FQP4P40

-400V/-3.5A P-Channel MOSFET

Features

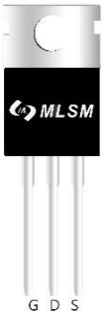
- Integrate fast recovery diode
- Fast switching
- 100% avalanche tested
- Improved dv/dt capability

Application

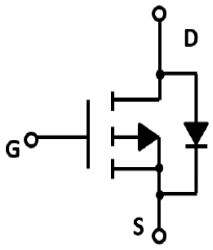
- Switch Mode Power Supply (SMPS)
- Motor Controls
- Power Factor Correction (PFC)

Product Summary

V_{DS}	$R_{DS(ON)}$ TYP	I_D
-400V	2.4Ω@-10V	-3.5A



TO-220



Schematic diagram

Pb-Free RoHS Halogen-Free

Absolute Maximum Ratings (TA=25℃unless otherwise note

Symbol	Parameter		Value	Unit
Common Ratings (TC=25°C Unless Otherwise Noted)				
V_{DS}	Drain-Source Breakdown Voltage		-400	V
V_{GS}	Gate-Source Voltage		±30	V
T_J	Maximum Junction Temperature		150	°C
T_{STG}	Storage Temperature Range		-50 to 155	°C
I_S	Diode Continuous Forward Current	Tc=25°C	-3.5	A
Mounted on Large Heat Sink				
I_{DM}	Pulse Drain Current Tested	Tc=25°C	-14	A
I_D	Continuous Drain Current@GS=10V	Tc=25°C	-3.5	A
P_D	Maximum Power Dissipation	Tc=25°C	85	W
R_{thJA}	Thermal Resistance, Junction-to-Ambient		62.5	°C/W
E_{AS}	Single pulse avalanche energy(Notes1)		260	mJ

Ordering Information (Example)

Type	Package	Marking	Minimum Package(pcs)	Inner Box Quantity(pcs)	Outer Carton Quantity(pcs)	Delivery Mode
FQP4P40	TO-220	FQP4P40	50	1,000	5,000	/

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	-400	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=-400V，V_{GS}=0V	--	--	-1	uA
I_{GSS}	Gate-Body Leakage Current	V_{GS}=±30V，V_{DS}=0V	--	--	±100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}，I_D=-250μA	-2.5	--	-4.5	V
$R_{DS(on)}$	Drain-Source On-State Resistance	V_{GS}=-10V， I_D=-1.75A	--	2.4	3.1	Ω
Dynamic Electrical Characteristics @ TJ = 25°C (unless otherwise stated)						
C_{ISS}	Input Capacitance	V_{DS}=-25V，V_{GS}=0V， f=1MHz	--	510	--	pF
C_{OSS}	Output Capacitance		--	82	--	pF
C_{RSS}	Reverse Transfer Capacitance		--	10	--	pF
Switching Characteristics						
Q_g	Total Gate Charge	V_{DD}=-320V，I_D=3.5A，V_{GS}=-10V	--	18	--	nC
Q_{gs}	Gate Source Charge		--	4	--	nC
Q_{gd}	Gate Drain Charge		--	9.5	--	nC
$t_{d(on)}$	Turn-on Delay Time	V_{DD}=-200V，I_D=-3.5A，R_G=25Ω	--	12	--	nS
t_r	Turn-on Rise Time		--	53	--	nS
$t_{d(off)}$	Turn-Off Delay Time		--	35	--	nS
t_f	Turn-Off Fall Time		--	35	--	nS
Source- Drain Diode Characteristics						
V_{SD}	Forward on voltage	Tj=25℃，Is=-3.5A，	--	--	-5	V

Notes:
1. Repetitive rating: pulse-width limited by maximum junction ttemperature.
2. L = 37 mH, I_{As} = -3.5 A, V_{DD} = 50 V, R_G=25 Ω, starting T_J=25° C.
3. Is_D ≤ -3.5 A, di/dt ≤ 200 A/us , V_{DD} < BVpss. starting T=25° C.
4. Essentially independent of operating temperature.

Typical Operating Characteristics

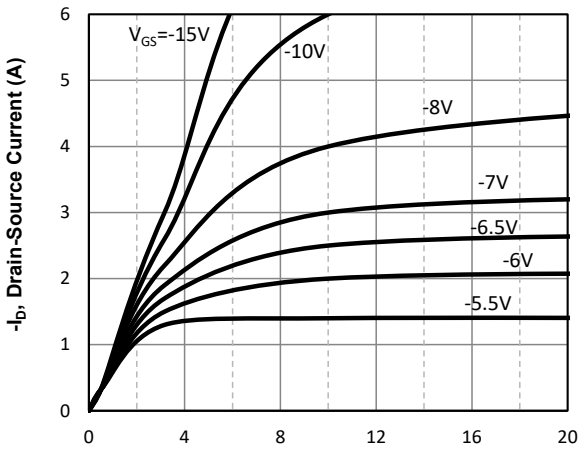


Fig1. Typical Output Characteristics

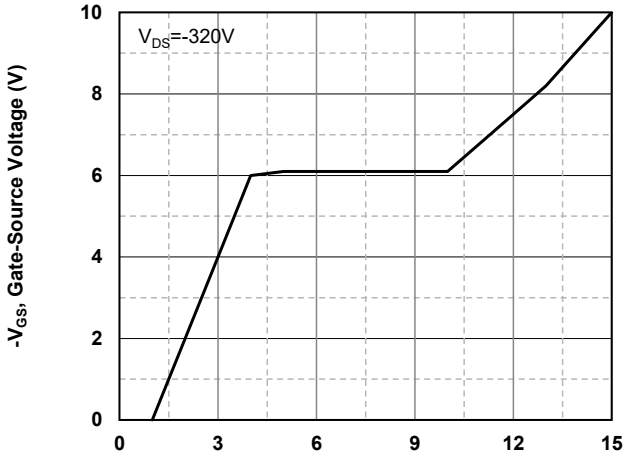


Fig2. Typical Gate Charge Vs.Gate-Source Voltage

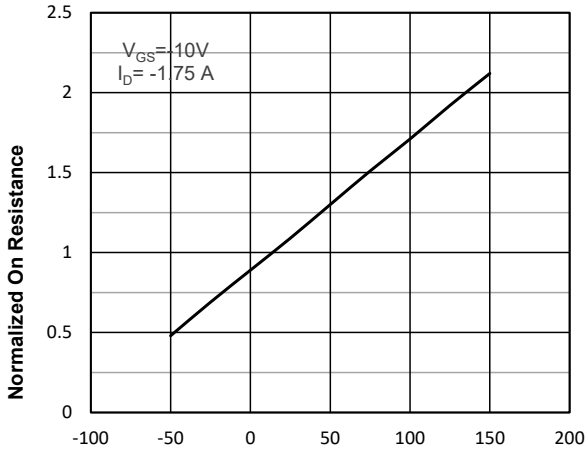


Fig3. Normalized On-Resistance Vs. Temperature

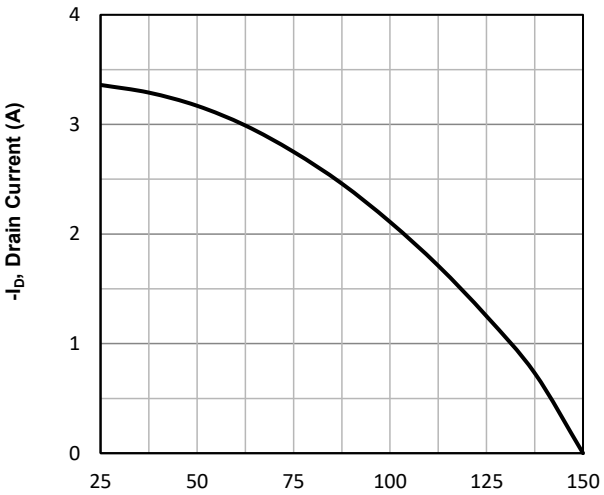


Fig4. Drain Current vs. Temperature

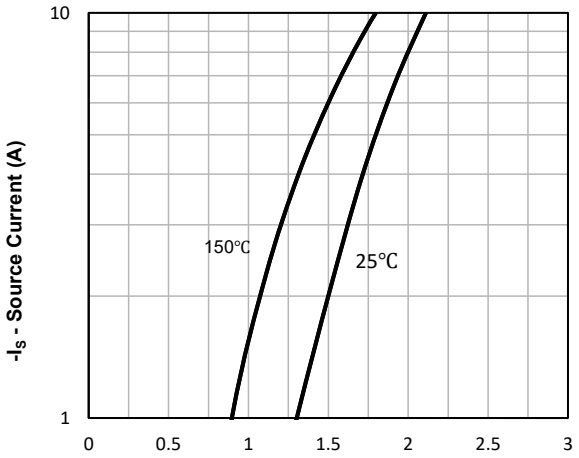


Fig5. Body Diode Forward Voltage

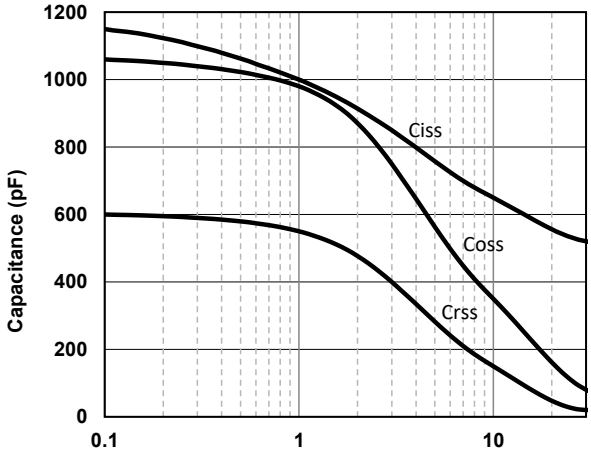
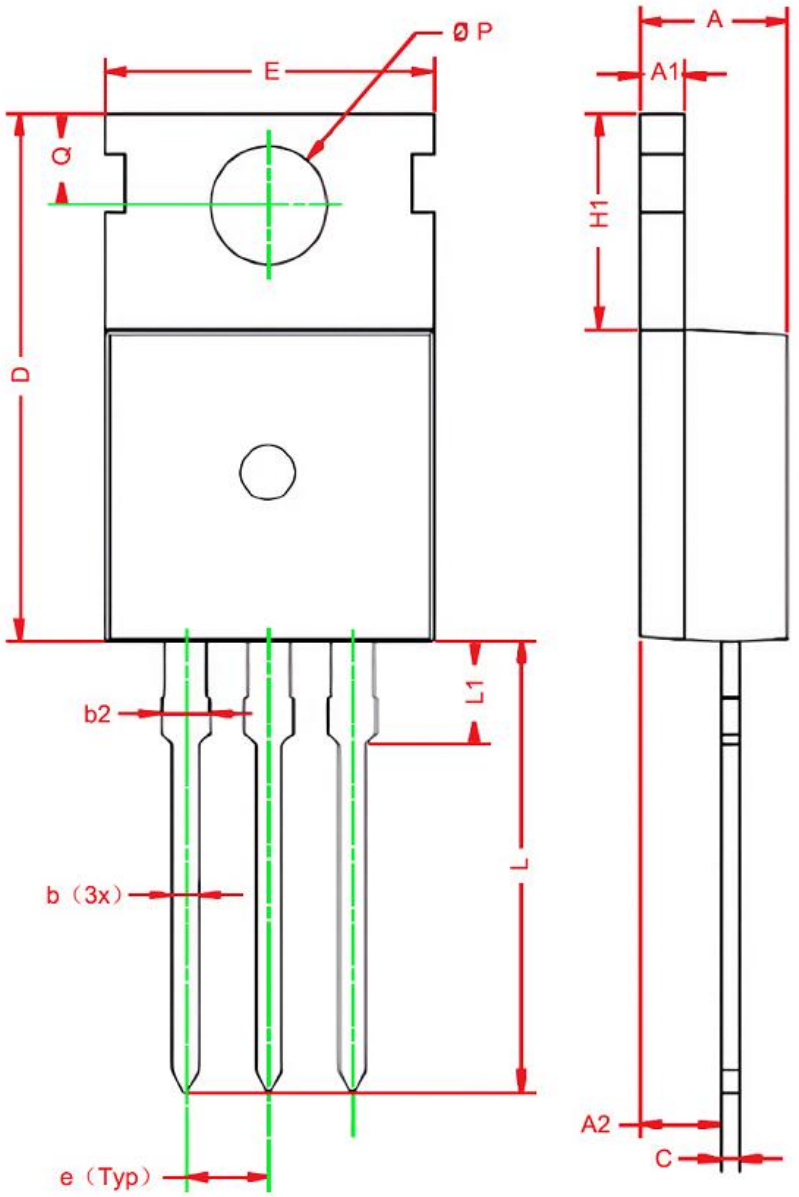


Fig6 Typical Capacitance Vs.Drain-Source Voltage

TO-220 Package information



Symbol	Dimensions in Millimeters(mm)		Dimensions In Inches	
	Min	Max	Min	Max
A	3.600	4.800	0.142	0.189
A1	1.200	1.400	0.047	0.055
A2	2.030	2.900	0.080	0.114
b	0.400	1.000	0.016	0.039
b2	1.200	1.780	0.047	0.070
c	0.360	0.600	0.014	0.024
D	14.220	16.500	0.561	0.651
e	2.340	2.740	0.092	0.108
E	9.700	10.600	0.383	0.418
H1	5.840	6.850	0.230	0.270
L	12.700	14.700	0.501	0.580
L1	2.700	3.300	0.106	0.130
ØP	3.500	4.000	0.138	0.158
Q	2.540	3.400	0.100	0.134