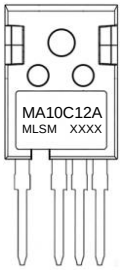
MA10C12A
1200V/195A SiC MOSFET

Features

- Wide Bandgap SiC MOSFET Technology
- Low On-Resistance with High Blocking Voltage
- Low Capacitances with High-Speed Switching
- Low Reverse Recovery(Qrr)
- Easy to Parallel and Simple to Drive

Application

- Power Factor Correction Modules
- Switch Mode Power Supplies



1 2 3 4

Marking and pin assignment

MA10C12A= Device code

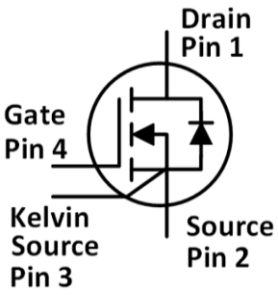
XXXX= Code

Product Summary

V_{DS}	$R_{DS(ON)}$ TYP	I_D
1200V	10mΩ@18V	195A

1 2 3 4

TO-247-4L top view



Schematic diagram

Pb-Free RoHS Halogen-Free

Absolute Maximum Ratings (TA=25℃unless otherwise noted)				
Symbol	**Parameter**		**Rating**	**Unit**
Common Ratings (TC=25°C Unless Otherwise Noted)				
V_{DS}	Drain-Source Breakdown Voltage		1200	V
V_{GS}	Gate-Source Voltage		-10/+22	V
V_{GSop}	Recommended Operation Voltage of Gate to Source		-5/+18	V
T_J,T_{STG}	Operating and Storage Temperature Range		-55 to 175	°C
I_S	Diode Continuous Forward Current	Tc=25°C	195	A
I_{DM}	Pulse Drain Current Tested	Tc=25°C	414	A
		Tc=100°C	330	A
I_D	Continuous Drain Current	Tc=25°C	195	A
		Tc=100°C	138	A
P_D	Maximum Power Dissipation	Tc=25°C	880	W
E_{AS}	Single Pulsed Avalanche Energy Note1		1410	mJ
$R_{th(j-c)}$	Thermal Resistance from Junction-Case		0.17	°C/W

Ordering Information (Example)

Type	Package	Marking	Minimum Package(pcs)	Inner Box Quantity(pcs)	Outer Carton Quantity(pcs)	Delivery Mode
MA10C12A	TO-247-4L	MA10C12A	30	270	2,160	Tube

Electrical Characteristics (TJ=25℃ unless otherwise noted)						
Symbol	**Parameter**	**Condition**	**Min**	**Typ**	**Max**	**Unit**
Static Electrical Characteristics @ TJ = 25°C (unless otherwise stated)						
$BV_{(BR)DSS}$	Drain-Source Breakdown Voltage	V_{GS}=0V，I_D=100μA	1200	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=1200V，V_{GS}=0V	--	--	10	μA
I_{GSS}	Gate-Body Leakage Current	V_{GS}=22V，V_{DS}=0V	--	--	250	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}，I_D=33mA	2.5	--	4.5	V
$R_{DS(on)}$	Drain-Source On-State Resistance	V_{GS}=18V，I_D=67.5A	--	10	13.5	mΩ
		V_{GS}=18V，I_D=67.5A，Tj=175℃	--	22	--	mΩ
Dynamic Electrical Characteristics @ TJ = 25°C (unless otherwise stated)						
C_{ISS}	Input Capacitance	V_{DS}=800V，V_{GS}=0V， f=100KHz	--	5900	--	pF
C_{OSS}	Output Capacitance		--	213	--	pF
C_{RSS}	Reverse Transfer Capacitance		--	9	--	pF
Switching Characteristics						
Q_g	Total Gate Charge	V_{DS}=800V，I_D=67.5A，V_{GS}=-5/18V	--	220	--	nC
Q_{gs}	Gate Source Charge		--	75	--	nC
Q_{gd}	Gate Drain Charge		--	15	--	nC
$t_{d(on)}$	Turn-on Delay Time	V_{DD}=800V，I_D=67.5A，V_{GS}=-5/18V，R_G=2.2Ω	--	17.5	--	nS
t_r	Turn-on Rise Time		--	17.9	--	nS
$t_{d(off)}$	Turn-Off Delay Time		--	40.4	--	nS
t_f	Turn-Off Fall Time		--	8.9	--	nS
R_g	Gate Resistance	V_{AC}=25mV, f=1MHz	--	1.1	--	Ω
Source Drain Diode Characteristics						
V_{SD}	Forward on voltage	Tj=25℃，I_{SD}=35A	--	4.2	--	V
I_S	Continuous Diode Forward Current	V_{GS}=0V，Tj=25℃	--	90	--	A
t_{rr}	Reverse Recovery Time	V_{GS} =-5V, I_{SD}=67.5A, V_{DS}=800V, di/dt=2.1KA/us, Tj=25℃	--	24.9	--	ns
Q_{rr}	Reverse Recovery Charge		--	415	--	nC
I_{rrm}	Peak Reverse Recovery Current		--	33	--	A

Note 1:L=0.5mH, R_G=25Ω, V_{GS}=20V, V_{DD}=50V, Start T_J=25℃

Typical Operating Characteristics

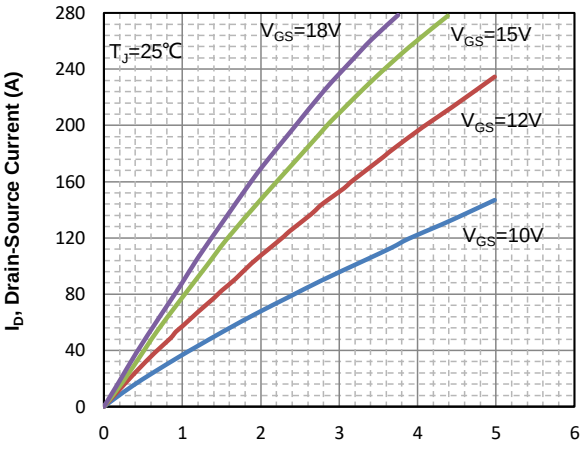


Fig1. Typical Output Characteristics

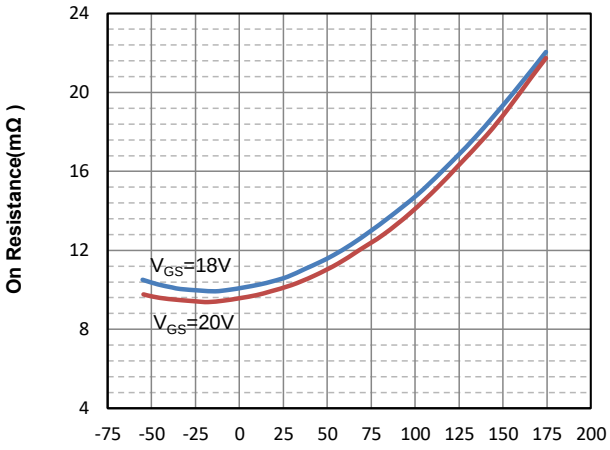


Fig2. Normalized On-Resistance Vs. Temperature

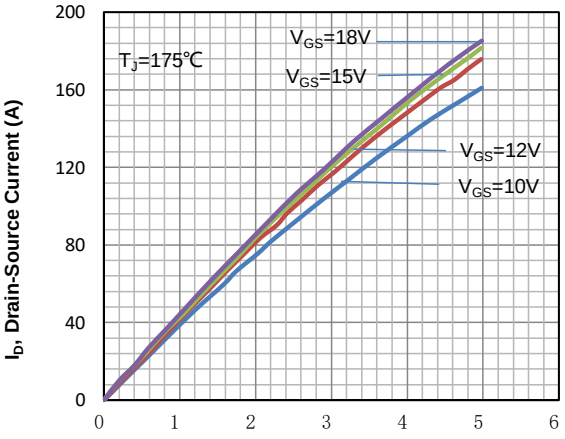


Fig3. Typical Output Characteristics

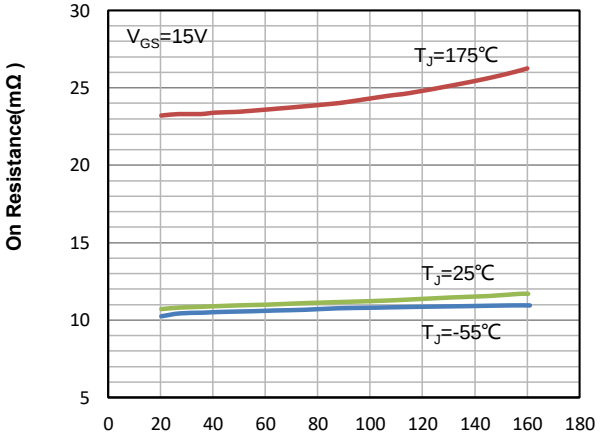


Fig4. On-Resistance Vs. Drain-Source Current

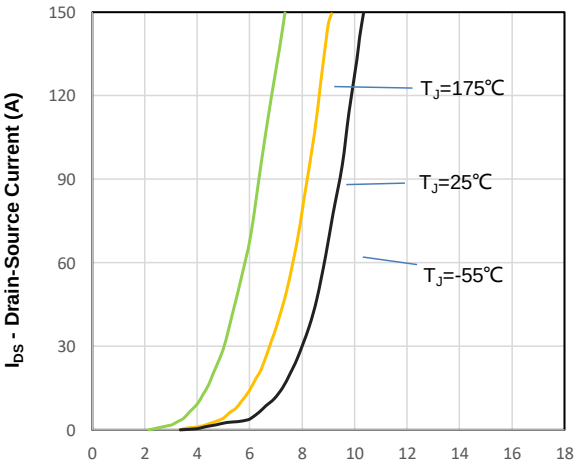


Fig5. Typical Transfer Characteristics

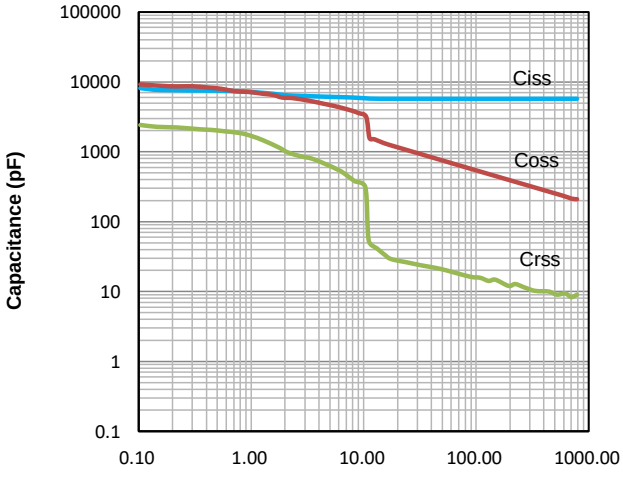
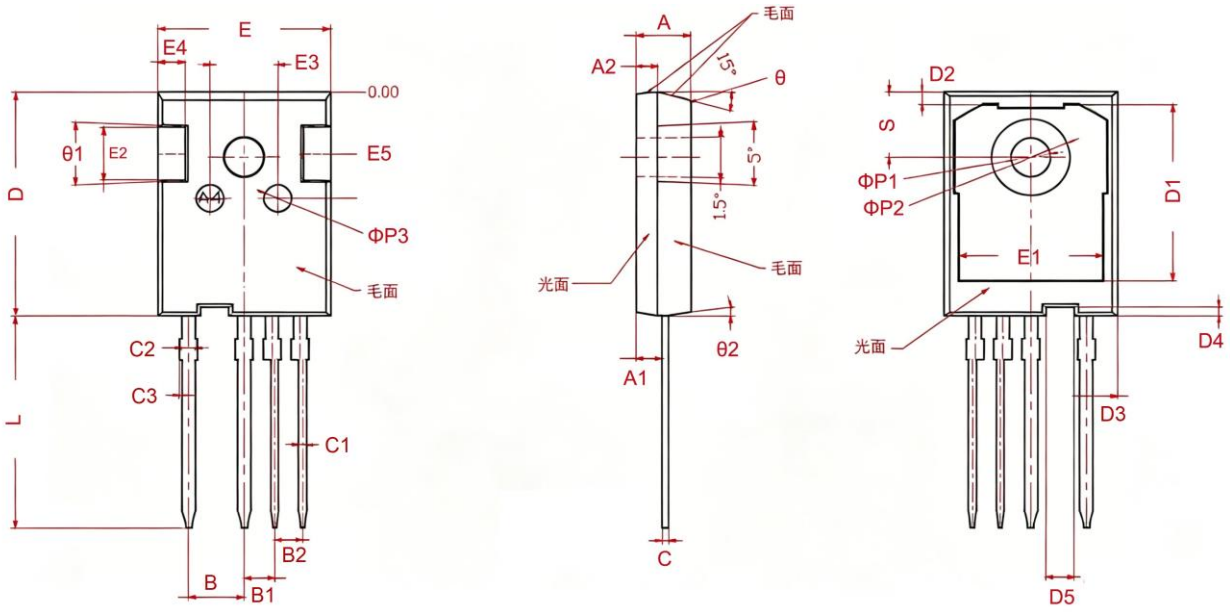


Fig6 Typical Capacitance Vs.Drain-Source

TO-247-4L Package information



Symbol	Dimensions in Millimeters(mm)		Dimensions In Inches	
	Min	Max	Min	Max
A	4.900	5.100	0.192	0.200
A1	2.300	2.500	0.090	0.098
A2	1.900	2.100	0.074	0.082
B	5.060	5.100	0.199	0.200
B1	2.790BSC		0.109BSC	
B2	2.540BSC		0.100BSC	
C	0.590	0.610	0.023	0.024
C1	0.700BSC		0.027BSC	
C2	1.180	1.220	0.046	0.048
C3	0.000	0.200	0.000	0.007
D	20.900	21.100	0.822	0.830
D1	16.450	16.650	0.647	0.655
D2	1.070	1.270	0.042	0.050
D3	3.820	4.020	0.150	0.158
D4	0.800	0.850	0.031	0.033
D5	2.480	2.680	0.097	0.105
E	15.700	15.900	0.618	0.625
E1	13.160	13.360	0.518	0.525
E2	4.900	5.100	0.192	0.200
E3	6.000	6.400	0.236	0.251
E4	2.400	2.600	0.094	0.102
E5	5.700	5.900	0.224	0.232
L	19.720	20.120	0.776	0.792
S	6.050	6.250	0.238	0.246
ΦP1	3.500	3.700	0.137	0.145
ΦP2	7.090	7.290	0.279	0.287
ΦP3	2.400	2.600	0.094	0.102
θ	5°TYP		5°TYP	
θ1	15°TYP		15°TYP	
θ2	3°	7°	3°	7°