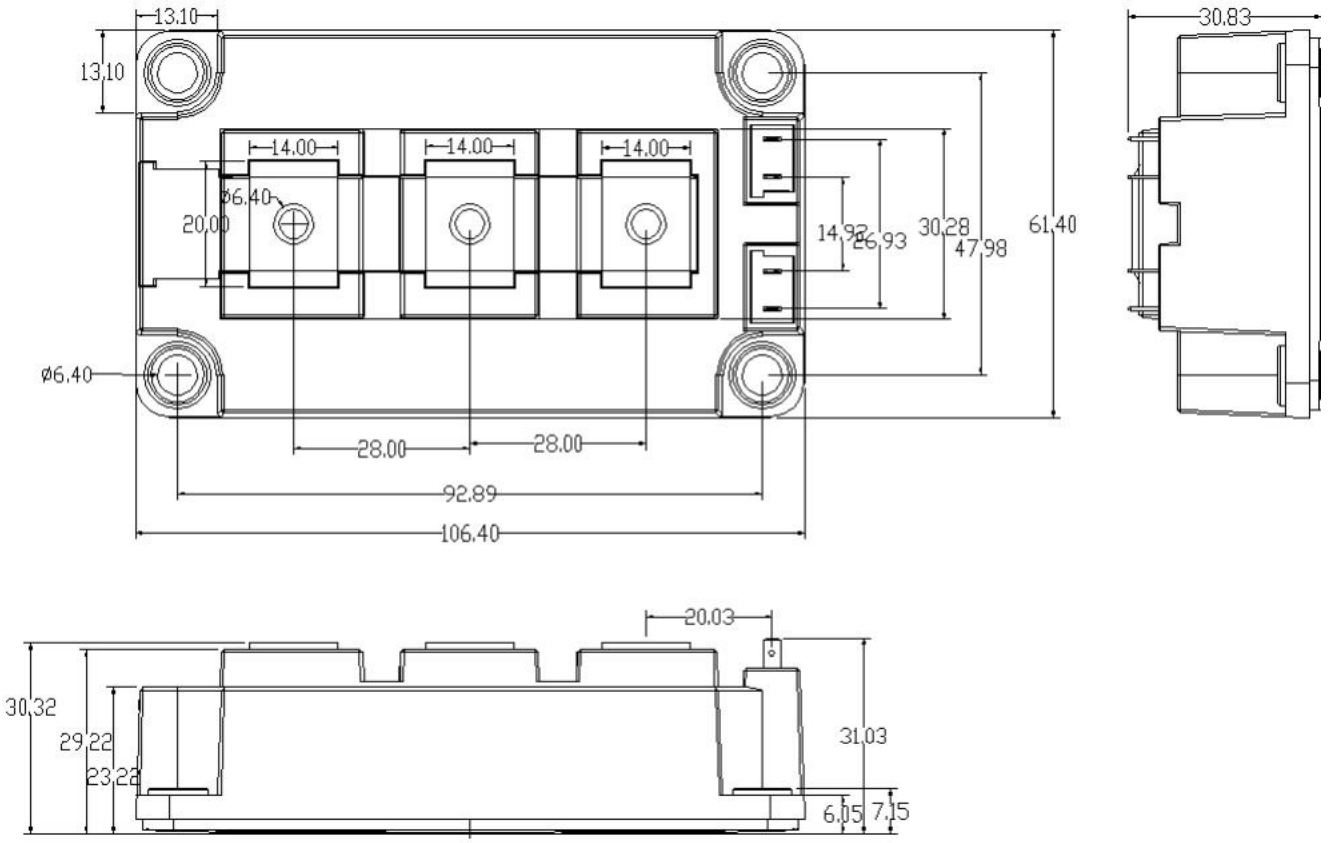
Figure 13. I_F vs V_F

V_{GS} =0V

Circuit Diagram



Package Outlines(Unit: mm):



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