MLSM MICROELECTRONICS

MLS3416

20V/6.5A N-Channel MOSFET

Features

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

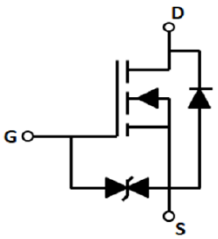
Product Summary

V_{DS}	$R_{DS(ON)}$ MAX	I_D MAX
20V	22mΩ@4.5V	6.5A
	26mΩ@2.5V	

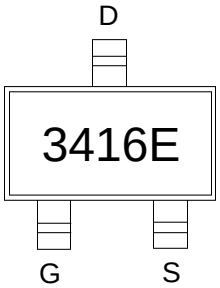
Application

- Load Switch
- PWM Application
- Power

SOT-23 top view



Schematic diagram



3416E: Device code

Marking and pin assignment

Pb-Free RoHS Halogen-Free

Absolute Maximum Ratings (TA=25℃unless otherwise noted)				
Symbol	**Parameter**		**Rating**	**Unit**
Common Ratings (TC=25°C Unless Otherwise Noted)				
V_{DS}	Drain-Source Breakdown Voltage		20	V
V_{GS}	Gate-Source Voltage		±12	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	6.5	A
Mounted on Large Heat Sink				
I_{DM}	Pulse Drain Current Tested	Tc=25°C	30	A
I_D	Continuous Drain Current	Tc=25°C	6.5	A
P_D	Maximum Power Dissipation	Tc=25°C	1.4	W
$R_{\theta JA}$	Thermal Resistance Junction-to-Ambient		125	°C/W

Ordering Information (Example)						
Type	**Package**	**Marking**	**Minimum Package(pcs)**	**Inner Box Quantity(pcs)**	**Outer Carton Quantity(pcs)**	**Delivery Mode**
MLS3416	SOT-23	3416E	3,000	45,000	180,000	7"reel

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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	20	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=20V，V_{GS}=0V	--	--	1	μA
I_{GSS}	Gate-Body Leakage Current	V_{GS}=±10V，V_{DS}=0V	--	--	±10	μA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}，I_D=250μA	0.4	0.7	1.1	V
$R_{DS(on)}$	Drain-Source On-State Resistance	V_{GS}=4.5V，I_D=6.5A	--	17	22	mΩ
		V_{GS}=2.5V，I_D=5.5A	--	20	26	mΩ
		V_{GS}=1.8V，I_D=5.0A	--	35	50	mΩ
Dynamic Electrical Characteristics @ TJ = 25°C (unless otherwise stated)						
C_{ISS}	Input Capacitance	V_{DS}=10V，V_{GS}=0V， f=1MHz	--	660	--	pF
C_{OSS}	Output Capacitance		--	160	--	pF
C_{RSS}	Reverse Transfer Capacitance		--	90	--	pF
Switching Characteristics						
Q_g	Total Gate Charge	V_{DS}=10V，I_D=6.5A，V_{GS}=4.5V	--	8	--	nC
Q_{gs}	Gate Source Charge		--	2.5	--	nC
Q_{gd}	Gate Drain Charge		--	3	--	nC
$t_{d(on)}$	Turn-on Delay Time	V_{DD}=10V，I_D=0.5A，V_{GS}=4.5V，R_G=10Ω	--	0.5	--	nS
t_r	Turn-on Rise Time		--	1	--	nS
$t_{d(off)}$	Turn-Off Delay Time		--	12	--	nS
t_f	Turn-Off Fall Time		--	4	--	nS
Source- Drain Diode Characteristics						
V_{SD}	Forward on voltage	Tj=25℃，Is=6.5A	--	--	1.2	V

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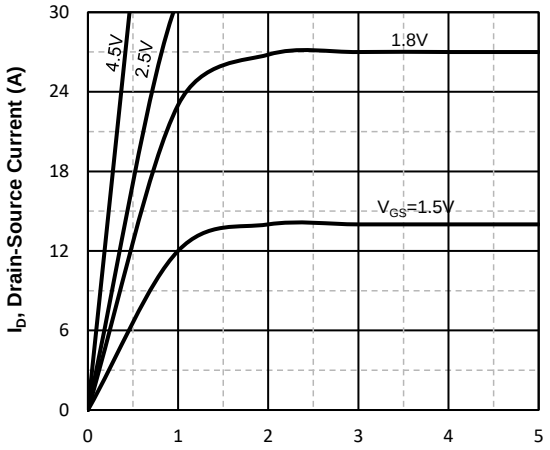
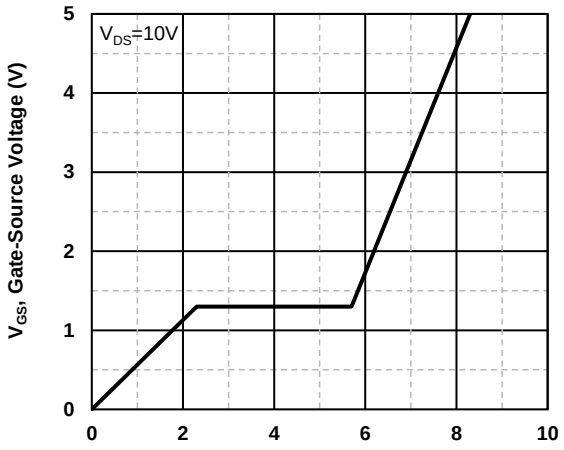
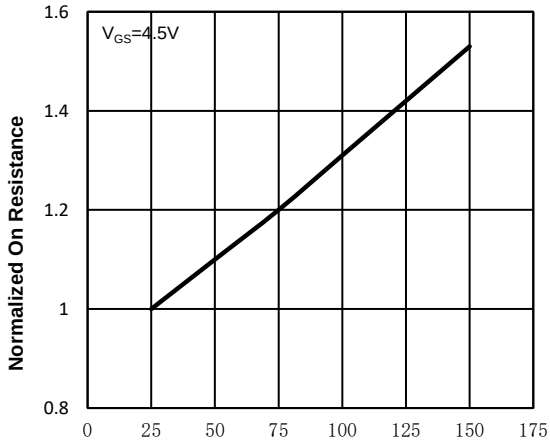
Typical Operating Characteristics



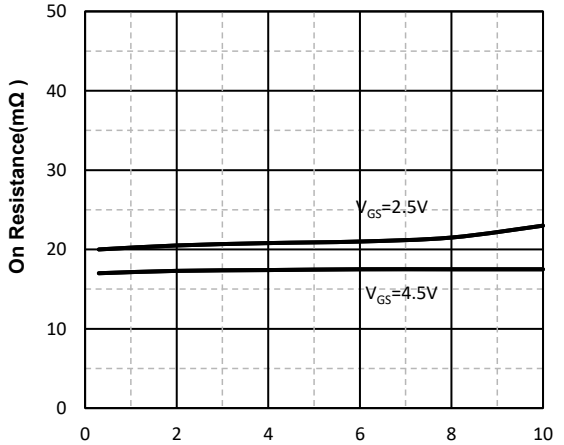
V_{DS}, Drain -Source Voltage (V)
Fig1. Typical Output Characteristics



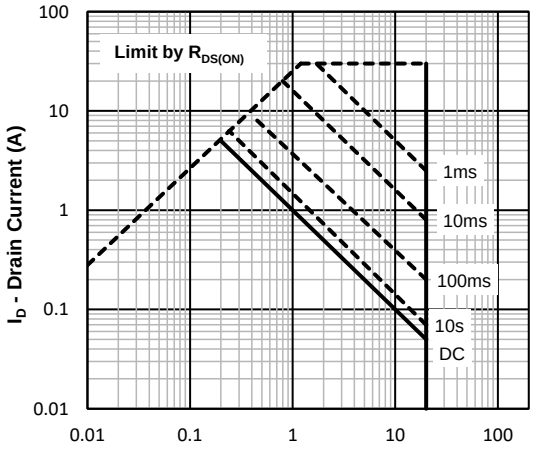
Qg -Total Gate Charge (nC)
Fig2. Typical Gate Charge Vs.Gate-Source Voltage



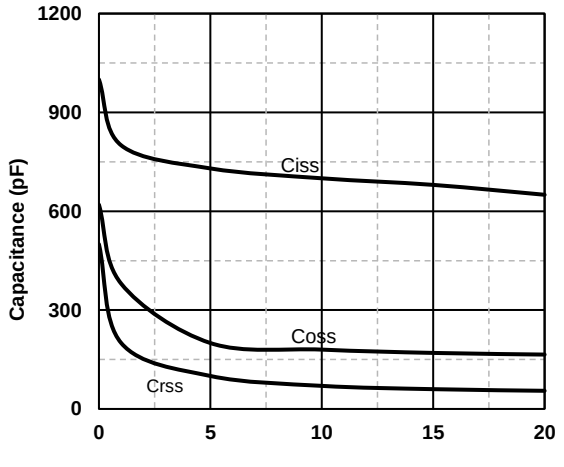
Tj - Junction Temperature (°C)
Fig3. Normalized On-Resistance Vs. Temperature



I_D, Drain-Source Current (A)
Fig4. On-Resistance Vs. Drain-Source Current



V_{DS}, Drain -Source Voltage (V)
Fig5. Maximum Safe Operating Area



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

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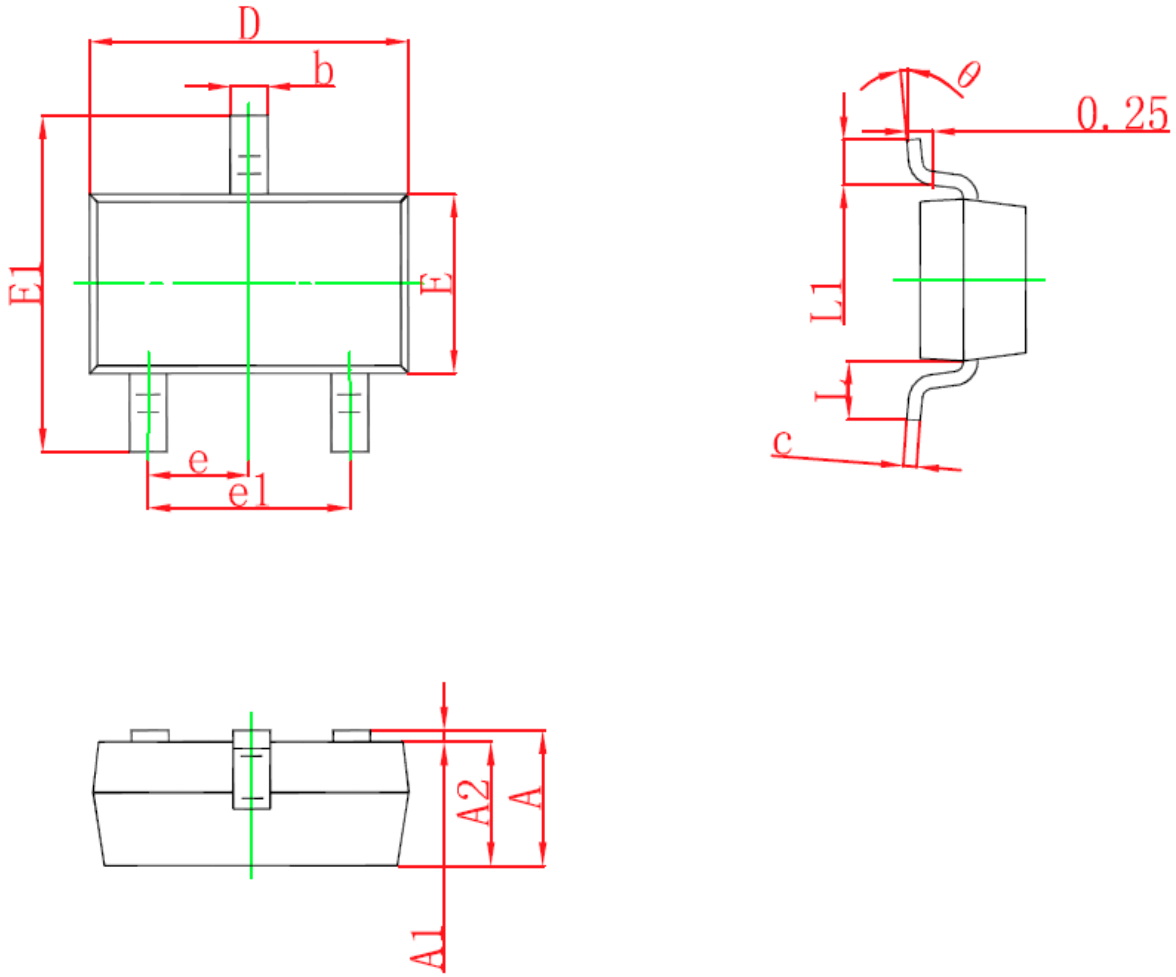
SOT-23 Package information



Symbol	Dimensions in Millimeters(mm)		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.150	0.035	0.045
A1	0.000	0.100	0.000	0.004
A2	0.900	1.050	0.035	0.041
b	0.300	0.500	0.012	0.020
c	0.080	0.150	0.003	0.006
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950TYP		0.037TYP	
e1	1.800	2.000	0.071	0.079
L	0.550REF		0.022REF	
L1	0.300	0.500	0.012	0.020
θ	0°	8°	0°	8°

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