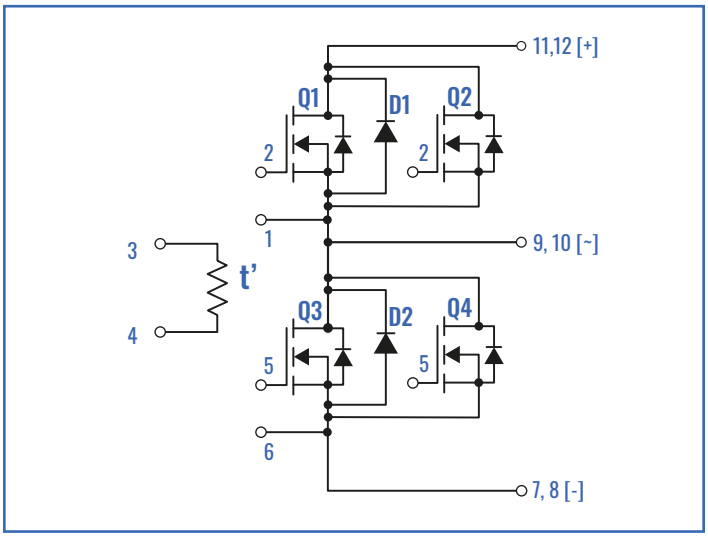
SD11487

SiC Half-Bridge Hermetic Power Module - 1

V_{DS} = 1200V

R_{DSon} = 12mΩ

I_D = 95A @ T_C = 25°C



FEATURES & BENEFITS

- SUPERIOR SYSTEM EFFICIENCY DUE TO LOW SWITCHING AND CONDUCTIONS LOSSES OF SIC
- OUTSTANDING POWER CONVERSION EFFICIENCY AT HIGH FREQUENCY OPERATION
- HIGH SPEED SWITCHING W/ LOW CAPACITANCE
- REDUCED PARASITIC INDUCTANCE AND CAPACITANCE
- REAL KELVIN SOURCE CONNECTION FOR STABLE GATE DRIVE
- ISOLATED BACKSIDE FOR DIRECT MOUNT TO HEATSINK
- ALN SUBSTRATE AND CUMO BASEPLATE FOR THERMAL CONDUCTIVITY
- HIGH JUNCTION TEMPERATURE OPERATION
- LOW JUNCTION TO CASE THERMAL RESISTANCE
- REDUCED THERMAL REQUIREMENTS AND SYSTEM COST
- INTEGRATED NTC TEMPERATURE SENSOR
- HERMETIC POWER PACKAGE

PIN CONNECTIONS

PIN	DESCRIPTION
1	S1, S2
2	G1, G2
3	Temp. Monitoring
4	Temp. Monitoring
5	G3, G4
6	S3, S4
7, 8	AC
9, 10	N
11, 12	P

ABSOLUTE MAXIMIMUM RATINGS (T_a = 25°C)

SYMBOL	CHARACTERISTIC	TEST CONDITIONS	VALUE	UNIT
V_{DSS}	Drain-Source Voltage		1200	V
I_D	Continuous Drain Current [1]		95	A
$I_{D, pulse}$	Pulsed Drain Current [2]		237	A
V_{GSS}	Gate-Source Voltage		-4 to 22	V
T_J, T_{STG}	Junction Temperature, Operating and Storage		-55 to +175	°C

ELECTRICAL CHARACTERISTICS (T_a = 25°C)

SYMBOL	CHARACTERISTIC	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	V_{GS} < 0V, I_D = 1mA	1200			V
I_{DSS}	Off -State Drain Current	V_{GS} = 0V, V_{DS} = 1200V, T_J = 25°C		15	20	µA
		V_{GS} = 0V, V_{DS} = 1200V, T_J = 125°C		56		
I_{GSS+}	Gate-Source Leakage Current	V_{GS} = +22V, V_{DS} = 0V			100	nA
I_{GSS-}		V_{GS} = -4V, V_{DS} = 0V			-100	
$V_{GS (th)}$	Gate Threshold Voltage	V_{DS} = 10V, I_D = 18.2mA	2.7		5.6	V
$R_{DS (on)}$	Drain-Source On-state Resistance [3]	V_{GS} = 18V, I_D = 36A, T_J = 25°C		10	12	mΩ
		V_{GS} = 18V, I_D = 36A, T_J = 125°C		15		
R_G	Gate Input Resistance	f = 100MHz, Open Drain		4		Ω
g_{fs}	Transconductance [3]	V_{DS} = 10V, I_D = 36A		14.2		S
C_{iss}	Input Capacitance	V_{GS} = 0V, V_{DS} = 30V, f = 1MHz		5866		pF
C_{oss}	Output Capacitance			1691		
C_{rss}	Reverse Transfer Capacitance			159		
$t_{d (on)}$	Turn-On Delay Time [3]	V_{DD} = 400V, V_{GS} = 18/0V, I_D = 40A, R_L = 10Ω, R_G = 15Ω		130		ns
t_r	Rise Time [3]			290		
$t_{d (off)}$	Turn-Off Delay Time [3]			440		
t_f	Fall Time [3]			250		
E_{on}	Turn-On Switching Loss [3]	V_{DD} = 400V, V_{GS} = 18/0V, I_D = 40A, R_G = 15Ω, L = 250µH E_{on} includes diode reverse recovery		632		µJ
E_{off}	Turn-Off Switching Loss [3]			243		

GATE CHARGE CHARACTERISTICS (T_a = 25°C)

SYMBOL	CHARACTERISTIC	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Q_g	Total Gate Charge [3]	V_{DD} = 400V, V_{GS} = 18V, I_D = 36A		299		nC
Q_{gs}	Gate - Source Charge [3]			43		
Q_{gd}	Gate - Drain Charge [3]			129		

Notes:
1. For T_j = 175°C and thermal dissipation to ambience of 427W or more. Limited only by maximum temperature allowed.
2. PW ≤ 10µs, duty cycle ≤ 1%.
3. Pulsed.

BODY DIODE RATINGS AND CHARACTERISTICS (T_a = 25°C)

SYMBOL	CHARACTERISTIC	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
I_S	Inverse Diode Continuous, Forward Current [1]	T_c = 25°C			95	A
I_{SM}	Inverse Diode Direct Current, Pulsed [2]				237	
V_{SD}	Diode Forward Voltage [3]	V_{GS} = 0V, I_S = 36A		1.7		V
t_{rr}	Reverse Recovery Time [3]	I_F = 36A, V_R = 400V, di/dt = 1100A/µs		28		nS
Q_{rr}	Reverse Recovery Charge [3]			475		nC
I_{rrm}	Peak Reverse Recovery Current [3]			12		A

PACKAGE OUTLINE - dimensions in inches (mm)