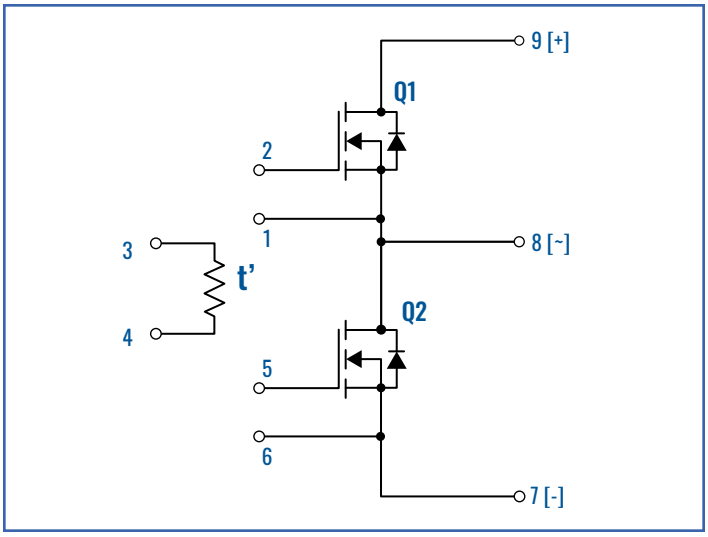
SD11903

SiC Half-Bridge Power Module - 1

V_{DS} = 1200V

R_{DSon} = 32mΩ

I_D = 50A @ T_C = 25°C

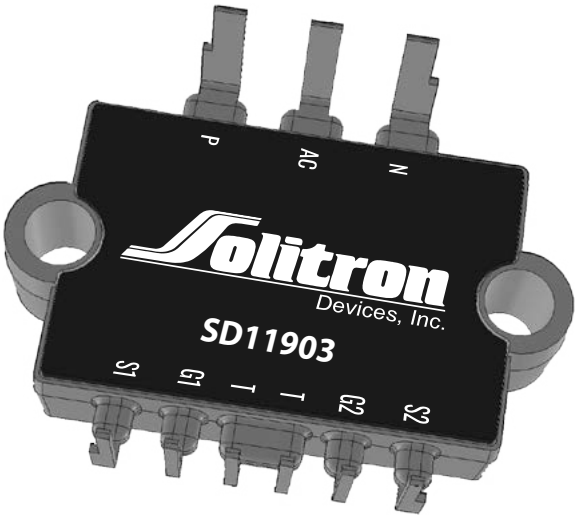


PIN CONNECTIONS

PIN	DESCRIPTION
1	S1
2	G1
3	Temp. Monitoring
4	Temp. Monitoring
5	G2
6	S2
7	N
8	AC
9	P

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
- RUGGED MOUNTING DUE TO INTEGRATED MOUNTING BUSHINGS
- LOW PROFILE COMPACT PACKAGE



Solitron DEVICES, INC.

SD11903
SiC Half-Bridge Power Module - 2

ABSOLUTE MAXIMIMUM RATINGS (T_C = 25°C)

SYMBOL	CHARACTERISTIC	TEST CONDITIONS	VALUE	UNIT
$V_{DS, max}$	Drain-Source Voltage	V_{GS} = 0V, I_D = 19µA	1200	V
$V_{GS, max}$	Gate-Source Voltage (Max.)	Absolute maximum values	-8/+19	V
$V_{GS, op}$	Gate-Source Voltage	Recommended operational values	-4/+15	V
I_D	Continuous Drain Current	V_{GS} = 15V	50	A
$I_{D, pulse}$	Pulsed Drain Current	Pulse Width t_p Limited by T_{jmax}	160	A
P_D	Maximum Power Dissipation		176	W
T_J, T_{STG}	Junction Temperature, Operating and Storage		-55 to +175	°C

ELECTRICAL CHARACTERISTICS (T_C = 25°C)

SYMBOL	CHARACTERISTIC	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	V_{GS} < 0V, I_D = 19µA	1200			V
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_{DS} = 11mA, Ta = - 55°C		3.2		V
		V_{DS} = V_{GS}, I_{DS} = 11mA, Ta = + 25°C	1.8	2.5	3.6	
		V_{DS} = V_{GS}, I_{DS} = 11mA, Ta = + 175°C		2.0		
I_{DSS}	Off -State Drain Current	V_{GS} = 0V, V_{DS} = 1200V		1	50	uA
I_{GSS}	Gate-Source Leakage Current	V_{GS} = +15V, V_{DS} = 0V		10	250	nA
$R_{DS (on)}$	Drain-Source On-state Resistance	V_{GS} = 15V, I_D = 40A, T_J = 25°C		33		mΩ
		V_{GS} = 15V, I_D = 40A, T_J = 175°C		46		
g_{fs}	Transconductance	V_{DS} = 20V, I_{DS} = 40A, T_a = 25°C		29		S
		V_{DS} = 20V, I_{DS} = 40A, T_a = 175°C		23		
C_{iss}*	Input Capacitance	V_{GS} = 0V, V_{DS} = 1000V, f = 100kHz, Vac = 25mV		3357		pF
C_{oss}*	Output Capacitance			129		pF
C_{rss}*	Reverse Transfer Capacitance			8		pF

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

SYMBOL	CHARACTERISTIC	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_{SD}	Diode Forward Voltage	V_{GS} = 0V		4.25		V
t_{rr}	Reverse Recovery Time			27		nS
Q_{rr}	Reverse Recovery Charge			478		nC
I_{rrm}	Peak Reverse Recovery Current	PW < 10uS, Duty Cycle < 1%, Non-repetitive		27		A

THERMAL RESISTANCE

SYMBOL	CHARACTERISTIC	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
R_{thJC}	Junction-to-Case				0.4	°C/W
R_{thCS}	Case-to-sink			0.21		°C/W
R_{thJA}	Junction-to-Ambient				40	°C/W

TEMPERATURE SENSOR NTC

SYMBOL	CHARACTERISTIC	MIN.	TYP.	MAX.	UNIT
R_{25}	Resistance @ 25°C		4.7		kΩ
$\Delta R_{25}/R_{25}$	Resistance tolerance		±5		%
$\Delta B/B$	Beta tolerance		±3		%
$B_{25/100}$	Beta Constant		4110		K

CHARACTERISTICS

Fig 1: Output Characteristics T_J = -55°C

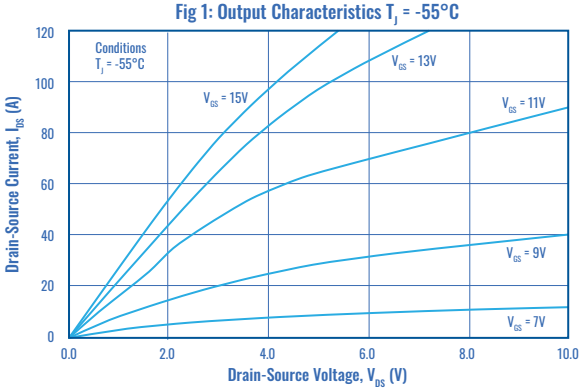


Fig 2: Output Characteristics T_J = +25°C

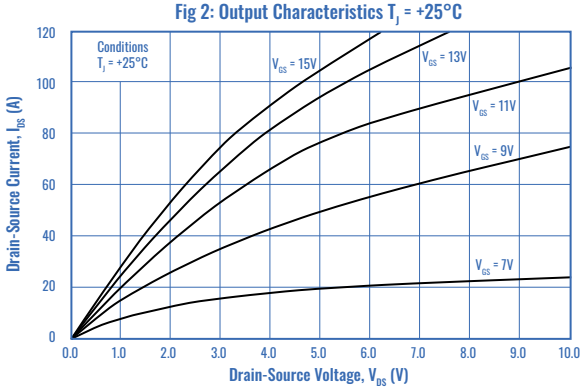


Fig 3: Output Characteristics T_J = +175°C

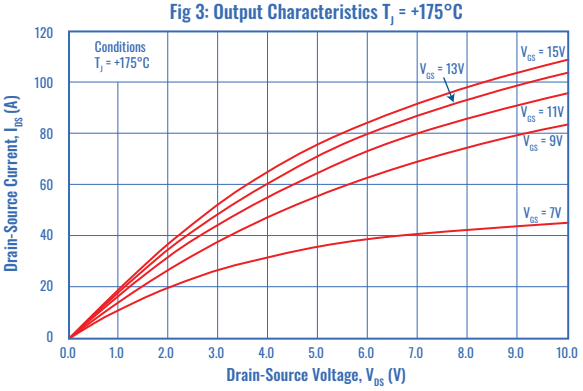


Fig 4:On-Resistance vs. Drain Current vs. Junction Temperature

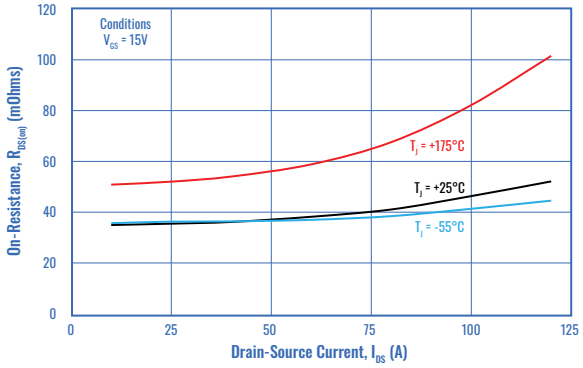


Fig 5: On-Resistance vs. Junction Temperature vs. Gate Voltage

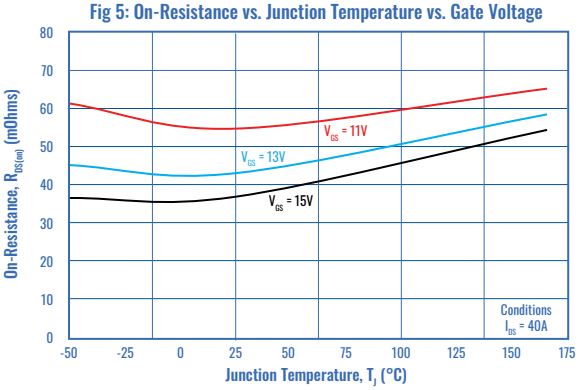
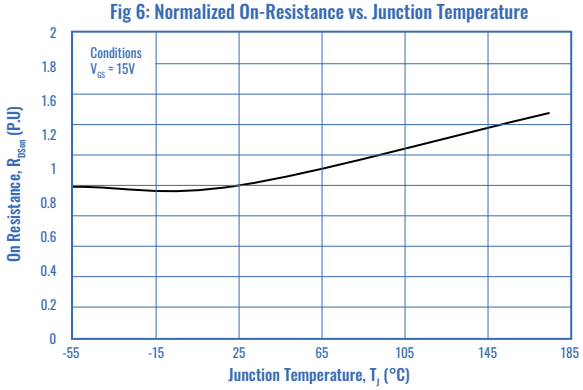


Fig 6: Normalized On-Resistance vs. Junction Temperature



CHARACTERISTICS, CONT.

Fig 7: Transfer Characteristic vs. Junction Temperature

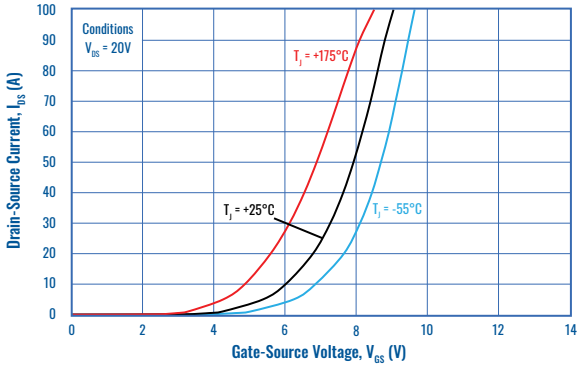


Fig 8: Body Diode Characteristic vs. Junction Temperature

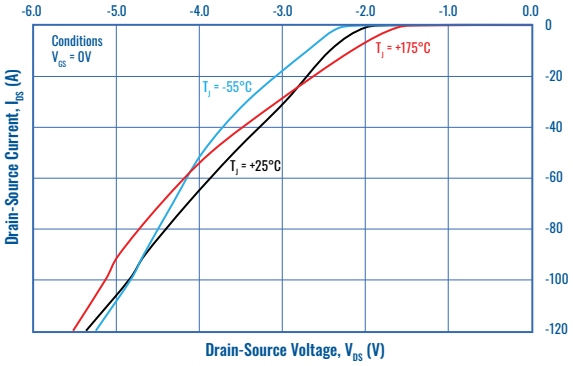


Fig 9: Threshold Voltage vs. Junction Temperature

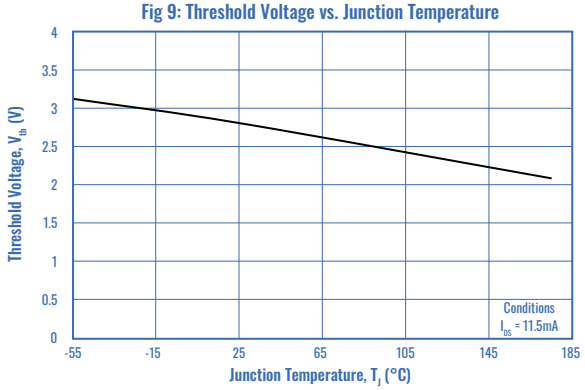


Fig 10: Maximum Power Dissipation vs. Case Temperature

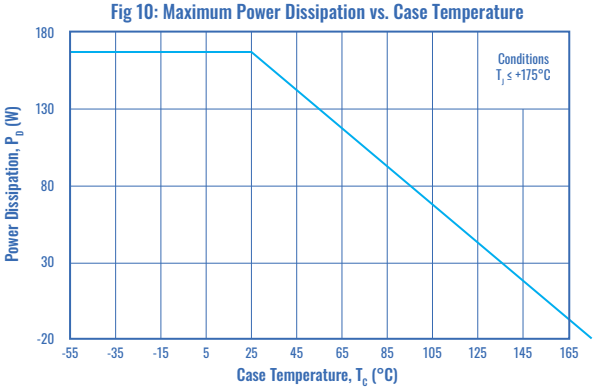


Fig 11: Continuous Drain Current Derating vs. Case Temperature

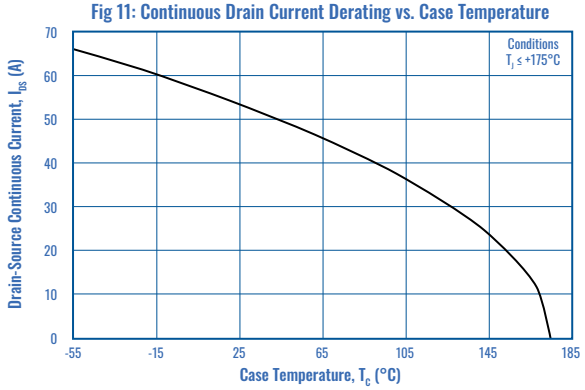


Fig 12: Nominal NTC Resistance vs. NTC Temperature

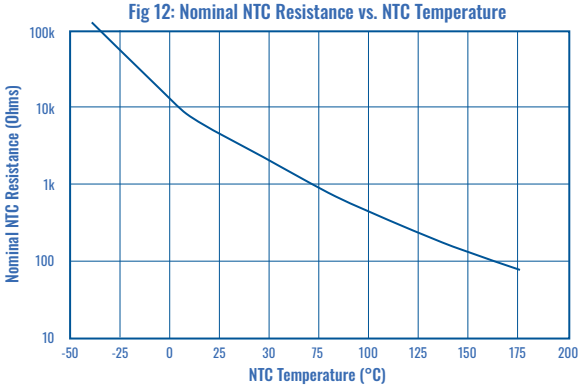


Fig 13: Capacitance vs. Drain-Source Voltage

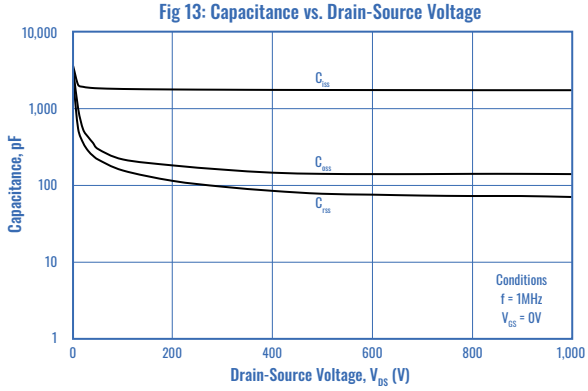
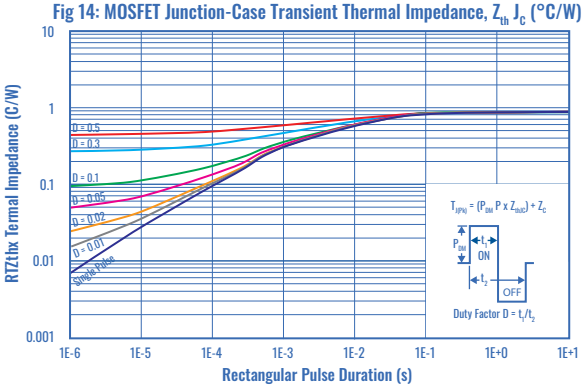
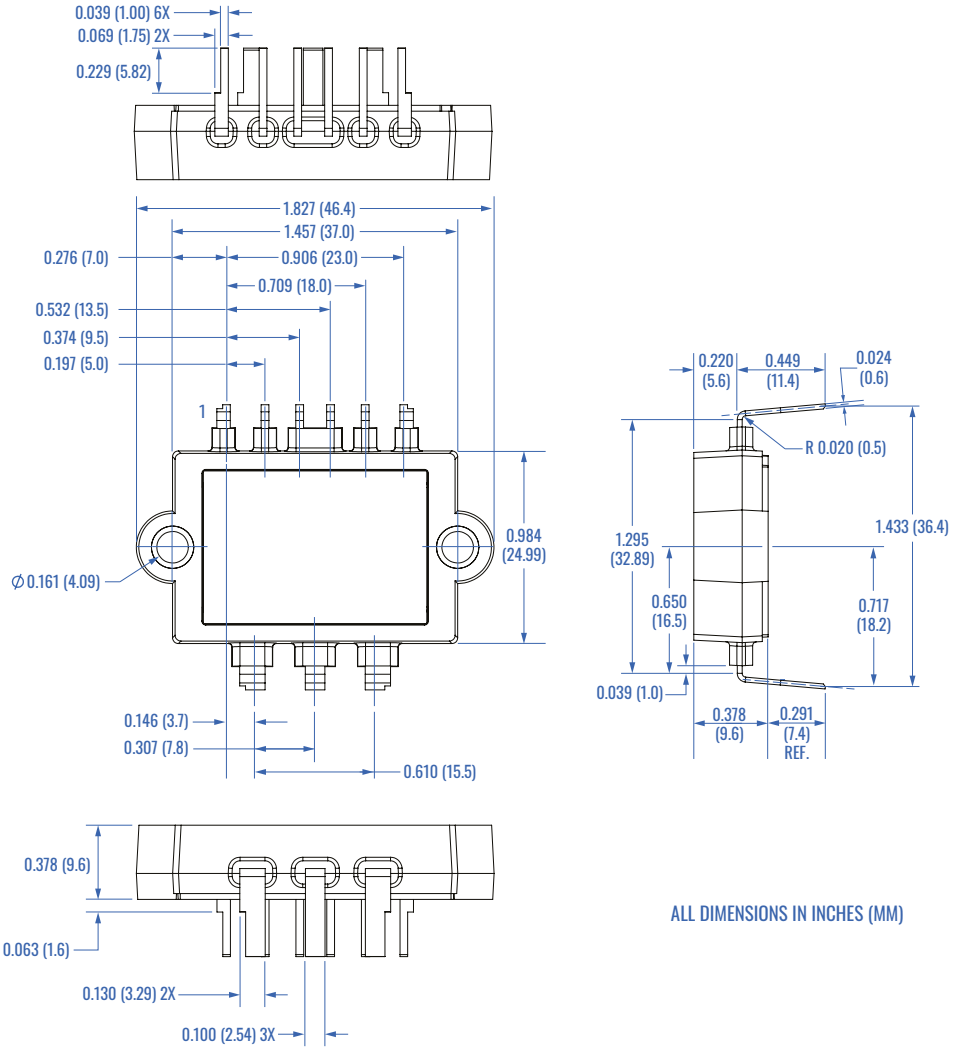


Fig 14: MOSFET Junction-Case Transient Thermal Impedance, Z_{th} J_C (°C/W)

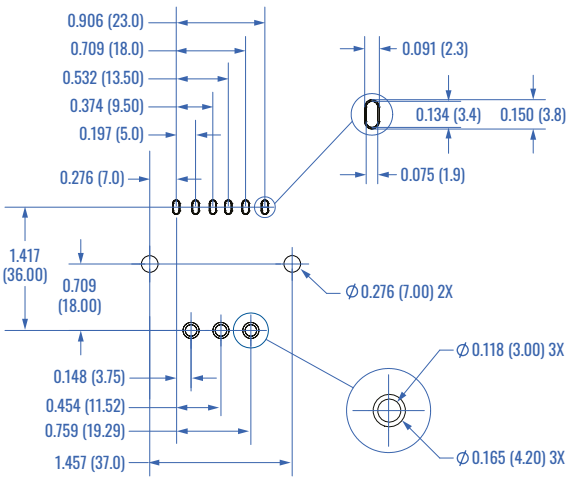


PACKAGE OUTLINE - dimensions in inches (mm)



ALL DIMENSIONS IN INCHES (MM)

PCB HOLE PATTERN



ALTERNATE PCB HOLE PATTERN