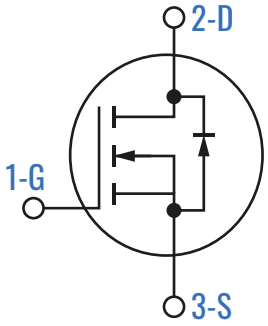
SD11705
1200V SiC N-Channel Power MOSFET - 1

KEY FEATURES

- LOW $R_{DS(ON)}$ AND Q_G
- AVALANCHE RATED
- TO-258 3L PACKAGE
- HERMETICALLY SEALED, ISOLATED PACKAGE
- JANTX, JANTXV SCREENING AVAILABLE

APPLICATIONS

- SWITCH-MODE AND RESONANT-MODE POWER SUPPLIES
- DC-DC CONVERTERS
- PFC CIRCUITS
- AC AND DC MOTOR DRIVES
- ROBOTICS AND SERVO CONTROLS



V_{DS} = 1200V
I_D @ 25°C = 50A
$R_{DS(on)}$ = 32mΩ

ORDERING GUIDE

Part Number	SD11705
Description	1200V SiC N-Channel Power MOSFET

ABSOLUTE MAXIMUM 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				0.68	°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		%
ΔB/B	Beta tolerance		±3		%
$B_{25/100}$	Beta Constant		4110		K

CHARACTERISTICS

Fig 1: Output Characteristics T_J = -55°C

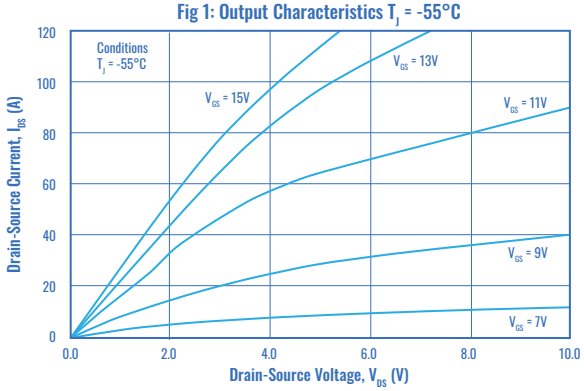


Fig 2: Output Characteristics T_J = +25°C

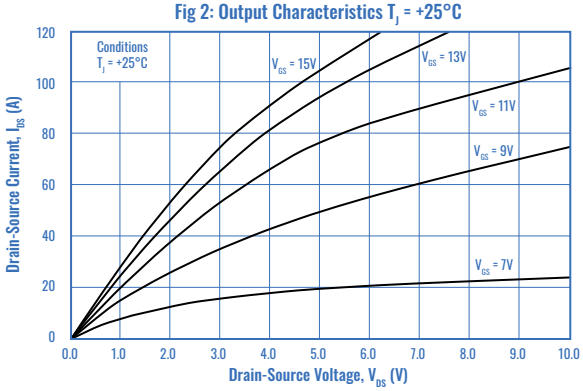


Fig 3: Output Characteristics T_J = +175°C

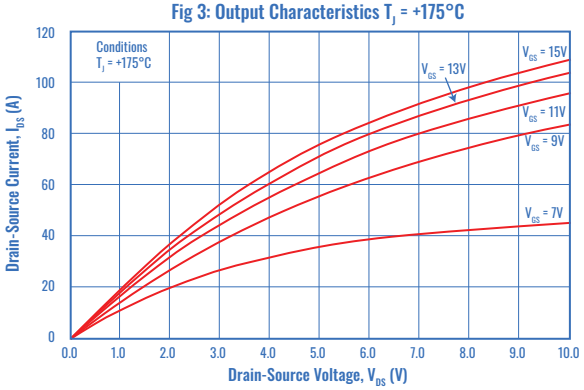


Fig 4:On-Resistance vs. Drain Current vs. Junction Temperature

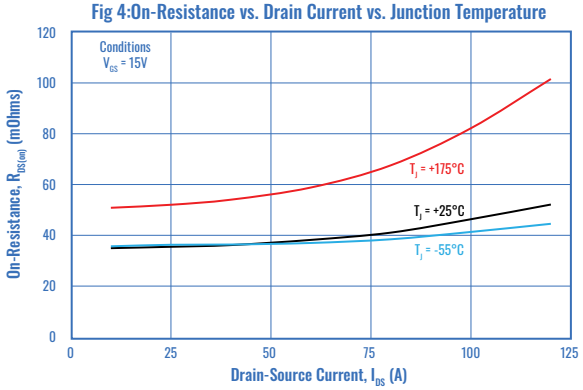


Fig 5: On-Resistance vs. Junction Temperature vs. Gate Voltage

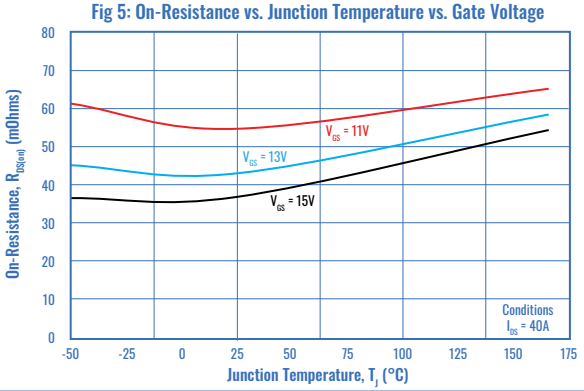
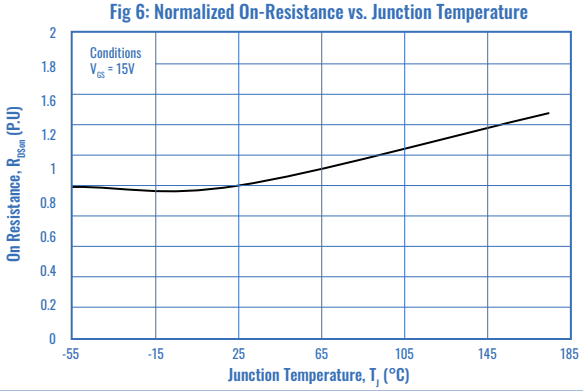


Fig 6: Normalized On-Resistance vs. Junction Temperature



CHARACTERISTICS, CONT.

Fig 7: Transfer Characteristic vs. Junction Temperature

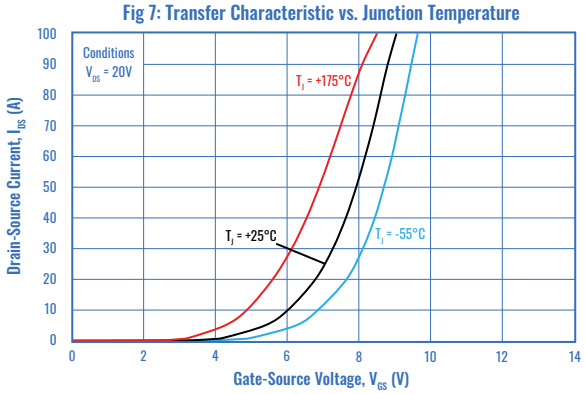


Fig 8: Body Diode Characteristic vs. Junction Temperature

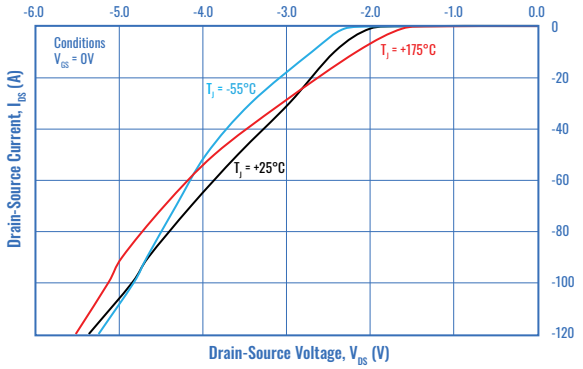


Fig 9: Threshold Voltage vs. Junction Temperature

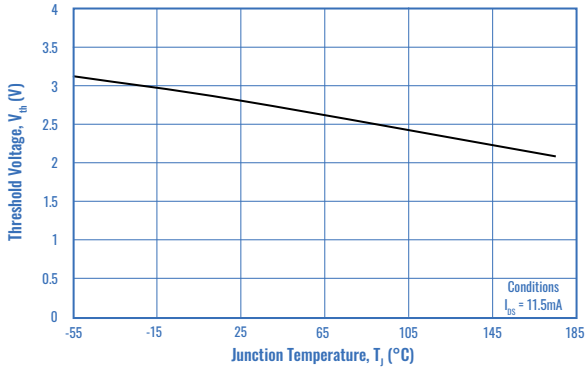


Fig 10: Maximum Power Dissipation vs. Case Temperature

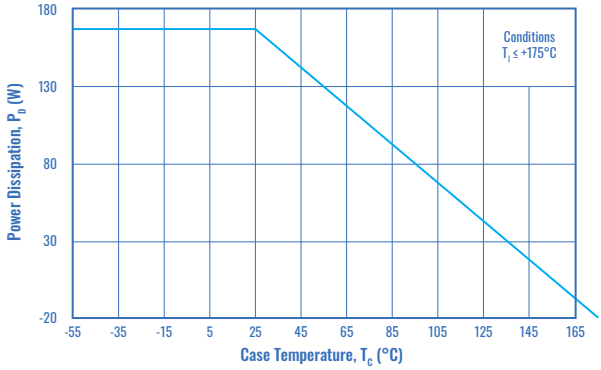


Fig 11: Continuous Drain Current Derating vs. Case Temperature

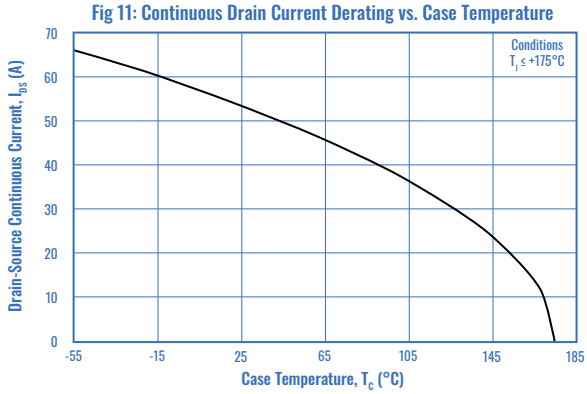


Fig 12: Capacitance vs. Drain-Source Voltage

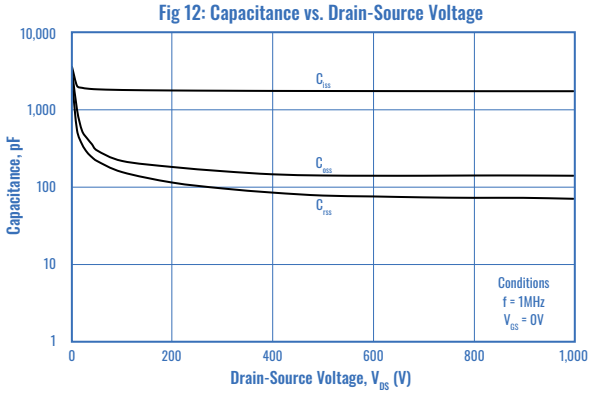
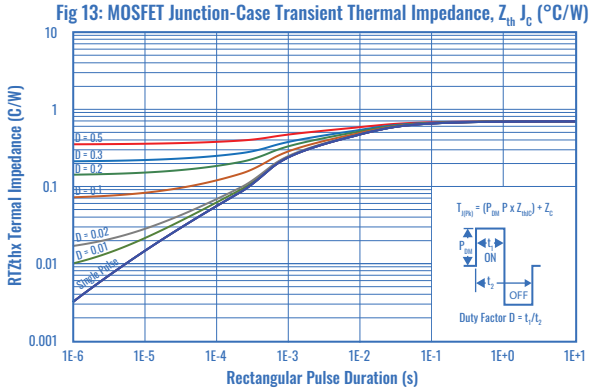
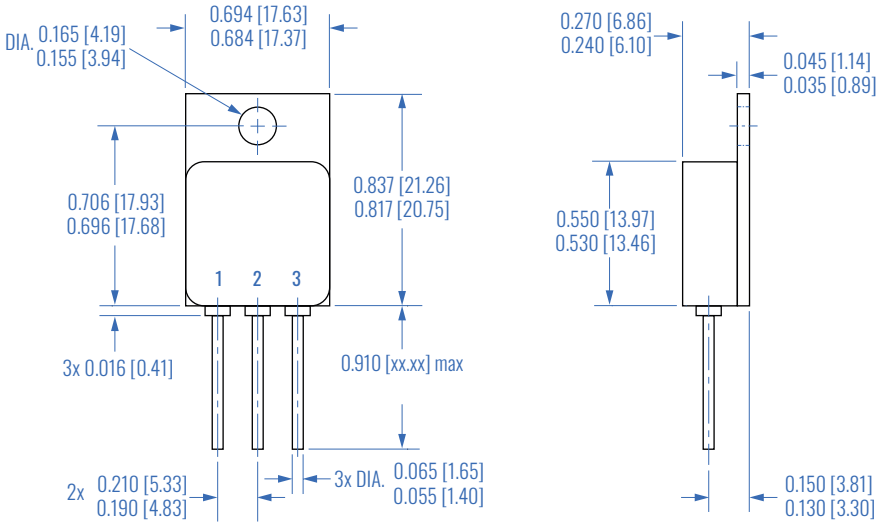


Fig 13: MOSFET Junction-Case Transient Thermal Impedance, Z_{th} J_C (°C/W)

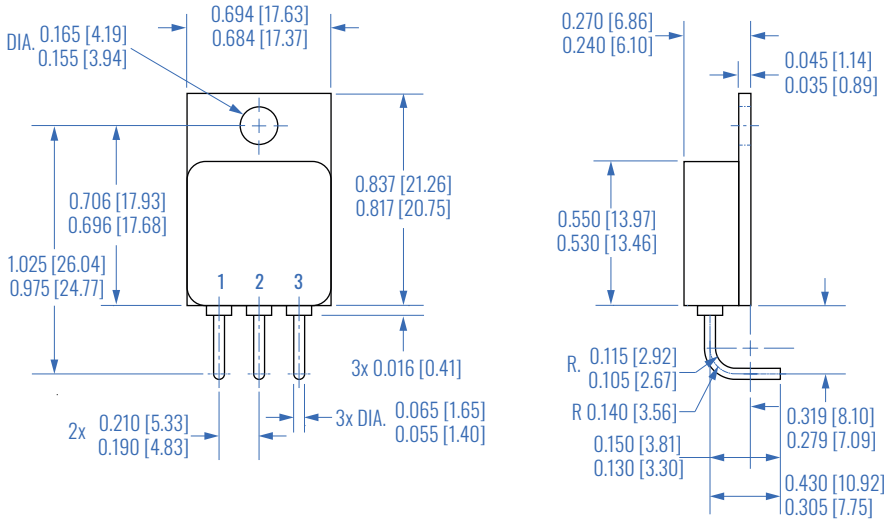


OUTLINE DIMENSIONS

Straight legs



90° bent Legs



All Dimensions are in Inches (mm)