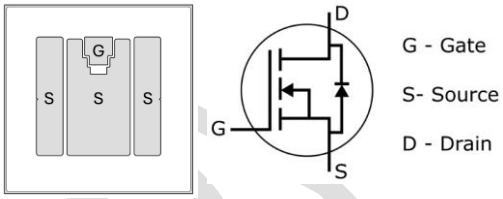
CPM3-10000-0300A

SiC 10 kV, 305 mΩ MOSFET Bare Die



Part Number	Die Size (mm)
CPM3-10000-0300A	8.1 × 8.1

Request for Full Datasheet Here

Description

This high-performance silicon carbide MOSFET die is developed to maximize the performance and simplify the design architecture of mid and high-voltage applications. This device can be implemented into any custom package providing additional design flexibility.

Features

- Easy to parallel and simple to drive
- Temperature-independent high-speed switching
- Enhanced Reliability
- Maintains reliable performance during reverse power flow

Typical Applications

- Pulsed Power
- Medium-Voltage Drives
- Solid-State Transformers
- Smart Grid/Grid-Tie Distributed Generation
- Medium-Voltage UPS Systems
- Nuclear Power Generation for AI Data Centers

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}	$V_{DS(max)}$		10000	V
Maximum Gate-Source Voltage, Peak Transient Capability	$V_{GS(max)}$		-10/+25	V
Static Gate-Source Voltage	$V_{GS(op)}$		-5/+20	V
Continuous Drain Current[1]	I_{DS}	T_c = 25 °C	20	A
		T_c = 90 °C	15	
Pulsed Drain Current, t_p limited by $T_{VJ(max)}$	$I_{DS(pulse)}$		40	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

Note 1. Assume testing at V_{GS} = +20 V, with a junction-to-case thermal resistance $R_{TH(J-C)}$ = 0.34 °C/W.

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Electrical Characteristics (T_{VJ} = 25 °C unless otherwise specified)

Characteristics	Symbol	Min.	Typ.	Max.	Unit	Test Conditions	Note
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	10			kV	V_{GS} = 0 V, I_{DS} = 100 µA	
Gate Threshold Voltage	$V_{GS(th)}$	1.8	2.8	3.5	V	V_{DS} = V_{GS}, I_{DS} = 1 mA	
			2.1		V	V_{DS} = V_{GS}, I_{DS} = 1 mA, T_{VJ} = 175 °C	
Zero Gate Voltage Drain Current	I_{DSS}		1	10	µA	V_{DS} = 10 kV, V_{GS} = 0 V	
Gate-Source Leakage Current	I_{GSS}		20		nA	V_{GS} = 20 V, V_{DS} = 0 V	
Drain-Source On-State Resistance	$R_{DS(on)}$		305	380	mΩ	V_{GS} = 20 V, I_{DS} = 15 A	
			1113			V_{GS} = 20 V, I_{DS} = 15 A, T_{VJ} = 175 °C	
Transconductance	g_{fs}		8.1		S	V_{DS} = 30 V, I_{DS} = 15 A	
			5.3			V_{DS} = 30 V, I_{DS} = 15 A, T_{VJ} = 175 °C	
Turn-On Switching Energy T_J = 25 °C 125 °C 175 °C	E_{ON}		22.8 20.9 22.4		mJ	V_{DS} = 6000 V, V_{GS} = -5/+15 V, ID = 15 A, $R_{G(ext)}$ = 25 Ω, Timing relative to V_{DS} Inductive Load	
Turn-Off Switching Energy T_J = 25 °C 125 °C 175 °C	E_{OFF}		1.4 1.4 1.5				
Input Capacitance	C_{iss}		8136		pF	V_{GS} = 0 V, V_{DS} = 3000 V f = 100 kHz V_{AC} = 25 mV	
Output Capacitance	C_{oss}		76				
Reverse Transfer Capacitance	C_{rss}		3.4				
C_{oss} Stored Energy	E_{oss}		342		µJ	V_{DS} = 3000 V, f = 100 kHz	
Internal Gate Resistance	$R_{G(int)}$		4		Ω	f = 100 kHz, V_{AC} = 25 mV	
Gate to Source Charge	Q_{gs}		122		nC	V_{DS} = 6000 V, V_{GS} = -5 V/+15 V I_{DS} = 15 A, $R_{G,ON}$ = $R_{G,OFF}$ = 25 Ω	
Gate to Drain Charge	Q_{gd}		48				
Total Gate Charge	Q_g		268				

Body Diode Characteristics (T_{VJ} = 25 °C unless otherwise specified)

Characteristics	Symbol	Min.	Typ.	Max.	Unit	Test Conditions	Note
Diode Forward Voltage	V_{SD}		5.3		V	V_{GS} = -5 V, I_{SD} = 7.5 A	
			4.5		V	V_{GS} = -5 V, I_{SD} = 7.5 A, T_{VJ} = 175 °C	
Reverse Recovery Time	t_{rr}		186		ns	V_{GS} = -5 V, I_{SD} = 15 A, V_R = 6000 V; di_f/dt = 680 A/µs, T_{VJ} = 175 °C	
Reverse Recovery Charge	Q_{rr}		2.91		µC		
Peak Reverse Recovery Current	I_{rrm}		22.5		A		

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