MLS(X)28N50

500V/28A N-Channel MOSFET

Features

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

Product Summary

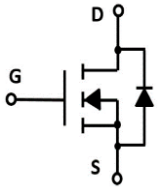
V_{DS}	$R_{DS(ON)}$ TYP	I_D
500V	140mΩ@10V	28A

Application

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

TO-247

TO-3P



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)			TO-247	TO-3P	
V_{DS}	Drain-Source Breakdown Voltage		500		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	28		A
Mounted on Large Heat Sink					
I_{DM}	Pulse Drain Current Tested	Tc=25°C	112		A
I_D	Continuous Drain Current@GS=10V	Tc=25°C	28		A
P_D	Maximum Power Dissipation	Tc=25°C	120		W
R_{thJA}	Thermal Resistance, Junction-to-Ambient		62	40	°C/W
E_{AS}	Single pulse avalanche energy(Notes1)		520		mJ

Ordering Information (Example)

Type	Package	Marking	Minimum Package(pcs)	Inner Box Quantity(pcs)	Outer Carton Quantity(pcs)	Delivery Mode
MLSA28N50	TO-247	MLSA28N50	30	270	2,160	/
MLSP28N50	TO-3P	MLSP28N50	30	270	2,160	/

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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	500	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=500V，V_{GS}=0V	--	--	1.0	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	3.0	--	4.0	V
$R_{DS(on)}$	Drain-Source On-State Resistance	V_{GS}=10V， I_D=14A	--	140	180	mΩ
Dynamic Electrical Characteristics @ TJ = 25°C (unless otherwise stated)						
C_{ISS}	Input Capacitance	V_{DS}=25V，V_{GS}=0V， f=1MHz	--	4295	--	pF
C_{OSS}	Output Capacitance		--	450	--	pF
C_{RSS}	Reverse Transfer Capacitance		--	32	--	pF
Switching Characteristics						
Q_g	Total Gate Charge	V_{DD}=400V，I_D=28A，V_{GS}=10V	--	22	--	nC
Q_{gs}	Gate Source Charge		--	4	--	nC
Q_{gd}	Gate Drain Charge		--	13	--	nC
$t_{d(on)}$	Turn-on Delay Time	V_{DD}=250V，I_D=28A，R_G=25Ω	--	66	--	nS
t_r	Turn-on Rise Time		--	59	--	nS
$t_{d(off)}$	Turn-Off Delay Time		--	427	--	nS
t_f	Turn-Off Fall Time		--	108	--	nS
Source- Drain Diode Characteristics						
V_{SD}	Forward on voltage	Tj=25℃，Is=14A，	--	--	1.4	V

Note：

1、L=10mH, V_{DD}=50V, R_G=25Ω, Starting T_J=25℃

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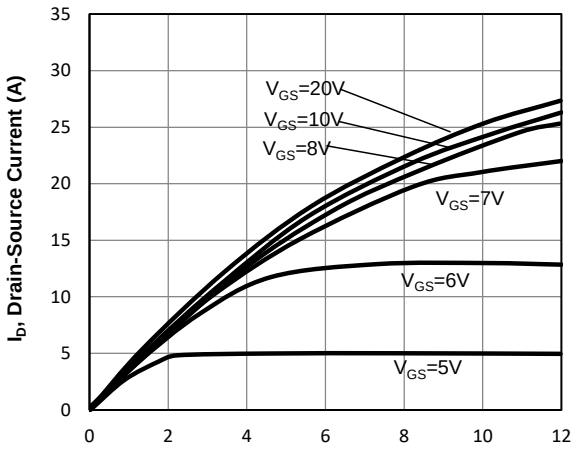
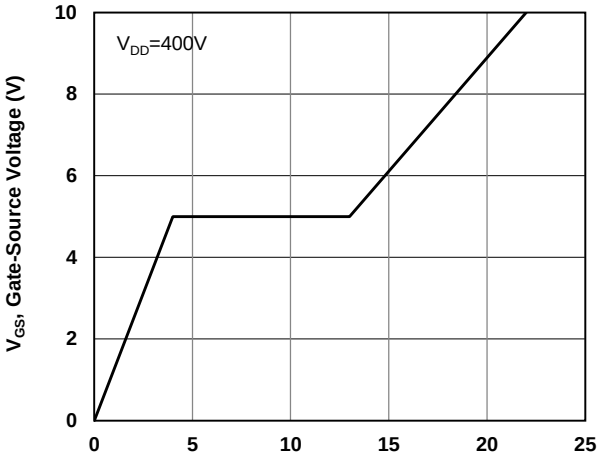
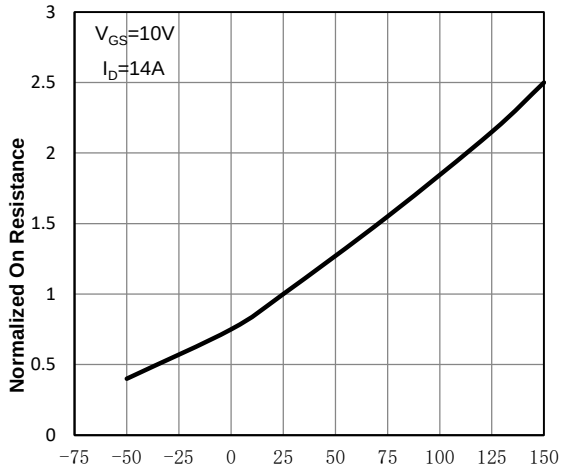
Typical Operating Characteristics



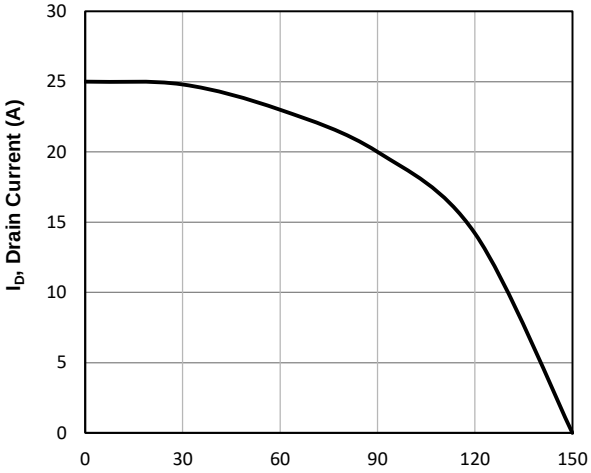
V_{DS}, Drain -Source Voltage (V)
Fig1. Typical Output Characteristics



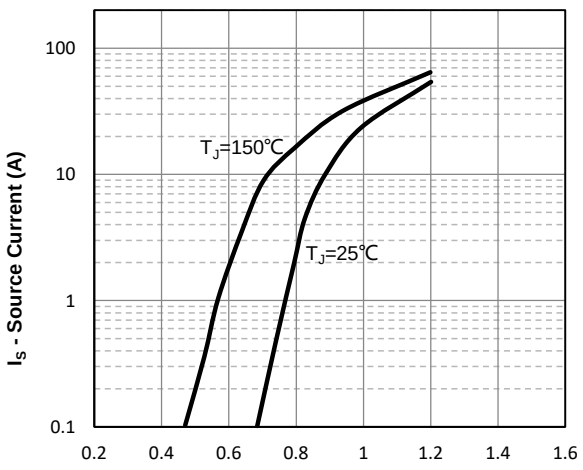
Qg -Total Gate Charge (nC)
Fig2. Typical Gate Charge Vs.Gate-Source Voltage



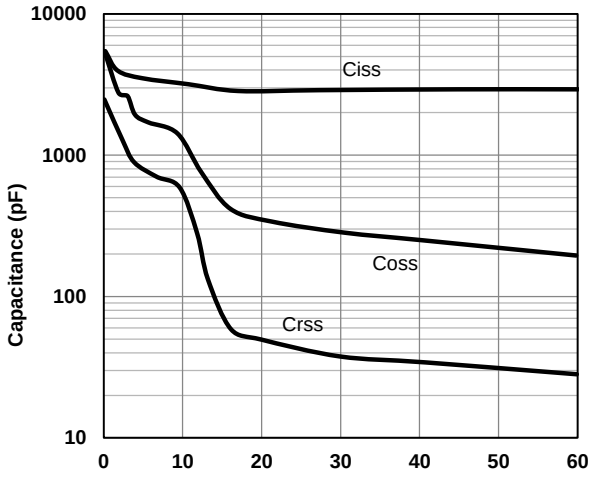
T_J - Junction Temperature (°C)
Fig3. Normalized On-Resistance Vs. Temperature



T_C, Case Temperature (A)
Fig4. Drain Current vs. Temperature



V_{DS}, Drain -Source Voltage (V)
Fig5. Body Diode Forward Voltage



V_{DS} , Drain-Source Voltage (V)
Fig6 Typical Capacitance Vs.Drain-Source Voltage

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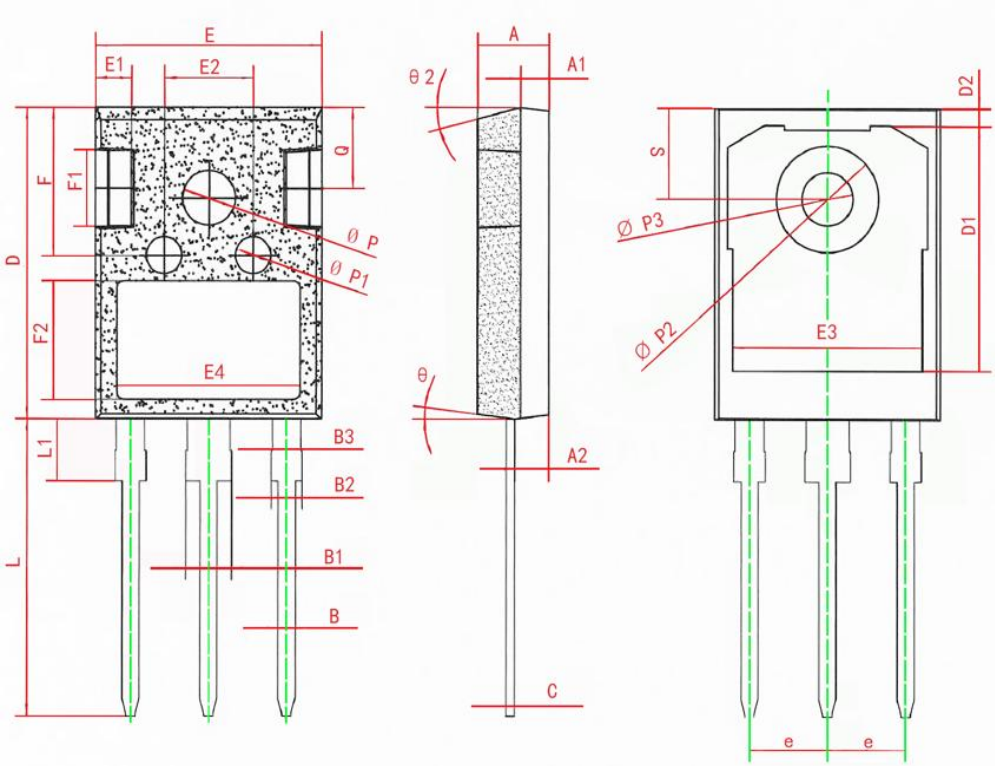
TO-247 Package information



Symbol	Dimensions in Millimeters(mm)		Dimensions In Inches	
	Min	Max	Min	Max
A	4.900	5.100	0.192	0.200
A1	1.900	2.100	0.074	0.082
A2	2.300	2.500	0.090	0.098
B	1.140	1.240	0.044	0.048
B1	3.050	3.250	0.120	0.127
B2	2.000	2.200	0.078	0.086
B3	1.900	2.100	0.074	0.082
C	0.550	0.650	0.021	0.025
D	20.800	21.200	0.818	0.834
D1	16.350	16.750	0.643	0.659
D2	1.020	1.320	0.040	0.051
E	15.600	16.000	0.614	0.629
E1	2.400	2.600	0.094	0.102
E2	6.100	6.300	0.240	0.248
E3	13.060	13.460	0.514	0.529
E4	12.700	12.900	0.500	0.507
F	9.800	10.200	0.385	0.401
F1	4.800	5.400	0.188	0.212
F2	7.900	8.100	0.311	0.318
e	5.436BSC		0.214BSC	
L	19.720	20.120	0.776	0.792
L1	3.900	4.300	0.153	0.169
ΦP	3.550	3.950	0.139	0.155
ΦP1	2.400	2.600	0.094	0.102
ΦP2	7.090	7.290	0.279	0.287
ΦP3	3.500	3.700	0.137	0.145
S	6.050	6.250	0.238	0.246
Q	5.400	5.600	0.212	0.220
θ	5°	9°	5°	9°
θ1	5°	9°	5°	9°
θ2	13°	17°	13°	17°

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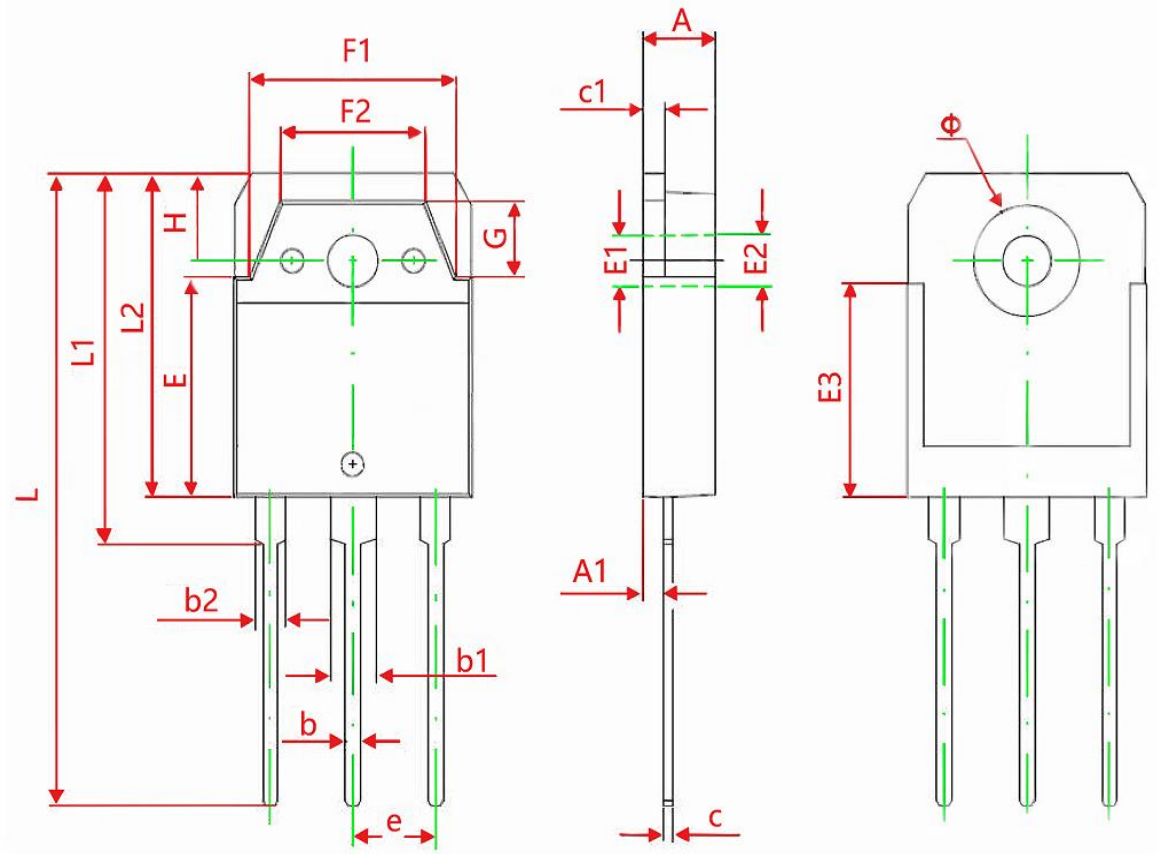
TO-3P Package information



Symbol	Dimensions in Millimeters(mm)		Dimensions In Inches	
	Min	Max	Min	Max
A	4.600	5.000	0.181	0.196
A1	2.300	2.500	0.090	0.098
b	0.800	1.200	0.031	0.047
b1	2.800	3.200	0.110	0.125
b2	1.800	2.200	0.070	0.086
c	0.500	0.700	0.019	0.027
c1	1.450	1.650	0.057	0.064
D	15.450	15.850	0.608	0.624
E	13.700	14.100	0.539	0.555
E1	3.200REF		0.126REF	
E2	3.300REF		0.130REF	
E3	13.450REF		0.530REF	
F1	13.200	13.400	0.519	0.527
F2	9.400	9.800	0.370	0.385
L	39.780	39.980	1.566	1.574
L1	23.200	23.600	0.913	0.929
L2	19.780	19.980	0.778	0.786
Φ	6.900	7.100	0.271	0.279
G	5.150	5.550	0.203	0.219
e	5.450TYP		0.215TYP	
H	5.000REF		0.197REF	
h	0.000	0.300	0.000	0.011

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