All Silicon Carbide Power Module

1200V/300A Half-Bridge Package

Features

- High Blocking Voltage with Low On-Resistance
- High Speed Switching with Low Capacitances
- Easy to Parallel and Simple to Drive
- Avalanche Ruggedness
- Halogen Free, RoHS Compliant

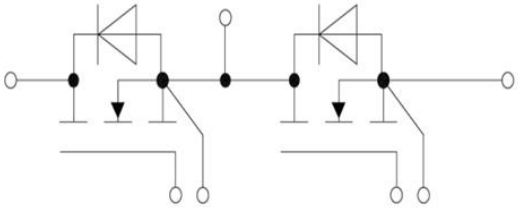
Benefits

- Higher System Efficiency
- Reduced Cooling Requirements
- Increased Power Density
- Increased System Switching Frequency

Applications

- Automotive application
- Hybrid and electric vehicle
- Inverter for motor drive

Equivalent Circuit Schematic



Part Number	Package
CI300R120MD	**61.4mm X 106.4mm X 30mm**

Maximum Ratings (T_c = 25°C unless otherwise specified)

Symbol	Parameter	Value	Unit	Test Conditions	Note
V_{DSmax}	Drain - Source Voltage	1200	V	T_C=25°C	
V_{GSmax}	Gate - Source Voltage	-8/+22	V	Absolute maximum values	
V_{GSop}	Gate - Source Voltage	-5/+18	V	Recommended operational values	
I_D	Continuous Drain Current	575	A	V_{GS}=18V, T_C=25°C, T_J≤150°C	
		422	A	V_{GS}=18V, T_C=90°C, T_J≤150°C	
P_D	Power Dissipation	1786	W	T_C=25°C, T_J≤150°C	
T_J, T_{stg}	Operating Junction and Storage Temperature	-55 to +150	°C		
V_{ISO}	Isolattion Voltage	5000	V	AC, 50Hz, 1min	

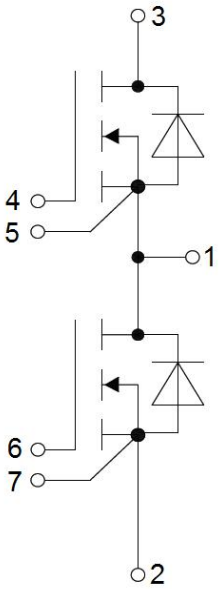
Electrical Characteristics

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions	Note
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	1200			V	V_{GS}=0V,I_D=100μA	
$V_{GS(th)}$	Gate Threshold Voltage	2.0	3.0	4.0	V	V_{GS}= V_{DS}, I_D=120mA,T_C=25°C	
			2.3			V_{GS}= V_{DS}, I_D=120mA,T_C=150°C	
I_{DSS}	Zero Gate Voltage Drain Current		60	1000	μA	V_{DS}= 1200V, V_{GS}=0V	
I_{GSS}	Gate-Source Leakage Current			200	nA	V_{GS}=18V, V_{DS}= 0V	
$R_{DS(on)}$	Drain-Source on-state Resistance		3.0	4.0	mΩ	V_{GS}=18V, I_D=300A, T_C=25°C	
			5.4		mΩ	V_{GS}=18V, I_D=300A, T_C=150°C	
Ciss	Input Capacitance		30.25		nF	V_{GS}=0V, V_{DS}=800V, f=100kHz, V_{AC}=25 mV	
Coss	Output Capacitance		2307		pF		
Crss	Reverse Transfer Capacitance		82.5		pF		
E_{ON}	Turn-OnSwitching Energy		4		mJ	V_{DS}=600V, V_{GS}=-5/18V, I_D = 300A，Rg(ext)=0Ω	
E_{OFF}	Turn-Off Switching Energy		3				
$R_{G(int)}$	Internal Gate Resistance		1.1		Ω	f=100kHz,V_{AC}=25 mV	
$t_{d(on)}$	Turn-On Delay Time		48		ns	V_{DS}=600V, V_{GS}=-5/18 V, I_D = 300A Rg(ext)=0Ω	
t_r	Rise Time		42				
$t_{d(off)}$	Turn-Off Delay Time		145				
t_f	Fall Time		30				
Q_{gs}	Gate to Source Charge		366		nC	V_{DS}=800V, V_{GS}=-5/18 V, I_D = 300A	
Q_{gd}	Gate to Drain Charge		156				
Q_g	Total Gate Charge		1284				
$R_{th\ JC}$	FET Thermal Resistance, Junction to Case		0.07	0.075	°C/W		

Reverse Diode Characteristics

Symbol	Parameter	Typ.	Max.	Unit	Test Conditions	Note
V_{SD}	Diode Forward Voltage	1.6		V	V_{GS} =-5V, I_{SD} = 300 A, T_J = 25 °C	
		2.2		V	V_{GS} =-5V, I_{SD} = 300 A, T_J = 150 °C	
I_{SD}	Continuous Diode Forward Current	300		A	T_C = 25°C, T_J ≤ 150°C	
t_{rr}	Reverse Recovery time	37		ns	V_{GS} =-5V, I_{SD} = 300 A, V_R= 600V	
Q_{rr}	Reverse Recovery Charge	1500		nC		
I_{rrm}	Peak Reverse Recovery Current	-330		A		
$R_{th\ JC}$	Diode Thermal Resistance, Junction to Case	0.073	0.076	°C/W		

Circuit Schematic:



Package Dimensions: (mm)