MLSM
MICROELECTRONICS

MU1F04AP

-150V/-4A P-Channel MOSFET

Features

- High density cell design for ultra low $R_{DS(ON)}$
- Fully characterized avalanche voltage and current
- Good stability and uniformity with high EAS

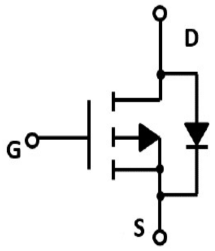
Product Summary

V_{DS}	$R_{DS(ON)}$ MAX	I_D MAX
-150V	780mΩ@-10V 980mΩ@-4.5V	-4A

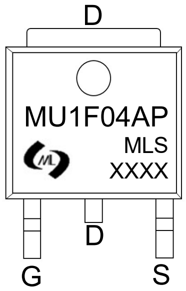
Application

- Battery and loading switching
- Excellent package for good heat dissipation

TO-252 top view



Schematic diagram



MU1F04AP: Device code
XXXX:Code

Marking and pin assignment

Pb-Free RoHS Halogen-Free

Symbol	Parameter		Rating	Unit
Absolute Maximum Ratings (TA=25℃unless otherwise noted)				
Common Ratings (TC=25°C Unless Otherwise Noted)				
V_{DS}	Drain-Source Breakdown Voltage		-150	V
V_{GS}	Gate-Source Voltage		±20	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	-4	A
Mounted on Large Heat Sink				
I_{DM}	Pulse Drain Current Tested	Tc=25°C	-18	A
I_D	Continuous Drain Current	Tc=25°C	-4	A
P_D	Maximum Power Dissipation	Tc=25°C	15	W
E_{AS}	Single Pulsed Avalanche Energy^{Note1}		16.2	mJ

Ordering Information (Example)

Type	Package	Marking	Minimum Package(pcs)	Inner Box Quantity(pcs)	Outer Carton Quantity(pcs)	Delivery Mode
MU1F04AP	TO-252	MU1F04AP	2,500	5,000	35,000	13"reel

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	-150	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=-150V, V_{GS}=0V	--	--	-1	uA
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	-2	-3	-4	V
$R_{DS(on)}$	Drain-Source On-State Resistance	V_{GS}=-10V, I_D=-2A	--	715	780	mΩ
		V_{GS}=-4.5V, I_D=-1A	--	740	980	mΩ
Dynamic Electrical Characteristics @ TJ = 25°C (unless otherwise stated)						
C_{ISS}	Input Capacitance	V_{DS}=-75V, V_{GS}=0V, f=1MHz	--	710	--	pF
C_{OSS}	Output Capacitance		--	23	--	pF
C_{RSS}	Reverse Transfer Capacitance		--	13	--	pF
Switching Characteristics						
Q_g	Total Gate Charge	V_{DS}=-75V, I_D=-4A, V_{GS}=-10V	--	11	--	nC
Q_{gs}	Gate Source Charge		--	3	--	nC
Q_{gd}	Gate Drain Charge		--	2	--	nC
$t_{d(on)}$	Turn-on Delay Time	V_{DS}=-75V, I_D=-1A, V_{GS}=-10V, R_G=6Ω	--	20	--	nS
t_r	Turn-on Rise Time		--	16	--	nS
$t_{d(off)}$	Turn-Off Delay Time		--	40	--	nS
t_f	Turn-Off Fall Time		--	18	--	nS
Source- Drain Diode Characteristics						
V_{SD}	Forward on voltage	Tj=25℃, Is=-4A	--	-0.8	-1.2	V

Note：

1、EAS Test condition: V_{DD}=-50V,V_{GS}=-10V,L=0.1mH, I_{AS}=1.8A,R_G=25Ω ,Starting T_J = 25℃

Typical Operating Characteristics

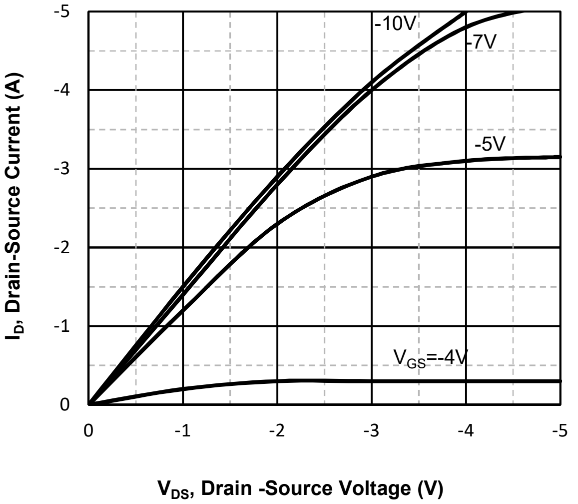


Fig1. Typical Output Characteristics

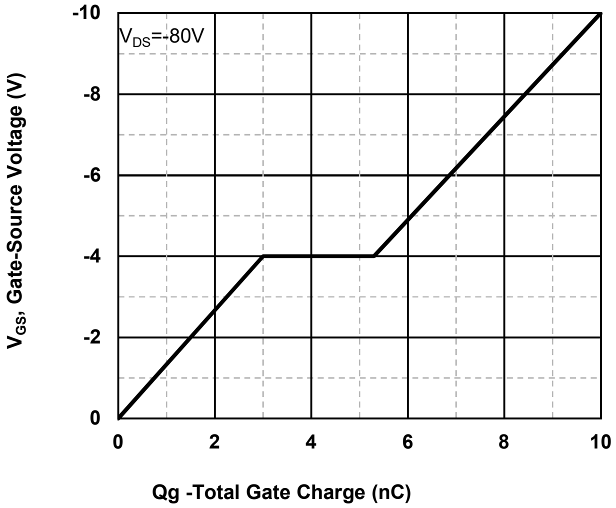


Fig2. Typical Gate Charge Vs.Gate-Source Voltage

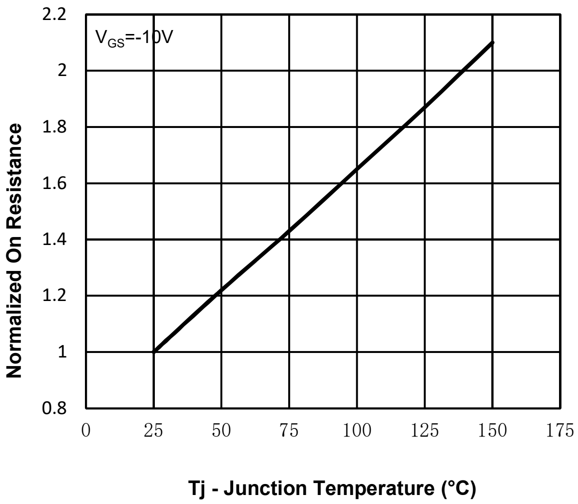


Fig3. Normalized On-Resistance Vs. Temperature

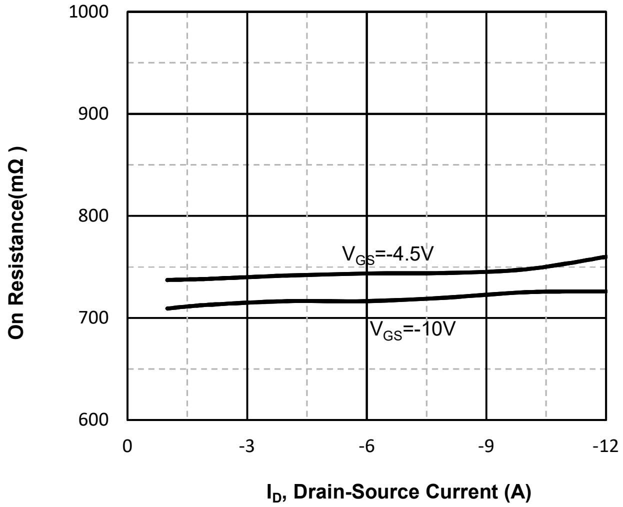


Fig4. On-Resistance Vs. Drain-Source Current

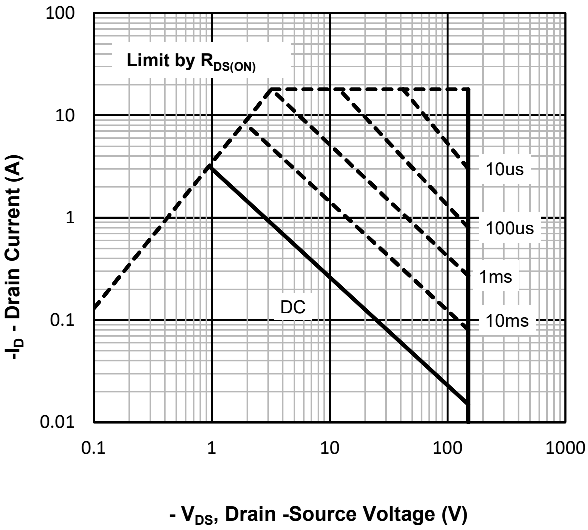


Fig5. Maximum Safe Operating Area

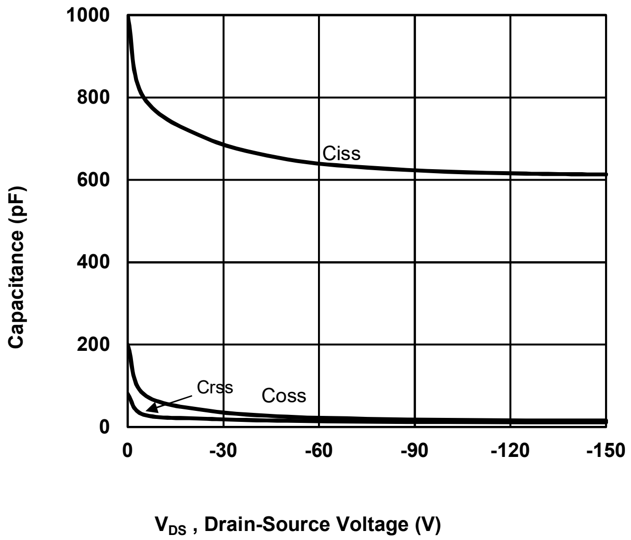
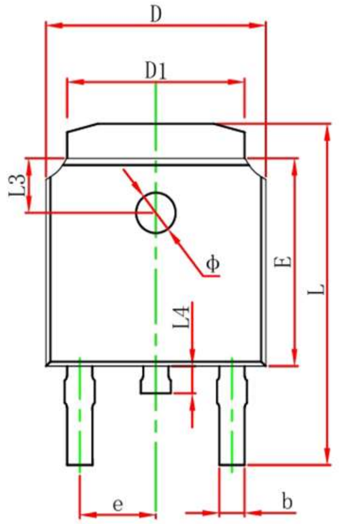
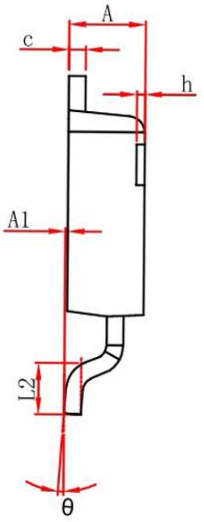
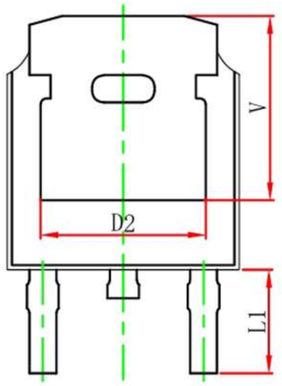


Fig6 Typical Capacitance Vs.Drain-Source Voltage

TO-252 Package information







Symbol	Dimensions in Millimeters(mm)		Dimensions In Inches	
	Min	Max	Min	Max
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.635	0.770	0.025	0.030
c	0.450	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	4.830 REF.		0.190 REF.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.712	10.312	0.386	0.406
L1	2.900 REF.		0.114 REF.	
L2	1.400	1.700	0.055	0.067
L3	1.600 REF.		0.063 REF.	
L4	0.600	1.000	0.024	0.039
Φ	1.100	1.300	0.043	0.051
θ	0°	8°	0°	8°
h	0.000	0.300	0.000	0.012
V	5.250 REF.		0.207 REF.	