MCPD40A

30V N-Channel and P-Channel MOSFET

Features

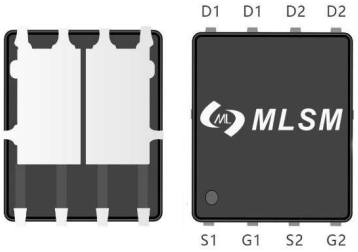
- High power and current handing capability
- Lead free product is acquired
- Surface mount package

Application

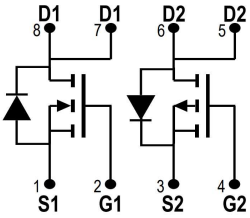
- Battery protection
- Load switch
- Power management

Product Summary

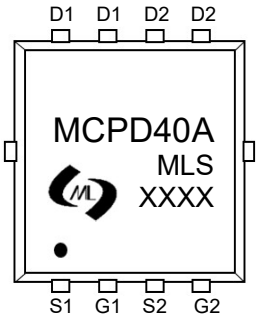
V_{DS}	$R_{DS(ON)}$ MAX	I_D MAX
30V	8mΩ@10V	40A
	12mΩ@4.5V	
-30V	18mΩ@-10V	-40A
	30mΩ@-4.5V	



PDFN5X6-8L view



Schematic diagram



Marking and pin assignment

MCPD40A : Device code
XXXX : Code

Pb-Free RoHS Halogen-Free

Absolute Maximum Ratings (TA=25℃unless otherwise noted)

Symbol	Parameter		N-Channel	P-Channel	Unit
Common Ratings (TC=25°C Unless Otherwise Noted)					
V_{DS}	Drain-Source Breakdown Voltage		30	-30	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	Tc=25°C	40	-40	A
Mounted on Large Heat Sink					
I_{DM}	Pulse Drain Current Tested	Tc=25°C	160	-160	A
I_D	Continuous Drain Current	Tc=25°C	40	-40	A
P_D	Maximum Power Dissipation	Tc=25°C	45	45	W
$R_{\theta JA}$	Thermal Resistance Junction-Ambient		83	83	°C/W

Ordering Information (Example)

Type	Package	Marking	Minimum Package(pcs)	Inner Box Quantity(pcs)	Outer Carton Quantity(pcs)	Delivery Mode
MCPD40A	PDFN5X6-8L	MCPD40A	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°C (unless otherwise stated)						
$BV_{(BR)DSS}$	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=250μA	30	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=30V, V_{GS}=0V	--	--	1	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	1.5	2.5	V
$R_{DS(on)}$	Drain-Source On-State Resistance	V_{GS}=10V, I_D=20A	--	6.5	8	mΩ
		V_{GS}=4.5V, I_D=15A	--	7.8	12	mΩ
Dynamic Electrical Characteristics @ TJ = 25°C (unless otherwise stated)						
C_{ISS}	Input Capacitance	V_{DS}=15V, V_{GS}=0V, f=1MHz	--	1015	--	pF
C_{OSS}	Output Capacitance		--	201	--	pF
C_{RSS}	Reverse Transfer Capacitance		--	164	--	pF
Switching Characteristics						
Q_g	Total Gate Charge	V_{DS}=20V, I_D=15A, V_{GS}=10V	--	23.6	--	nC
Q_{gs}	Gate Source Charge		--	3.9	--	nC
Q_{gd}	Gate Drain Charge		--	7	--	nC
$t_{d(on)}$	Turn-on Delay Time	V_{DD}=20V, R_G=3Ω, V_{GS}=10V, I_D=15A	--	7	--	nS
t_r	Turn-on Rise Time		--	19	--	nS
$t_{d(off)}$	Turn-Off Delay Time		--	24	--	nS
t_f	Turn-Off Fall Time		--	24	--	nS
Source- Drain Diode Characteristics						
V_{SD}	Forward on voltage	Tj=25℃, Is=10A	--	--	1.2	V

P-CH 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=-250μA	-30	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=-30V, V_{GS}=0V	--	--	-1	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	-1.5	-2.5	V
$R_{DS(on)}$	Drain-Source On-State Resistance	V_{GS}=-10V, I_D=-20A	--	12	18	mΩ
		V_{GS}=-4.5V, I_D=-10A	--	22	30	mΩ
Dynamic Electrical Characteristics @ TJ = 25°C (unless otherwise stated)						
C_{ISS}	Input Capacitance	V_{DS}=-15V, V_{GS}=0V, f=1MHz	--	2400	--	pF
C_{OSS}	Output Capacitance		--	315	--	pF
C_{RSS}	Reverse Transfer Capacitance		--	260	--	pF
Switching Characteristics						
Q_g	Total Gate Charge	V_{DD}=-15V, I_D=-15A, V_{GS}=-10V	--	44.5	--	nC
Q_{gs}	Gate Source Charge		--	4..5	--	nC
Q_{gd}	Gate Drain Charge		--	10	--	nC
$t_{d(on)}$	Turn-on Delay Time	V_{DD}=-15V, I_D=-15A, V_{GS}=-10V, R_G=2.5Ω	--	9	--	nS
t_r	Turn-on Rise Time		--	8	--	nS
$t_{d(off)}$	Turn-Off Delay Time		--	28	--	nS
t_f	Turn-Off Fall Time		--	10	--	nS
Source- Drain Diode Characteristics						
V_{SD}	Forward on voltage	Tj=25℃, Is=-10A	--	--	-1.2	V

N-Channel Typical Operating Characteristics

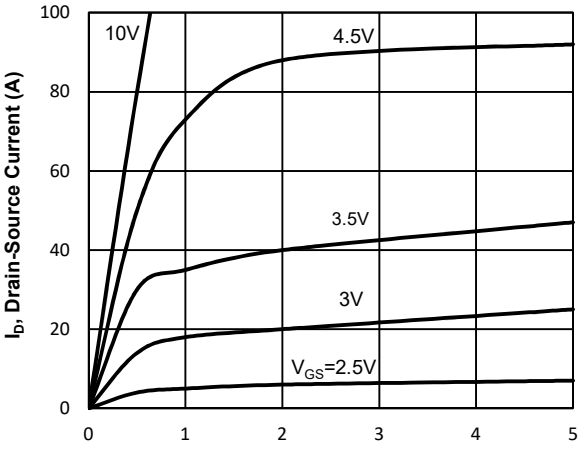


Fig1. Typical Output Characteristics

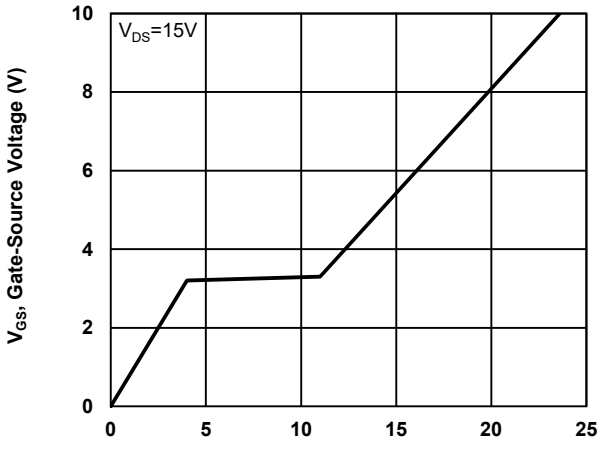


Fig2. Typical Gate Charge Vs.Gate-Source Voltage

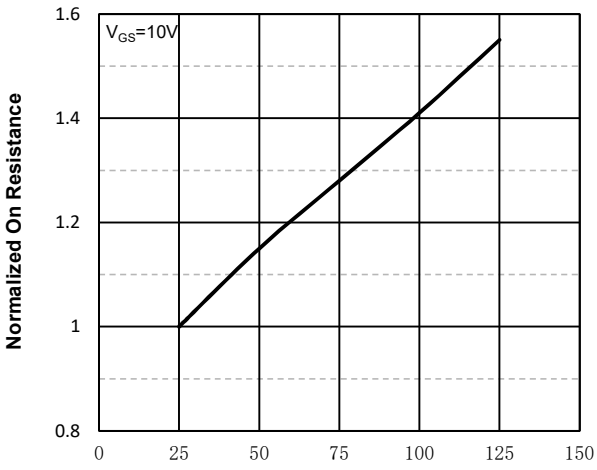


Fig3. Normalized On-Resistance Vs. Temperature

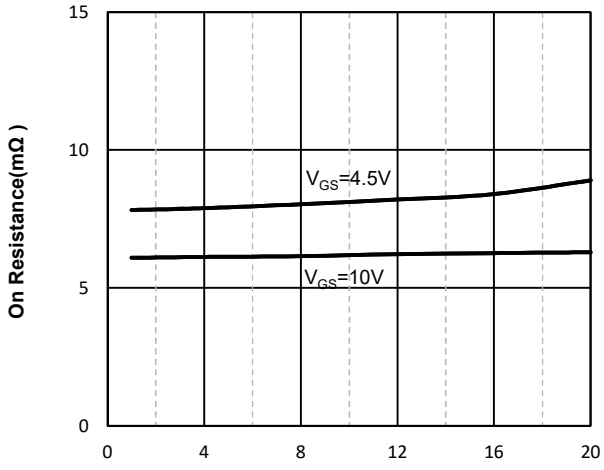


Fig4. On-Resistance Vs. Drain-Source Current

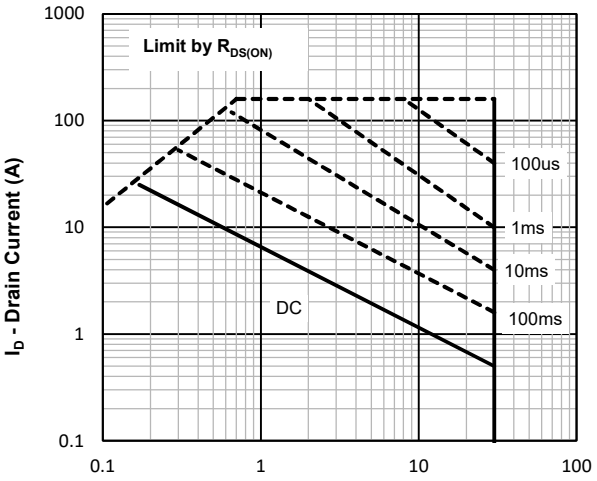


Fig5. Maximum Safe Operating Area

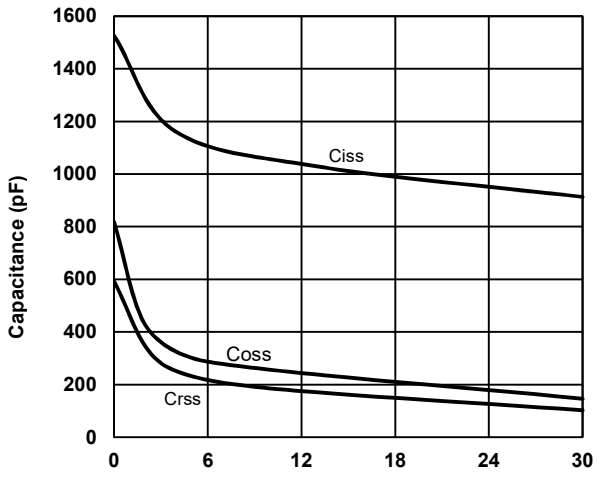


Fig6 Typical Capacitance Vs.Drain-Source Voltage

P-Channel Typical Operating Characteristics

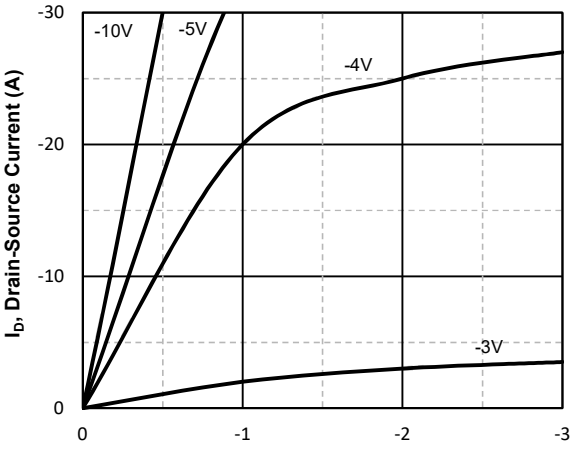


Fig7. Typical Output Characteristics

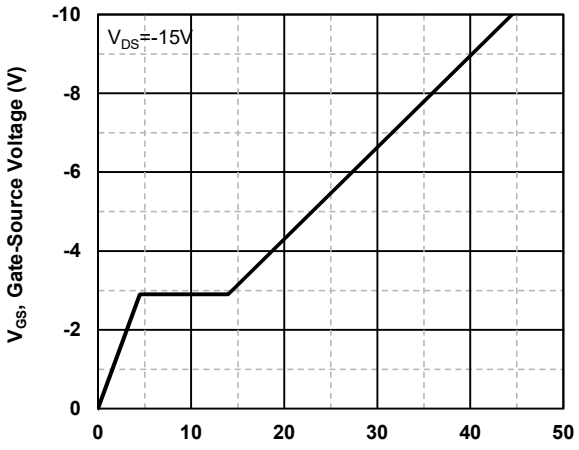


Fig8. Typical Gate Charge Vs.Gate-Source Voltage

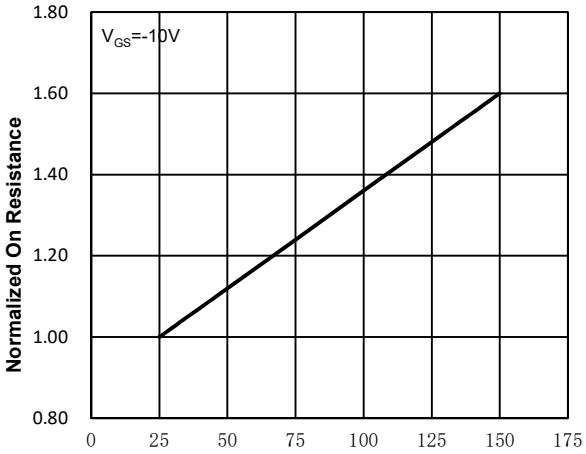


Fig9. Normalized On-Resistance Vs. Temperature

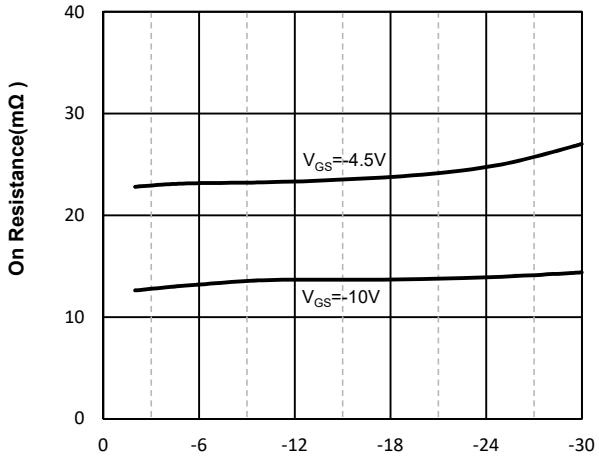


Fig10. On-Resistance Vs. Drain-Source Current

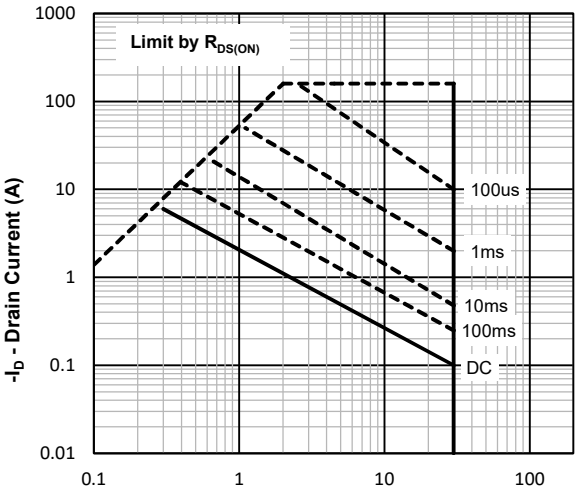


Fig11. Maximum Safe Operating Area

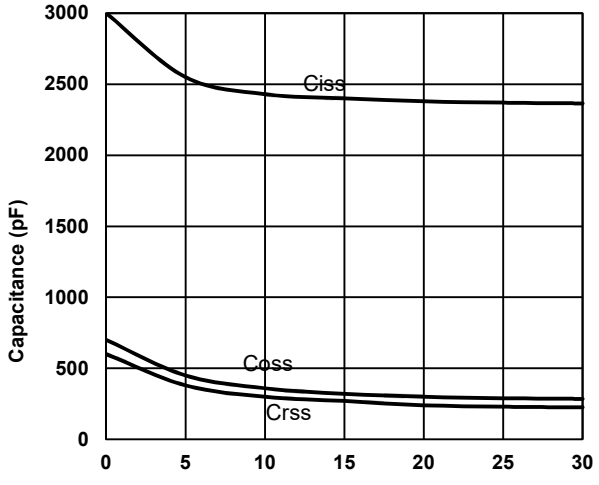
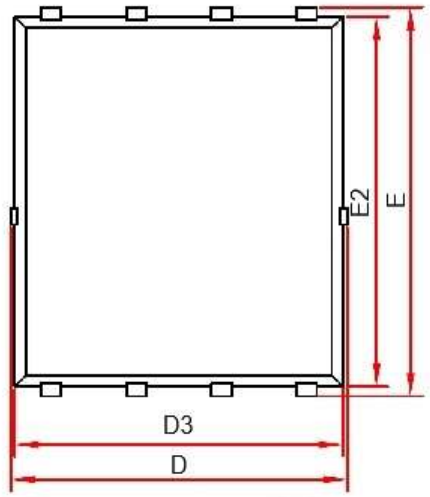
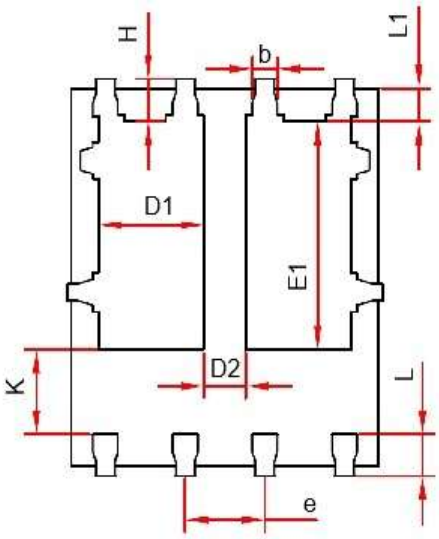
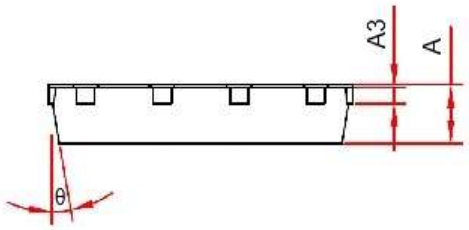


Fig12. Typical Capacitance Vs.Drain-Source Voltage

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°