



APSEMI

AC3M0065100K

Silicon Carbide Power MOSFET
N-Channel Enhancement Mode

Features

- 1) Low on-resistance
- 2) Fast switching speed
- 3) Fast reverse recovery
- 4) Easy to parallel
- 5) Simple to drive
- 6) Pb-free lead plating ; RoHS compliant

Parameter	Rating	Units
V_{DS}	1000	V
I_D @ 25°C	33	A
$R_{DS(on)}$	65	mΩ



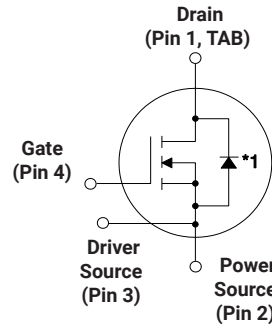
Applications

- Solar inverters
- DC/DC converters
- Switch mode power supplies
- Induction heating



TO-247-4
Package

Inner circuit



- (1) Drain
- (2) Power Source
- (3) Driver Source
- (4) Gate

*1 Body Diode

Maximum Ratings ($T_c = 25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Value	Unit	Test Conditions	Note
V_{DSmax}	Drain - Source Voltage	1000	V	$V_{GS} = 0\text{ V}, I_D = 100\text{ }\mu\text{A}$	
V_{GSmax}	Gate - Source Voltage (dynamic)	-8/+19	V	AC ($f > 1\text{ Hz}$)	
V_{GSop}	Gate - Source Voltage (static)	-4/+15	V	Static	
I_D	Continuous Drain Current	33	A	$V_{GS} = 15\text{ V}, T_c = 25^\circ\text{C}$	
		22		$V_{GS} = 15\text{ V}, T_c = 100^\circ\text{C}$	
$I_{D(pulse)}$	Pulsed Drain Current	90	A	Pulse width t_p limited by T_{jmax}	
E_{AS}	Avalanche energy, Single pulse	110	mJ	$I_D = 22\text{ A}, V_{DD} = 50\text{ V}$	
P_D	Power Dissipation	115	W	$T_c = 25^\circ\text{C}, T_j = 150^\circ\text{C}$	
T_J, T_{stg}	Operating Junction and Storage Temperature	-55 to +150	°C		
T_L	Solder Temperature	260	°C	1.6mm (0.063") from case for 10s	

Note (1): When using MOSFET Body Diode $V_{GSmax} = -4\text{V}/+19\text{V}$

Note (2): MOSFET can also safely operate at $0/+15\text{ V}$

**Electrical Characteristics** ($T_c = 25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions	Note
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	1000			V	$V_{GS} = 0\text{ V}, I_D = 100\text{ }\mu\text{A}$	
$V_{GS(th)}$	Gate Threshold Voltage	1.8	2.1	3.5	V	$V_{DS} = V_{GS}, I_D = 5\text{ mA}$	
			1.6		V	$V_{DS} = V_{GS}, I_D = 5\text{ mA}, T_J = 150^\circ\text{C}$	
I_{DSS}	Zero Gate Voltage Drain Current		1	100	μA	$V_{DS} = 1000\text{ V}, V_{GS} = 0\text{ V}$	
I_{GSS}	Gate-Source Leakage Current		10	250	nA	$V_{GS} = 15\text{ V}, V_{DS} = 0\text{ V}$	
$R_{DS(on)}$	Drain-Source On-State Resistance		65	80	m Ω	$V_{GS} = 15\text{ V}, I_D = 20\text{ A}$	
			95			$V_{GS} = 15\text{ V}, I_D = 20\text{ A}, T_J = 150^\circ\text{C}$	
g_{fs}	Transconductance		14		S	$V_{DS} = 20\text{ V}, I_{DS} = 20\text{ A}$	
			12			$V_{DS} = 20\text{ V}, I_{DS} = 20\text{ A}, T_J = 150^\circ\text{C}$	
C_{iss}	Input Capacitance		710		pF	$V_{GS} = 0\text{ V}, V_{DS} = 700\text{ V}$ $f = 1\text{ MHz}$ $V_{AC} = 25\text{ mV}$	
C_{oss}	Output Capacitance		70				
C_{rss}	Reverse Transfer Capacitance		5				
E_{oss}	C_{oss} Stored Energy		15				
E_{ON}	Turn-On Switching Energy (Body Diode FWD)		127		μJ	$V_{DS} = 700\text{ V}, V_{GS} = -4\text{ V}/15\text{ V}, I_D = 20\text{ A},$ $R_{G(ext)} = 2.5\Omega, L = 130\text{ }\mu\text{H}, T_J = 150^\circ\text{C}$	
E_{OFF}	Turn Off Switching Energy (Body Diode FWD)		39				
$t_{d(on)}$	Turn-On Delay Time		7		ns	$V_{DD} = 700\text{ V}, V_{GS} = -4\text{ V}/15\text{ V}$ $I_D = 20\text{ A}, R_{G(ext)} = 2.5\text{ }\Omega,$ Timing relative to V_{DS} Inductive load	
t_r	Rise Time		10				
$t_{d(off)}$	Turn-Off Delay Time		13				
t_f	Fall Time		7				
$R_{G(int)}$	Internal Gate Resistance		3.5		Ω	$f = 1\text{ MHz}, V_{AC} = 25\text{ mV}$	
Q_{gs}	Gate to Source Charge		9		nC	$V_{DS} = 700\text{ V}, V_{GS} = -4\text{ V}/15\text{ V}$ $I_D = 20\text{ A}$ Per IEC60747-8-4 pg 21	
Q_{gd}	Gate to Drain Charge		13				
Q_g	Total Gate Charge		33				

Reverse Diode Characteristics ($T_c = 25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Typ.	Max.	Unit	Test Conditions	Note
V_{SD}	Diode Forward Voltage	4.5		V	$V_{GS} = -4\text{ V}, I_{SD} = 10\text{ A}$	
		4.2		V	$V_{GS} = -4\text{ V}, I_{SD} = 10\text{ A}, T_J = 150^\circ\text{C}$	
I_S	Continuous Diode Forward Current		22	A	$V_{GS} = -4\text{ V}$	
$I_{S, pulse}$	Diode pulse Current		90	A	$V_{GS} = -4\text{ V},$ pulse width t_p limited by T_{jmax}	
t_{rr}	Reverse Recover time	20		ns	$V_{GS} = -4\text{ V}, I_{SD} = 20\text{ A}, V_R = 700\text{ V}$ $di/dt = 4500\text{ A}/\mu\text{s}, T_J = 150^\circ\text{C}$	
Q_{rr}	Reverse Recovery Charge	256		nC		
I_{rrm}	Peak Reverse Recovery Current	24		A		

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit	Test Conditions	Note
$R_{\theta JC}$	Thermal Resistance from Junction to Case	0.94	1.1	$^\circ\text{C}/\text{W}$		
$R_{\theta JA}$	Thermal Resistance From Junction to Ambient		40			



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Package Dimensions

Unit: mm

