TECHNICAL DATA
DATA SHEET D0324 REV.-

SILICON CARBIDE 1200V 41A POWER MOSFET DIE

Applications:

- **Solar inverters • Switch Mode Power Supplies • High voltage DC/DC converters**
- **Battery charges • Mode drive • Pulsed power application**

Features:

- **High blocking voltage with low on-resistance**
- **High Speed Switching with low capacitances**
- **Easy to parallel and simple to drive**
- **Avalanche ruggedness**
- **Resistant to latch-up**
- **Silver back metal**

Maximum Ratings@T_A=25°C unless otherwise specified:

Characteristics	Symbol	Condition	Max.	Units
Drain - Source Voltage	V_{DSmax}	V_{GS} = 0 V, I_D = 100 µA	1200	V
Gate - Source Voltage (dynamic)	V_{GSmax}	AC (f >1 Hz)	-10/+25	V
Gate - Source Voltage (static)	V_{GSop}	Static	-5/+20	V
Continuous Drain Current	I_D	V_{GS} =20 V, T_C = 25˚C	41	A
Pulsed Drain Current	$I_{D(pulse)}$	Pulse width t_P limited by T_{jmax}	82	A
Operating Junction and Storage Temperature	T_J , T_{stg}		-55 to +175	˚C
Maximum Processing Temperature	T_{Proc}	10 min. maximum	325	˚C

(1) When using MOSFET body diode V_{GSmax} = -5V/+25V

(2) MOSFET can also safely operate at V_{GS} = 0/+20 V

(3) Assumes a $R_{\theta JC}$ < 0.35 K/W

TECHNICAL DATA
DATA SHEET D0324 REV.-

Electrical Characteristics@T_A=25°C unless otherwise specified:

Characteristics	Symbol	Condition	Min.	Typ.	Max.	Units
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0 V, I_D = 1 mA	1200			V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 10mA	2.0	2.8	4	V
		V_{DS} = V_{GS}, I_D = 10mA, T_J = 175 °C		1.8		
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 1200 V, V_{GS} = 0 V		0.1	1	uA
Gate-Source Leakage Current	I_{GSS}	V_{GS} = 20 V, V_{DS} = 0 V			100	nA
Drain-Source On-State Resistance	$R_{DS(on)}$	V_{GS} = 20 V, I_D = 20A		77	100	mΩ
		V_{GS} = 20 V, I_D = 20 A, T_J = 175 °C		137		
Trans conductance	g_{fs}	V_{DS}= 20 V, I_{DS}= 40 A		10.5		S
		V_{DS}= 20 V, I_{DS}= 40 A, T_J = 175 °C		8		
Input Capacitance	C_{iss}	V_{GS} = 0 V V_{DS} =1000V f = 1 MHz VAC = 25 mV		1324		pF
Output Capacitance	C_{oss}			74		
Reverse Transfer Capacitance	C_{rss}			3.4		
C_{oss} Stored Energy	E_{oss}			37		µJ
Internal Gate Resistance	$R_{G(int)}$	f = 1 MHz, V_{AC} = 25 mV, ESR of C_{ISS}		3.3		Ω
Gate to Source Charge	Q_{gs}	V_{DS} = 800 V, V_{GS} = -5/20 V I_D = 50 A Per IEC60747-8-4 pg 83		23		nC
Gate to Drain Charge	Q_{gd}			14		
Total Gate Charge	Q_g			54		

Reverse Diode Characteristics:

Characteristics	Symbol	Condition	Typ.	Max.	Units
Diode Forward Voltage	V_{SD}	V_{GS} = - 5 V, I_{SD} = 10 A	4.0		V
		V_{GS} = - 5 V, I_{SD} = 10 A, T_J = 175 °C	3.5		V
Continuous Diode Forward Current	I_S	T_C= 25 °C		41	
Reverse Recovery Time	t_{rr}	V_{GS} = - 5 V, I_{SD} = 40 A ,T_J = 25 °C	25		ns
Reverse Recovery Charge	Q_{rr}	V_R = 800 V	102		nC
Peak Reverse Recovery Current	I_{rrm}	dif/dt = 1950 A/µs	6.7		A

TECHNICAL DATA
DATA SHEET D0324 REV.-

Typical Performance:

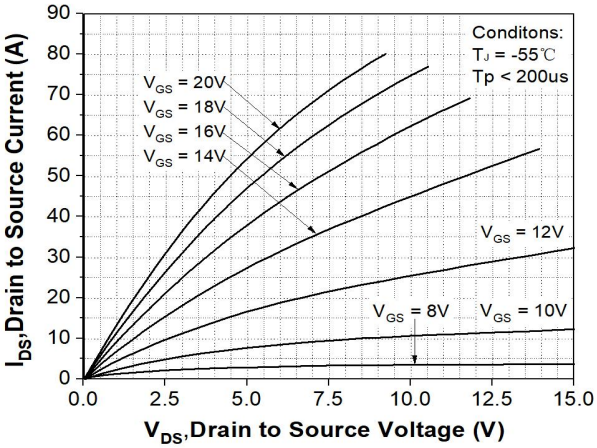


Figure 1. Output Characteristics T_J = -55 °C

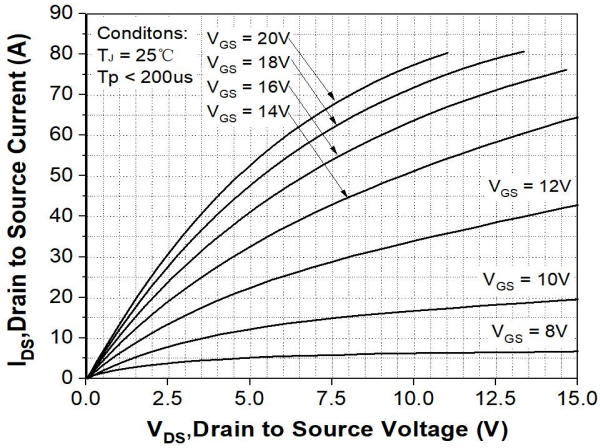


Figure 2. Output Characteristics T_J = 25 °C

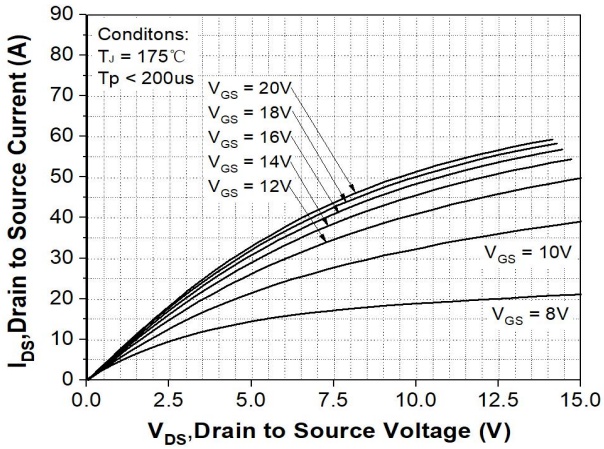


Figure 3. Output Characteristics T_J = 175°C

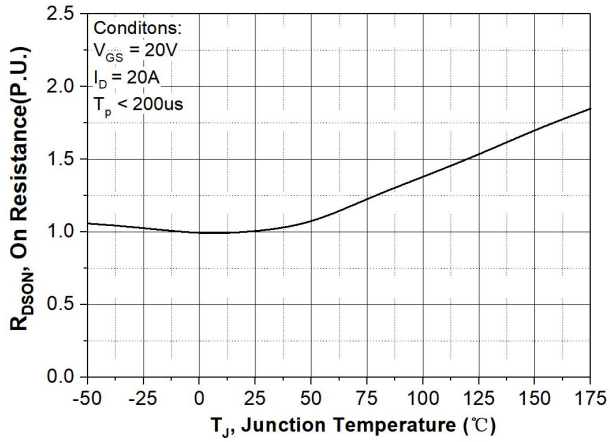


Figure 4. Normalized On-Resistance vs. Temperature

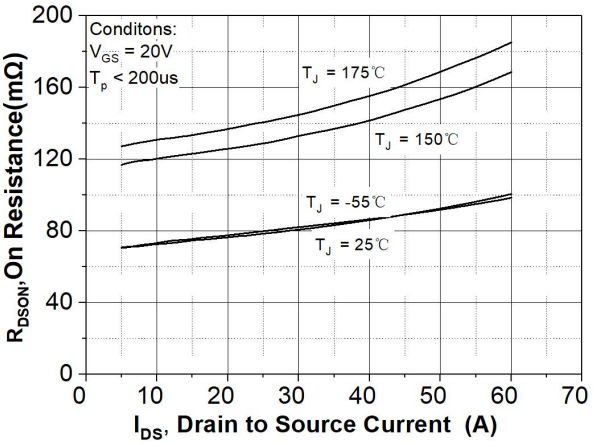


Figure 5. On-Resistance vs. Drain Current For Various Temperatures

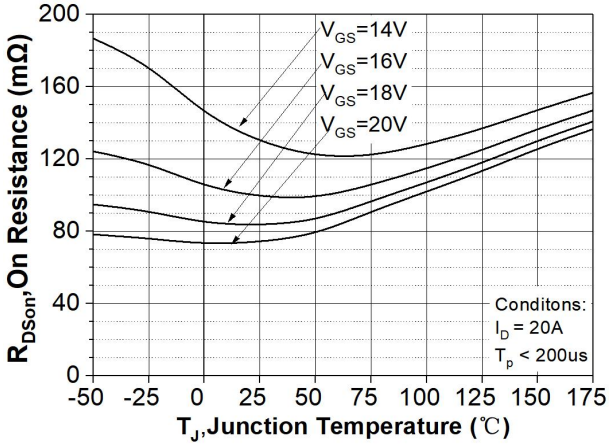


Figure 6. On-Resistance vs. Temperature For Various Gate Voltage

TECHNICAL DATA
DATA SHEET D0324 REV.-

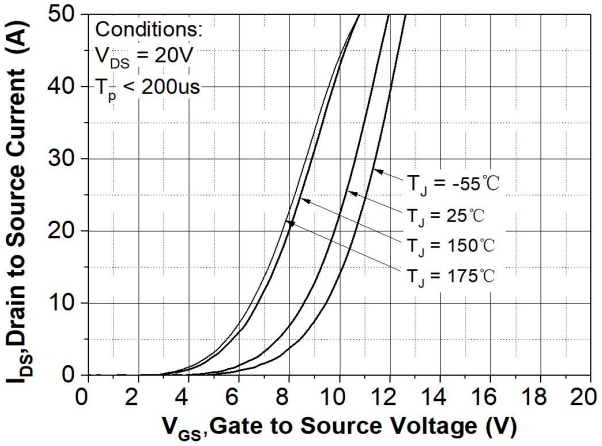


Figure 7. Transfer Characteristic for Various Junction Temperatures

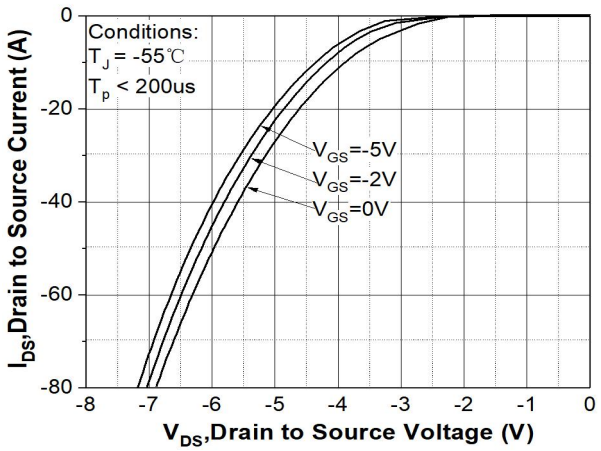


Figure 8. Body Diode Characteristic at T_J = -55 °C

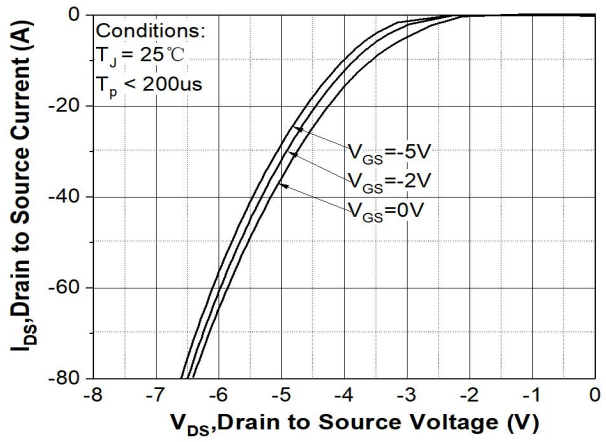


Figure 9. Body Diode Characteristic at T_J = 25 °C

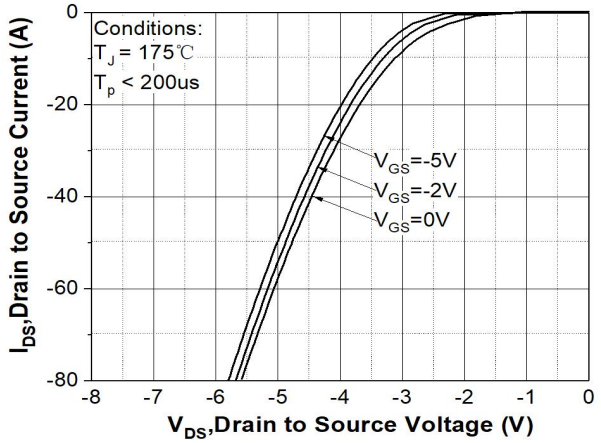


Figure 10. Body Diode Characteristic at T_J = 175 °C

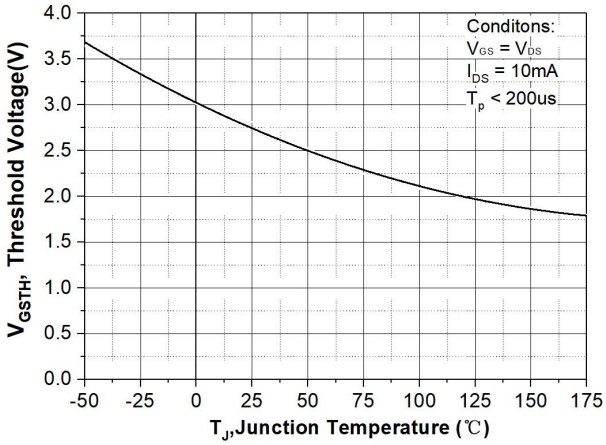


Figure 11. Threshold Voltage vs. Temperature

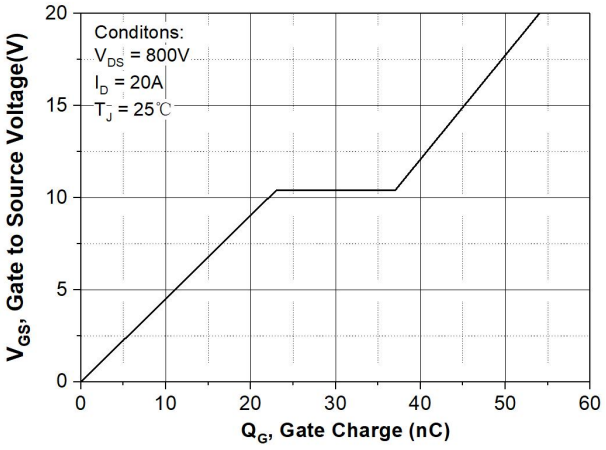


Figure 12. Gate Charge Characteristic

TECHNICAL DATA
DATA SHEET D0324 REV.-

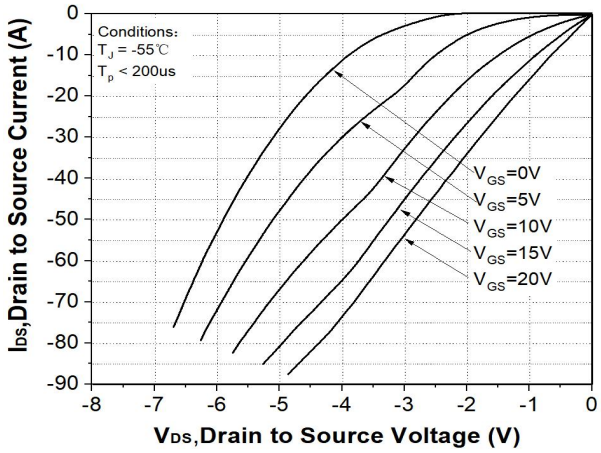


Figure 13. 3rd Quadrant Characteristic at T_J = -55 °C

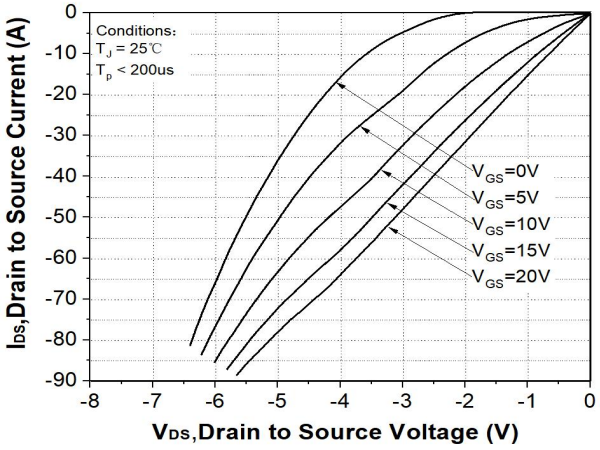


Figure 14. 3rd Quadrant Characteristic at T_J = 25 °C

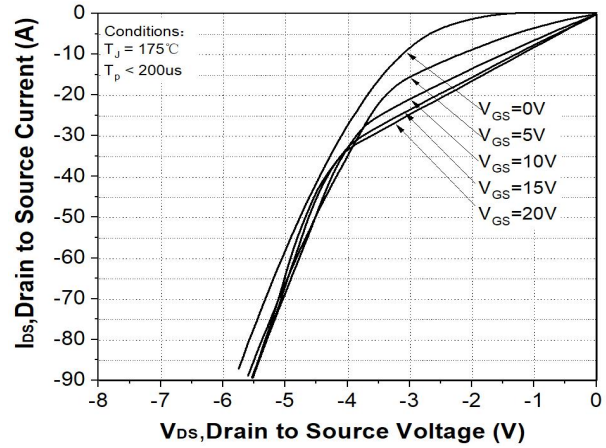


Figure 15. 3rd Quadrant Characteristic at T_J = 175°C

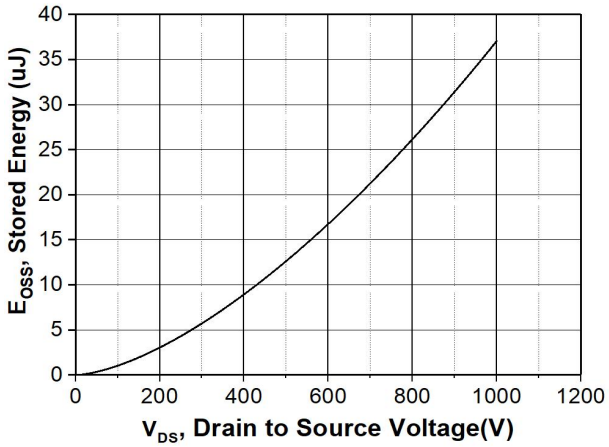


Figure 16. Output Capacitor Stored Energy

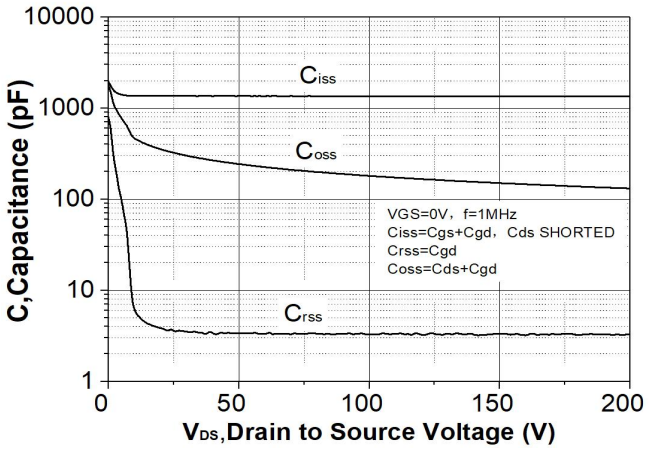


Figure 17. Capacitances vs. Drain-Source Voltage (0 - 200V)

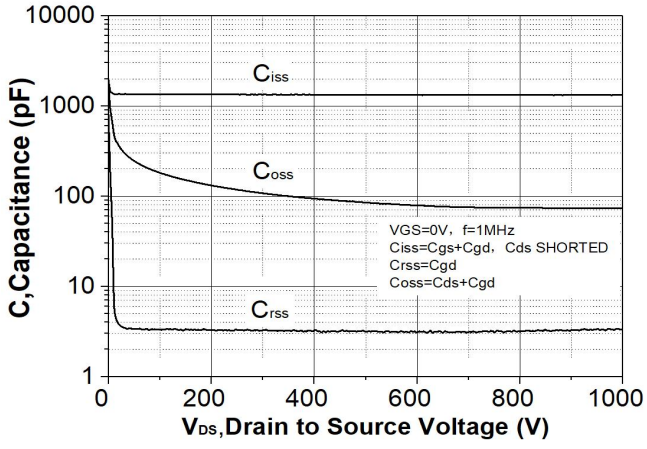
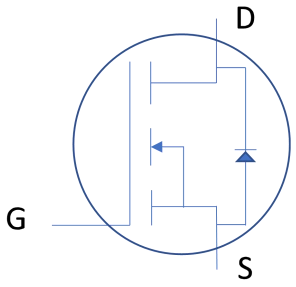


Figure 18. Capacitances vs. Drain-Source Voltage (0 - 1000V)

TECHNICAL DATA
DATA SHEET D0324 REV.-

Mechanical Dimensions



Parameter	Typical Value	Unit
Die Dimensions (L x W)	Please contact your sales representative to get the detailed information about die layout and dimensions.	mm
Exposed Source Pad Metal Dimensions (LxW) Each		mm
Sense Pad Metal Dimensions (LxW)		mm
Gate Pad Dimensions (L x W)		mm
Top Side Source metallization (Al)		µm
Top Side Gate metallization (Al)		µm
Bottom Drain metallization (Ni/Ag)		µm

TECHNICAL DATA
DATA SHEET D0324 REV.-

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