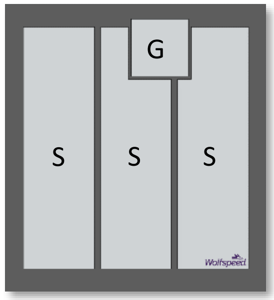
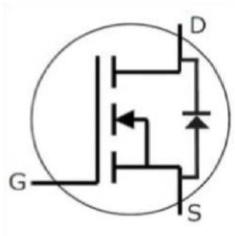
CPM3-1200-0032A

Wolfspeed SiC Gen 3 MOSFET





Package Types: Bare Die
PN's: CPM3-1200-0032A

Description

This is the Wolfspeed's 3rd generation of high performance silicon carbide MOSFET in a packageless bare die format to be implemented into any custom module design. The high blocking voltage with low on-resistance, high speed switching with low capacitance make this MOSFET ideal for high frequency switching application including solar inverters and EV chargers.

Features

- Enhanced 3rd Generation SiC MOSFET
- High blocking voltage with low on-resistance
- High speed switching with low capacitance
- Fast intrinsic diode with low reverse recovery

Applications

- EV Chargers
- Solar Inverters
- SMPS
- DC/DC Converters

Absolute Maximum Ratings

Stress beyond those listed under absolute maximum ratings may damage the device.

Parameter	Symbol		Rating	Unit
Drain-Source Voltage, across T_{vj}	$V_{DS(max)}$		1200	V
Maximum Gate-Source Voltage, Peak Transient Capability	$V_{GS(max)}$		-8/+19	V
Continuous Drain Current, V_{GS} = 15V, assumes die packaged in TO-247 package with $R_{th(j-c)}$ < 0.48 K/W	I_D	T_c = 25°C	63	A
		T_c = 100°C	48	
Pulsed Drain Current, t_p limited by $T_{vj(max)}$	$I_{D(pulse)}$		120	A
Virtual Junction and Storage Temperature	T_{VJ}, T_{stg}		-55 to +175	°C
Maximum Processing Temperature, in non-reactive ambient	T_{proc}		325	°C

Recommended Operating Conditions

Parameter	Symbol	Rating	Unit
Recommended Operating Gate - Source Voltage	$V_{GS(op)}$	-4/+15	V

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Electrical Characteristics (T_{VJ} = 25 ˚C)

Characteristics	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	1200			V	V_{GS} = 0 V, I_D =100 µA
Gate Threshold Voltage	$V_{GS(th)}$	1.8	2.5	3.6	V	V_{DS} = V_{GS}, I_{DS} = 11.44 mA
			2.0		V	V_{DS} = V_{GS}, I_{DS} = 11.44 mA, T_{VJ} = 175°C
Zero Gate Voltage Drain Current	I_{DSS}		1	19	µA	V_{DS} = 1200 V, V_{GS} = 0 V
Gate-Source Leakage Current	I_{GSS}		10	100	nA	V_{GS} = 15 V, V_{DS} = 0 V
Drain-Source On-State Resistance	$R_{DS(on)}$	22.4	32	41.6	mΩ	V_{GS} = 15 V, I_D = 41.4 A
			57.6			V_{GS} = 15 V, I_D = 41.4 A, T_{VJ} = 175°C
Transconductance	g_{fs}		27		S	V_{DS} = 20 V, I_{DS} = 41.4 A
			25			V_{DS} = 20 V, I_{DS} = 41.4 A, T_{VJ} = 175°C
Input Capacitance	C_{iss}		3357		pF	V_{GS} = 0 V, V_{DS} = 1000 V f = 100 kHz V_{AC} = 25 mV
Output Capacitance	C_{oss}		129			
Reverse Transfer Capacitance	C_{rss}		8			
C_{oss} Stored Energy	E_{oss}		76		µJ	V_{DS} = 1000 V, f = 100 kHz
Internal Gate Resistance	$R_{G(int)}$		1.7		Ω	f = 1 Mhz, V_{AC} = 25 mV
Gate to Source Charge	Q_{gs}		40		nC	V_{DS} = 800 V, V_{GS} = -4 V/15 V I_{DS} = 41.4 A
Gate to Drain Charge	Q_{gd}		34			
Total Gate Charge	Q_g		118			

Reverse Diode Characteristics (T_{VJ} = 25 ˚C)

Characteristics	Symbol	Typ.	Max.	Unit	Test Conditions
Diode Forward Voltage	V_{SD}	4.6		V	V_{GS} = -4 V, I_{SD} = 20.7 A
		4.0		V	V_{GS} = -4 V, I_{SD} = 20.7 A, T_{VJ} = 175 °C
Reverse Recovery Time	t_{rr}	27		ns	V_{GS} = -4 V, I_{SD} = 41.4 A, V_R = 800 V dif/dt = 2250 A/µs, T_{VJ} = 175 °C
Reverse Recovery Charge	Q_{rr}	478		nC	
Peak Reverse Recovery Current	I_{rrm}	27		A	

Typical Performance

All the graphs are based on a die placed in a TO-247-4L package.

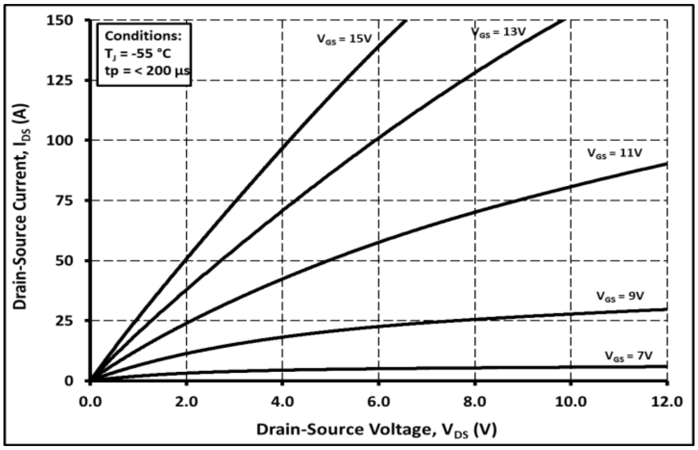

Figure 1.

Output Characteristics T_{vj} = -55 °C

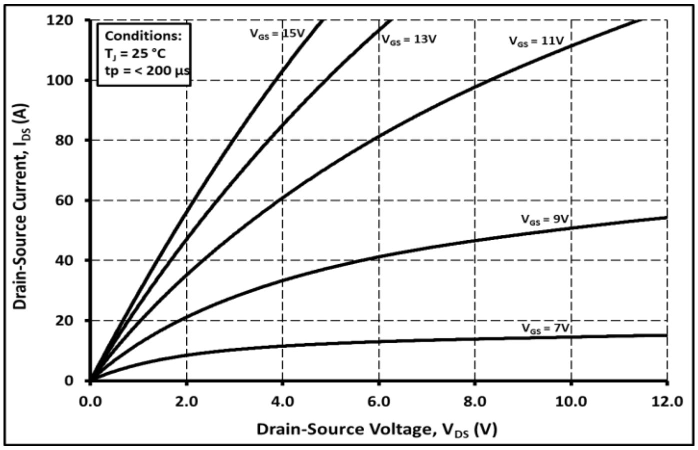

Figure 2.

Output Characteristics T_{vj} = 25 °C

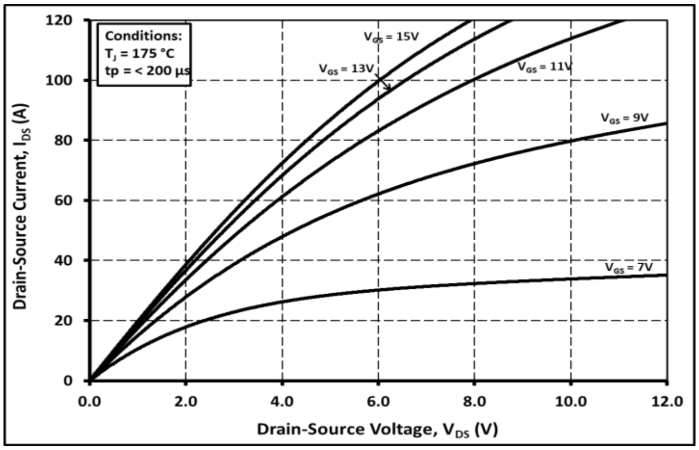

Figure 3.

Output Characteristics T_{vj} = 175 °C

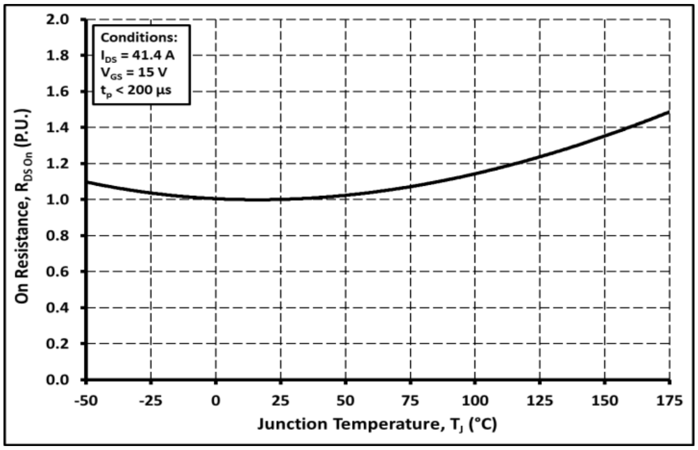

Figure 4.

Normalized On-Resistance vs. Temperature

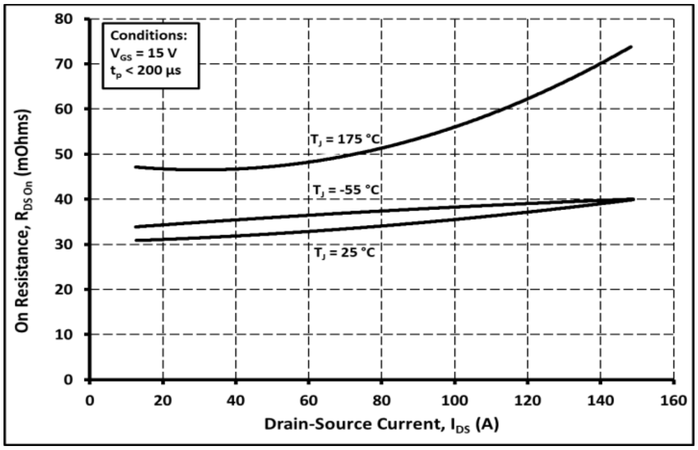

Figure 5.

On-Resistance vs. Drain Current For Various Temperatures

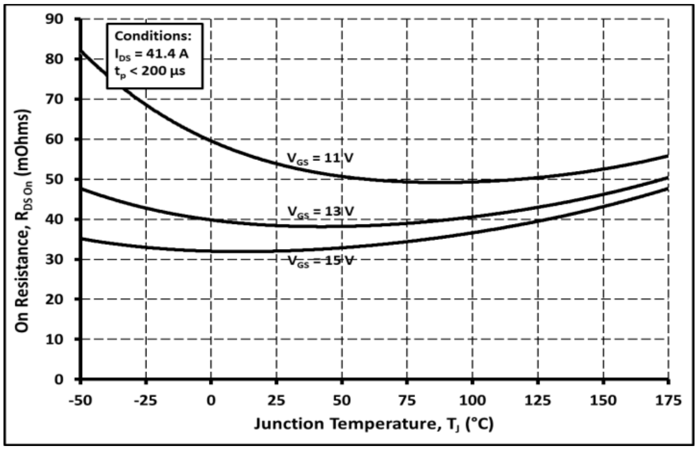

Figure 6.

On-Resistance vs. Temperature For Various Gate Voltages

Typical Performance

All the graphs are based on a die placed in a TO-247-4L package.

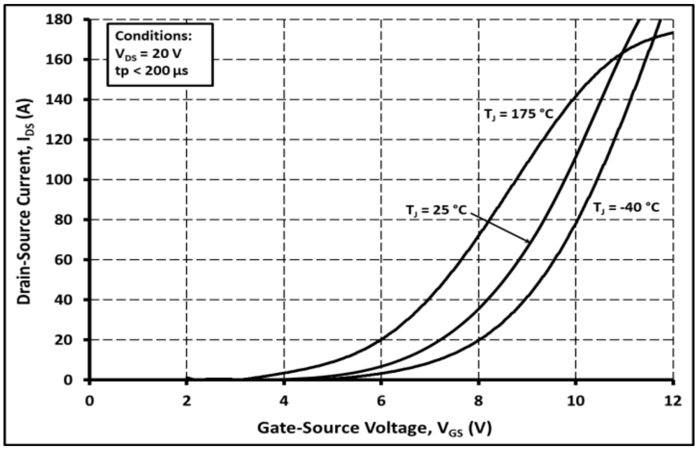

Figure 7.

Transfer Characteristic For Various Junction Temperatures

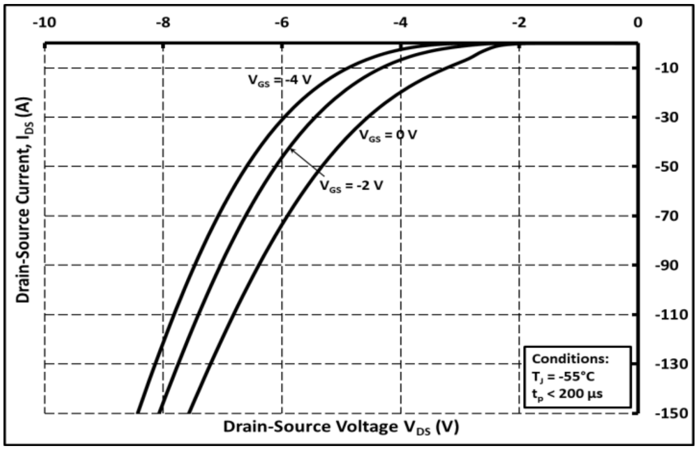

Figure 8.

Body Diode Characteristic at T_{vj} = -55 °C

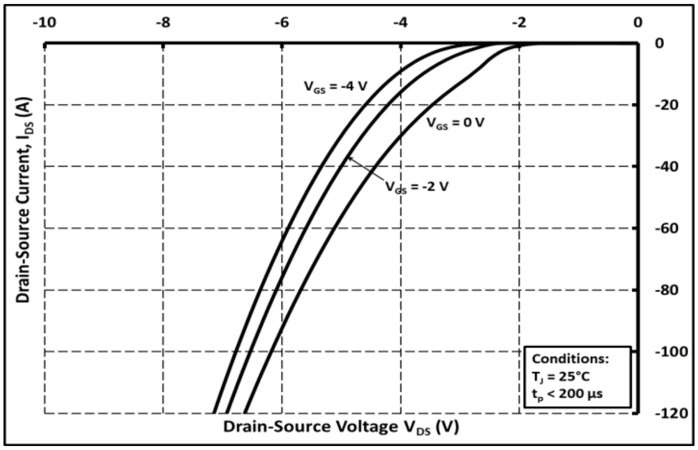

Figure 9.

Body Diode Characteristic at T_{vj} = 25 °C

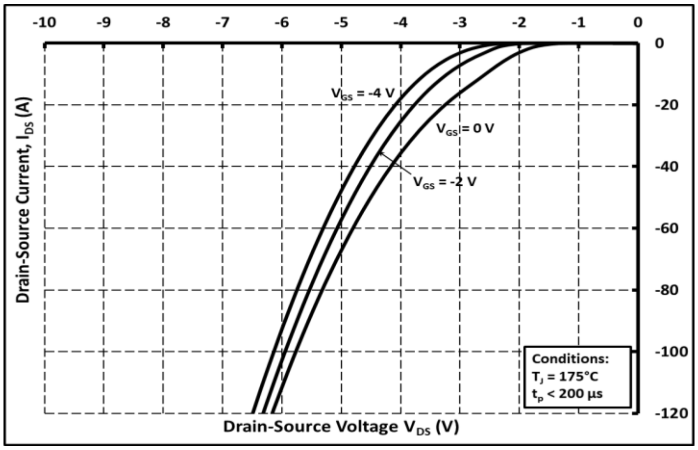

Figure 10.

Body Diode Characteristic at T_{vj} = 175 °C

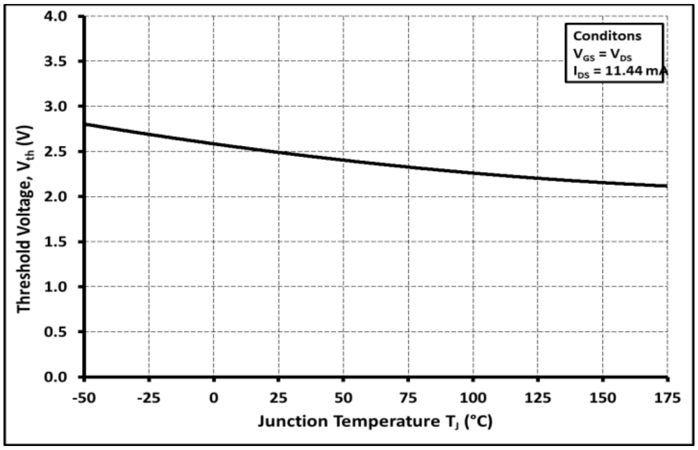

Figure 11.

Threshold Voltage vs. Temperature

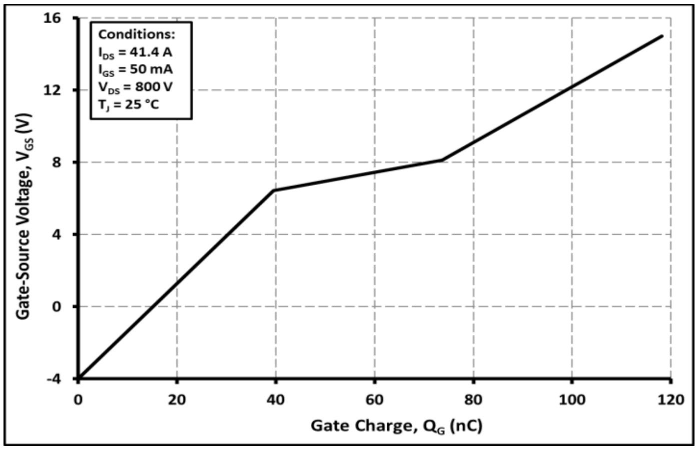

Figure 12.

Gate Charge Characteristics

Typical Performance

All the graphs are based on a die placed in a TO-247-4L package.

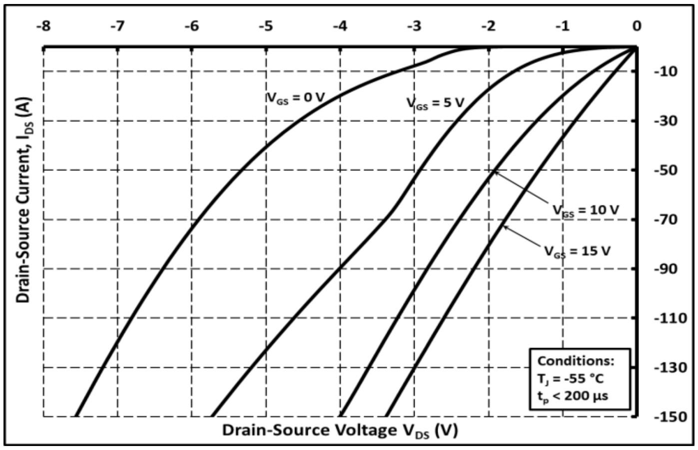

Figure 13.

3rd Quadrant Characteristic at T_{vj} = -55 °C

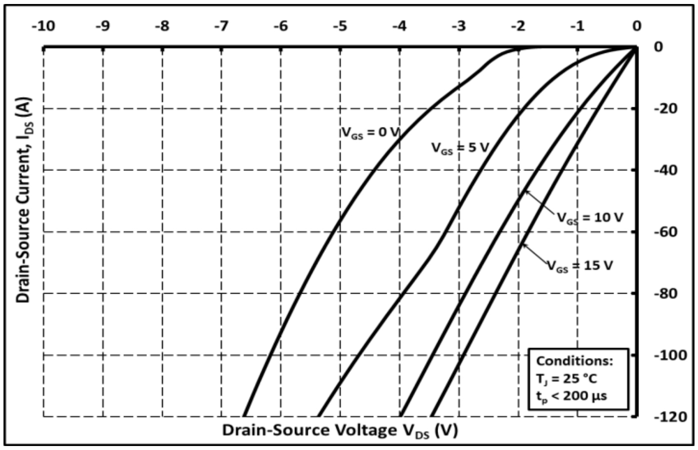

Figure 14.

3rd Quadrant Characteristic at T_{vj} = 25 °C

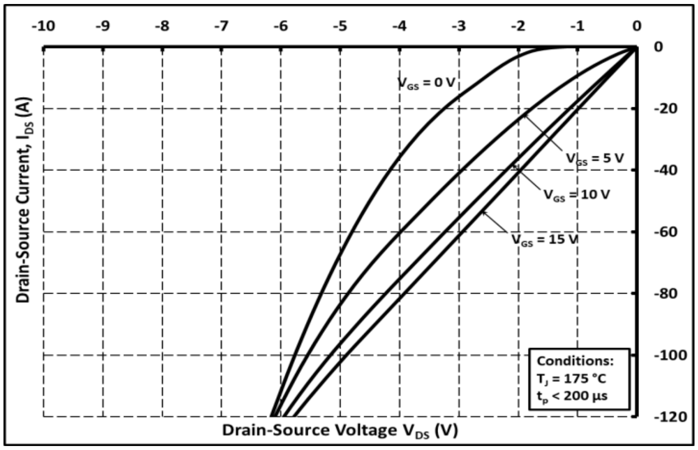

Figure 15.

3rd Quadrant Characteristic at T_{vj} = 175 °C

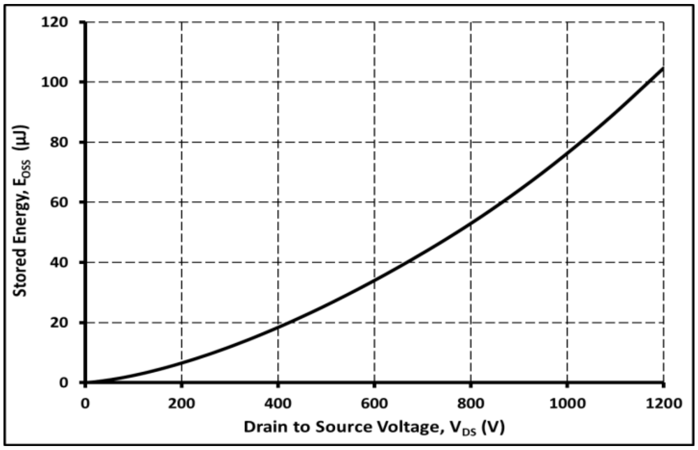

Figure 16.

Output Capacitor Stored Energy

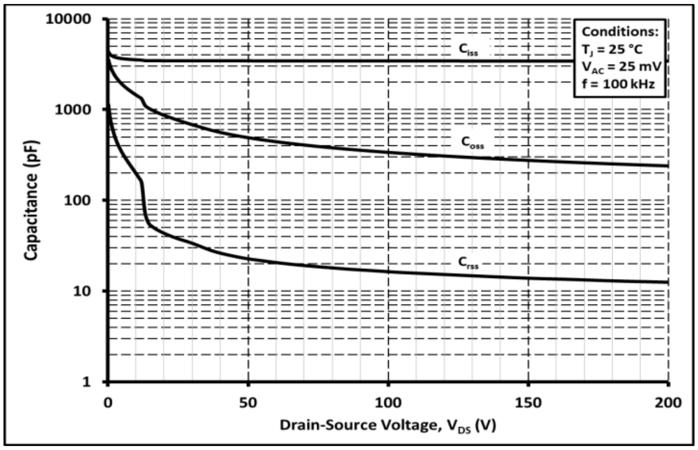

Figure 17.

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

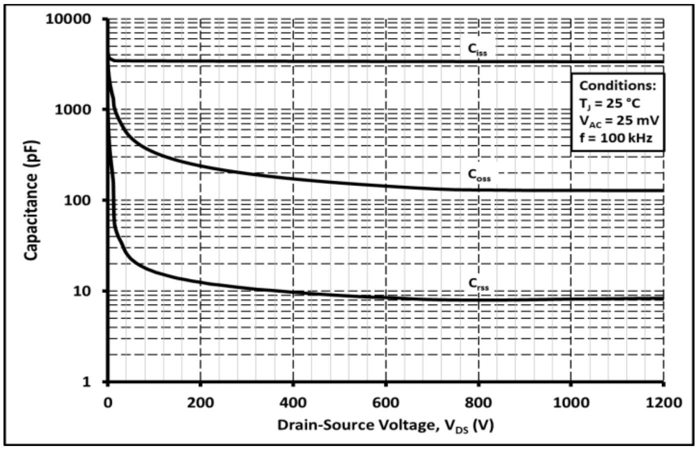

Figure 18.

Capacitances vs. Drain-Source Voltage (0-1200V)

Product Ordering Information

Order Number	Description	Package
CPM3-1200-0032A-FY6	SIC MOSFET G3 IND 1200V/32mO UV MLT	Bare Die Product
CPM3-1200-0032A-GQ8	SIC MOSFET G3 IND 1200V/32mO UV MVF	Bare Die Product

Revision History

Revision History	Date of Change	Brief Summary
-	04/04/2019	Initial Release
1	1/09/2020	• Removed test conditions and note section from the Maximum Ratings Table • Updated description for all the parameters in the Maximum Ratings Table • Updated footnotes • Temperature note removed and embedded into every test condition • Updated test conditions for gate threshold voltage, drain-source on-state resistance, transconductance, gate to source charge, gate to drain charge, total gate charge, diode forward voltage, reverse recovery time, reverse recovery charge and peak reverse recovery current • Updated typical values for continuous drain current, zero gate voltage drain current, gate-source leakage current, drain-source on-state resistance, transconductance, input capacitance, reverse transfer capacitance, Coss stored energy, gate too source charge, gate to drain charge, total gate charge, reverse recovery time and reverse recovery charge • All junction temperatures changed to virtual junction temperatures • All graphs updated to reflect the most recent test data
2	7/30/2023	• Document format updated
3	07/23/2024	• Updated die image on first page

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REACh Compliance

REACh substances of high concern (SVHCs) information is available for this product. Since the European Chemical Agency (ECHA) has published notice of their intent to frequently revise the SVHC listing for the foreseeable future, please contact your Wolfspeed representative to ensure you get the most up-to-date REACh SVHC Declaration. REACh banned substance information is also available upon request.

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