

Features

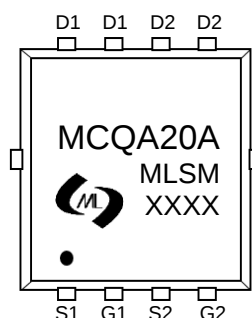
- High power and current handing capability
- Lead free product is acquired
- Surface mount package

Application

- Battery protection
- Load switch
- Power management

Product Summary

V_{DS}	$R_{DS(ON)}$ TYP	I_D
100V	62mΩ@10V	20A
	75mΩ@4.5V	
-100V	68mΩ@-10V	-20A
	75mΩ@-4.5V	



Marking and pin assignment

MCQA20A : Device code
XXXX : Code



PDFN5X6-8L view



Schematic diagram



Halogen-Free

Absolute Maximum Ratings (TA=25°C unless otherwise noted)

Symbol	Parameter	N-Channel	P-Channel	Unit
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Common Ratings (TC=25°C Unless Otherwise Noted)

V_{DS}	Drain-Source Breakdown Voltage	100	-100	V
V_{GS}	Gate-Source Voltage	±20	±20	V
T_J	Maximum Junction Temperature	150	150	°C
T_{STG}	Storage Temperature Range	-55 to 150	-55 to 150	°C
I_S	Diode Continuous Forward Current	$T_C=25^{\circ}C$		A
		20	-20	

Mounted on Large Heat Sink

I_{DM}	Pulse Drain Current Tested	$T_C=25^{\circ}C$	60	-60	A
I_D	Continuous Drain Current	$T_C=25^{\circ}C$	20	-20	A
P_D	Maximum Power Dissipation	$T_C=25^{\circ}C$	45	45	W
$R_{\theta JA}$	Thermal Resistance Junction-Ambient		59	59	°C/W

Ordering Information (Example)

Type	Package	Marking	Minimum Package(pcs)	Inner Box Quantity(pcs)	Outer Carton Quantity(pcs)	Delivery Mode
MCQA20A	PDFN5X6-8L	MCQA20A	5,000	10,000	70,000	13" reel



N-CH Electrical Characteristics (TJ=25℃ unless otherwise noted)						
Symbol	Parameter	Condition	Min	Typ	Max	Unit
Static Electrical Characteristics @ TJ = 25℃ (unless otherwise stated)						
BV _{(BR)DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250μA	100	--	--	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =100V, V _{GS} =0V	--	--	1.0	μA
I _{GSS}	Gate-Body Leakage Current	V _{GS} =±20V, V _{DS} =0V	--	--	±100	nA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250μA	1.0	1.8	2.5	V
R _{DS(on)}	Drain-Source On-State Resistance	V _{GS} =10V, I _D =15A	--	62	85	mΩ
		V _{GS} =4.5V, I _D =10A	--	75	105	mΩ
Dynamic Electrical Characteristics @ TJ = 25℃ (unless otherwise stated)						
C _{ISS}	Input Capacitance	V _{DS} =50V, V _{GS} =0V, f=1MHz	--	171	--	pF
C _{OSS}	Output Capacitance		--	58	--	pF
C _{RSS}	Reverse Transfer Capacitance		--	2	--	pF
Switching Characteristics						
Q _g	Total Gate Charge	V _{DS} =50V, I _D =10A, V _{GS} =10V	--	3.7	--	nC
Q _{gs}	Gate Source Charge		--	0.8	--	nC
Q _{gd}	Gate Drain Charge		--	1	--	nC
t _{d(on)}	Turn-on Delay Time	V _{DS} =50V, I _D =10A, V _{GS} =10V, R _G =3Ω	--	8	--	nS
t _r	Turn-on Rise Time		--	16	--	nS
t _{d(off)}	Turn-Off Delay Time		--	17	--	nS
t _f	Turn-Off Fall Time		--	14	--	nS
Source- Drain Diode Characteristics						
V _{SD}	Forward on voltage	Tj=25℃, Is=10A	--	--	1.2	V



P-CH Electrical Characteristics (TJ=25°C 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 =-250μA	-100	--	--	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =-100V, V _{GS} =0V	--	--	-1.0	μA
I _{GSS}	Gate-Body Leakage Current	V _{GS} =±20V, V _{DS} =0V	--	--	±100	nA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =-250μA	-1.0	--	-2.5	V
R _{DS(on)}	Drain-Source On-State Resistance	V _{GS} =-10V, I _D =-15A	--	68	85	mΩ
		V _{GS} =-4.5V, I _D =-10A	--	75	105	mΩ
Dynamic Electrical Characteristics @ TJ = 25°C (unless otherwise stated)						
C _{ISS}	Input Capacitance	V _{DS} =-20V, V _{GS} =0V, f=1MHz	--	1051	--	pF
C _{OSS}	Output Capacitance		--	119	--	pF
C _{RSS}	Reverse Transfer Capacitance		--	25	--	pF
Switching Characteristics						
Q _g	Total Gate Charge	V _{DD} =-50V, I _D =-15A, V _{GS} =-10V	--	20.1	--	nC
Q _{gs}	Gate Source Charge		--	3.9	--	nC
Q _{gd}	Gate Drain Charge		--	4.3	--	nC
t _{d(on)}	Turn-on Delay Time	V _{DD} =-50V, I _D =-15A, V _{GS} =-10V, R _G =3.3Ω	--	10	--	nS
t _r	Turn-on Rise Time		--	30	--	nS
t _{d(off)}	Turn-Off Delay Time		--	77	--	nS
t _f	Turn-Off Fall Time		--	81	--	nS
Source- Drain Diode Characteristics						
V _{SD}	Forward on voltage	Tj=25°C, Is=-10A	--	--	-1.2	V



N-Channel Typical Operating Characteristics

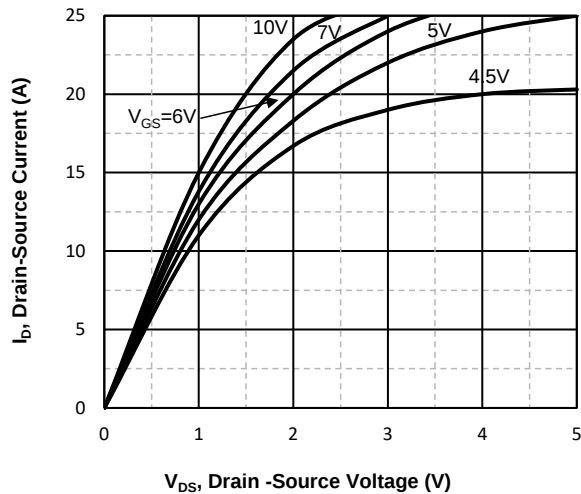


Fig1. Typical Output Characteristics

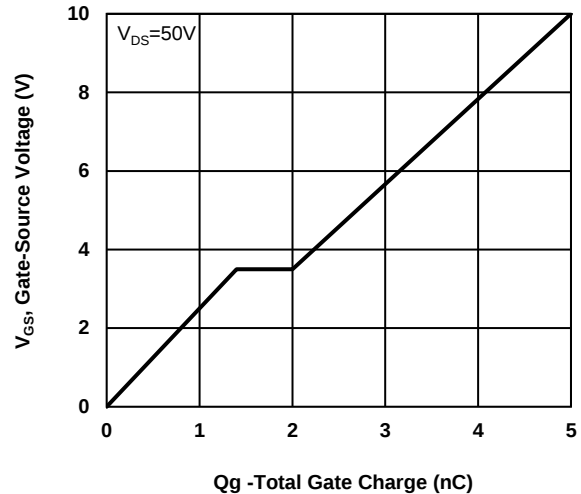


Fig2. Typical Gate Charge Vs. Gate-Source Voltage

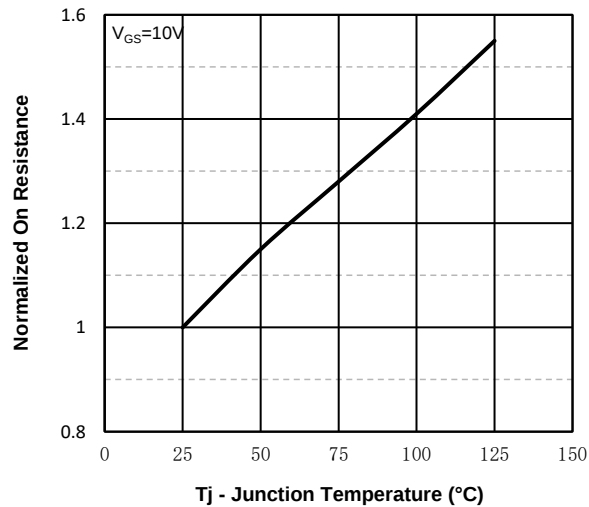


Fig3. Normalized On-Resistance Vs. Temperature

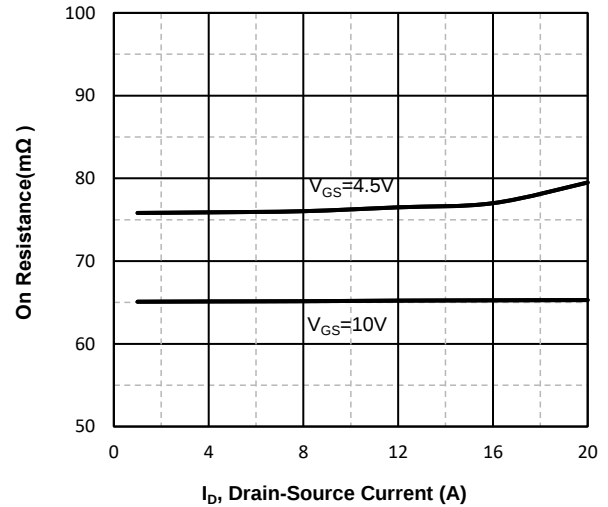


Fig4. On-Resistance Vs. Drain-Source Current

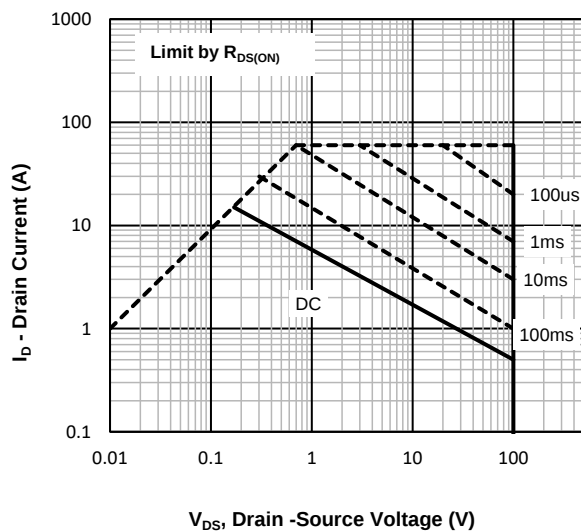


Fig5. Maximum Safe Operating Area

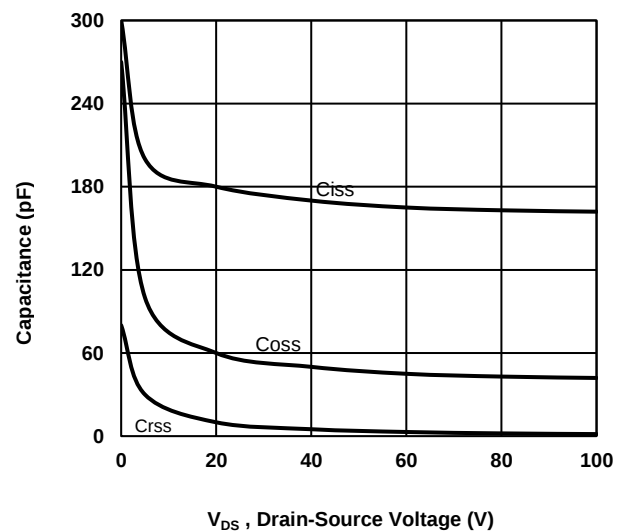
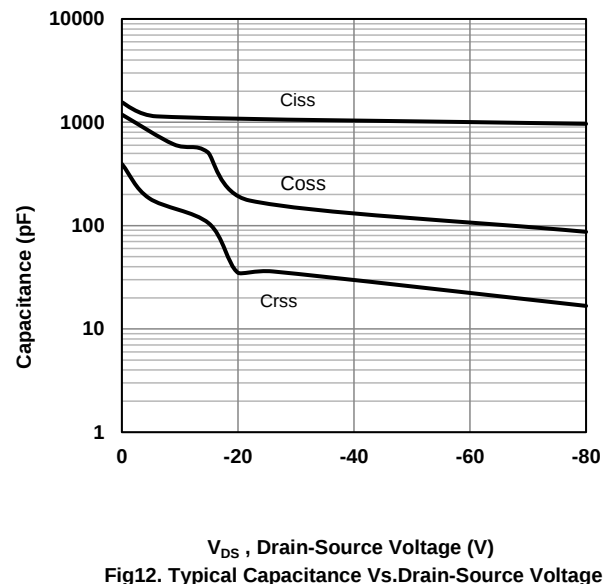
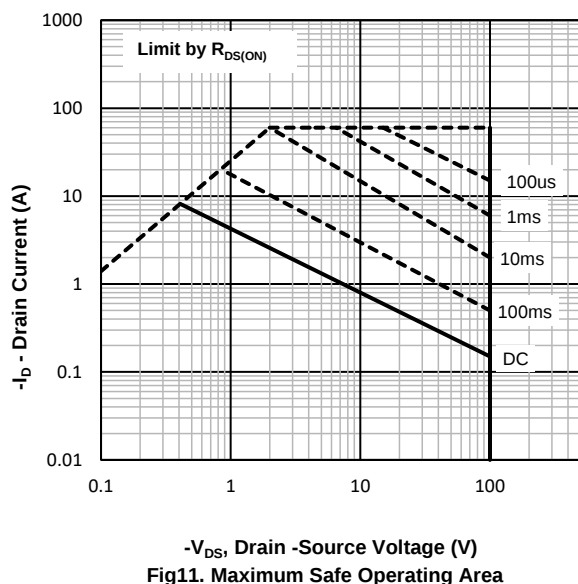
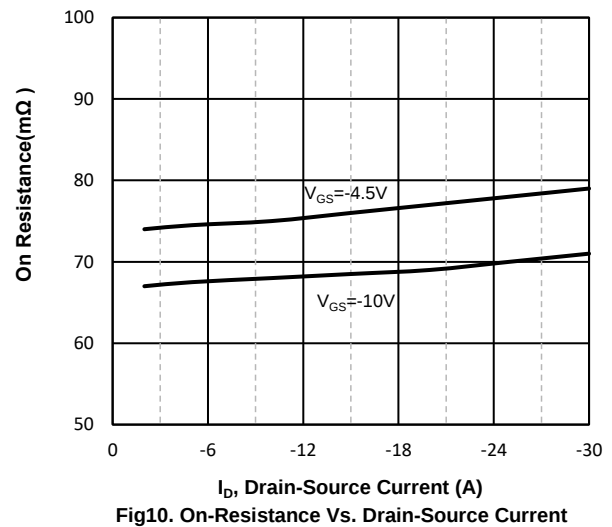
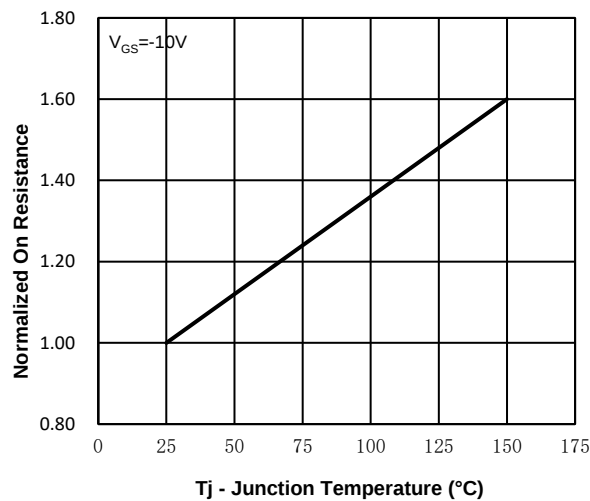
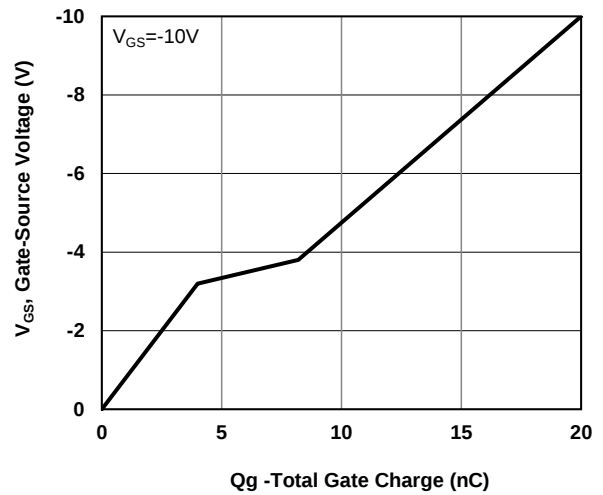
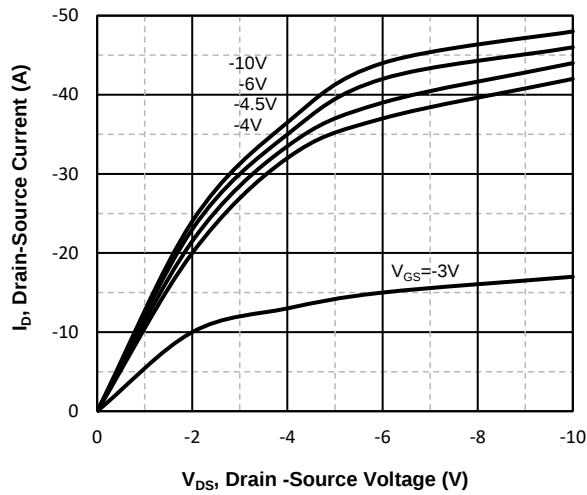


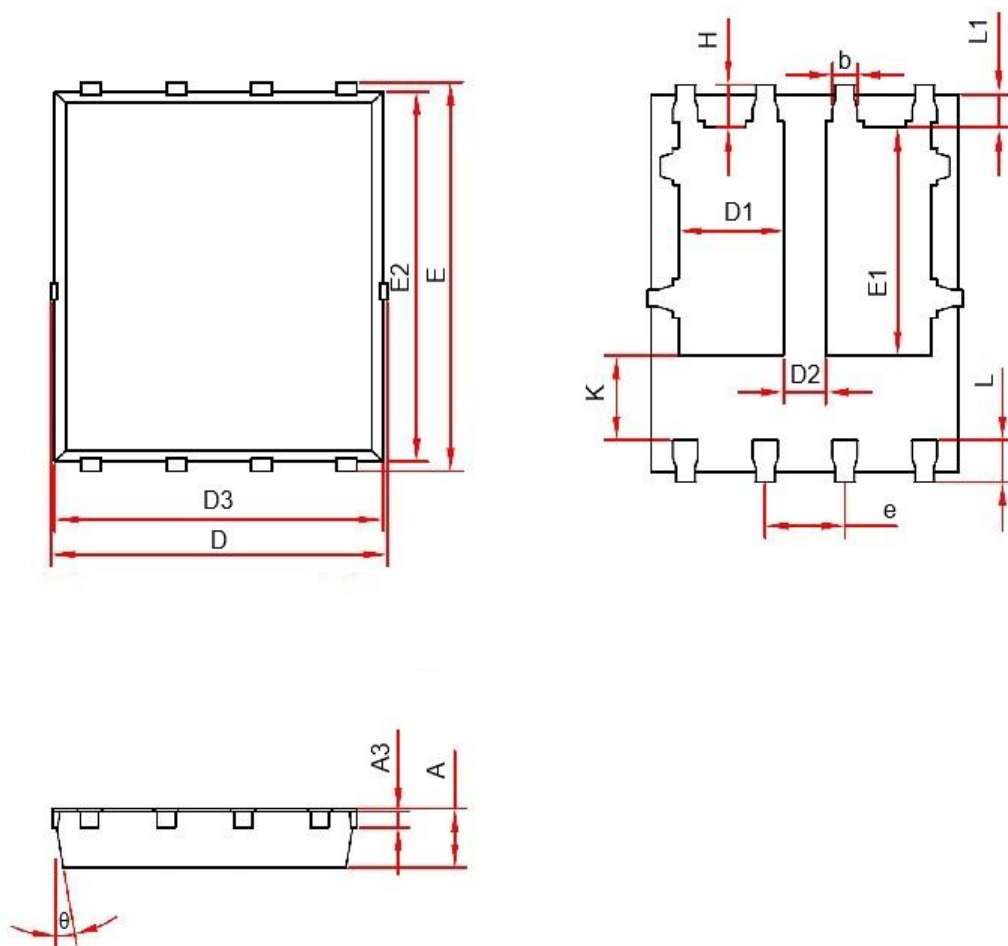
Fig6 Typical Capacitance Vs. Drain-Source Voltage



P-Channel Typical Operating Characteristics



PDFN5X6-8L Package information



Symbol	Dimensions in Millimeters(mm)		Dimensions In Inches	
	Min	Max	Min	Max
A	0.950	1.050	0.035	0.039
A3	0.254REF.		0.010REF.	
D	4.950	5.050	0.196	0.200
E	5.950	6.050	0.235	0.239
D1	1.470	1.870	0.058	0.074
D2	0.470	0.870	0.019	0.034
E1	3.510	3.610	0.139	0.143
D3	4.850	4.950	0.192	0.196
E2	5.700	5.800	0.225	0.229
k	1.190	1.390	0.047	0.055
b	0.300	0.400	0.012	0.016
e	1.270TYP.		0.050TYP.	
L	0.559	0.711	0.022	0.028
L1	0.424	0.576	0.017	0.023
H	0.574	0.726	0.023	0.029
θ	10°	12°	10°	12°