

Features

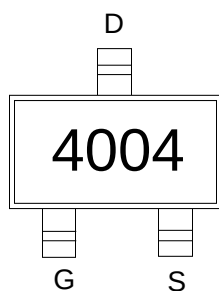
- Trench Power LV MOSFET technology
- High Density Cell Design for Low $R_{DS(ON)}$
- High Speed switching

Application

- CoBattery protection
- Load switch
- Power management

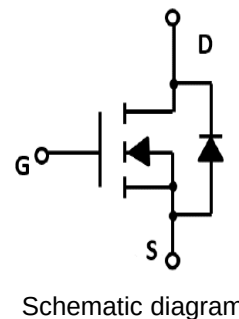
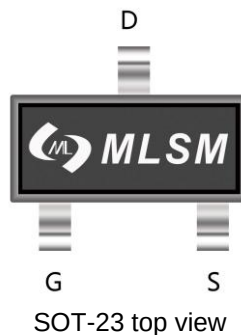
Product Summary

V_{DS}	$R_{DS(ON)}$ TYP	I_D
40V	52mΩ@10V	4A
	70mΩ@4.5V	



4004: Device code

Marking and pin assignment



Halogen-Free

Absolute Maximum Ratings (TA=25°C unless otherwise noted)

Symbol	Parameter	Rating	Unit
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Common Ratings (TC=25°C Unless Otherwise Noted)

V _{DS}	Drain-Source Breakdown Voltage		40	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	$T_C=25^\circ\text{C}$	16	A
I_D	Continuous Drain Current	$T_C=25^\circ\text{C}$	4	A
P_D	Maximum Power Dissipation	$T_C=25^\circ\text{C}$	0.3	W
$R_{\theta JA}$	Thermal Resistance Junction-Ambient		150	°C/W

Ordering Information (Example)

Type	Package	Marking	Minimum Package(pcs)	Inner Box Quantity(pcs)	Outer Carton Quantity(pcs)	Delivery Mode
MLS4004	SOT-23	4004	3,000	45,000	180,000	7" reel

Electrical Characteristics (T_J=25°C unless otherwise noted)

Symbol	Parameter	Condition	Min	Typ	Max	Unit
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Static Electrical Characteristics @ T_J = 25°C (unless otherwise stated)

B _{V(BR)DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250μA	40	--	--	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =40V, V _{GS} =0V	--	--	1.0	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 =2.5A	--	52	70	mΩ
		V _{GS} =4.5V, I _D =1.5A	--	70	95	mΩ

Dynamic Electrical Characteristics @ T_J = 25°C (unless otherwise stated)

C _{ISS}	Input Capacitance	V _{DS} =20V, V _{GS} =0V, f=1MHz	--	233	--	pF
C _{OSS}	Output Capacitance		--	26	--	pF
C _{RSS}	Reverse Transfer Capacitance		--	16	--	pF

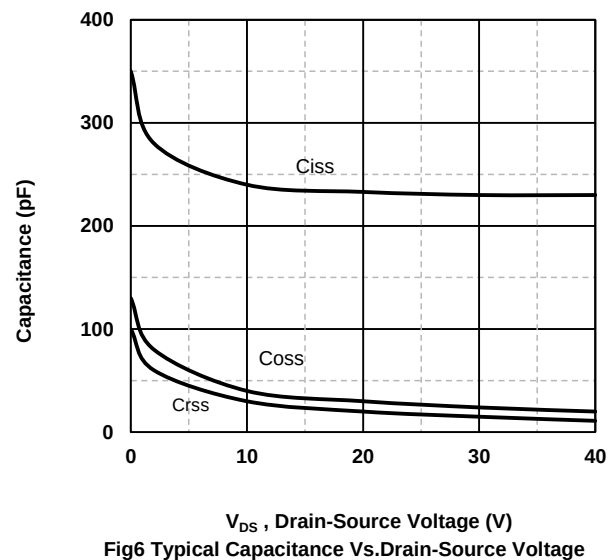
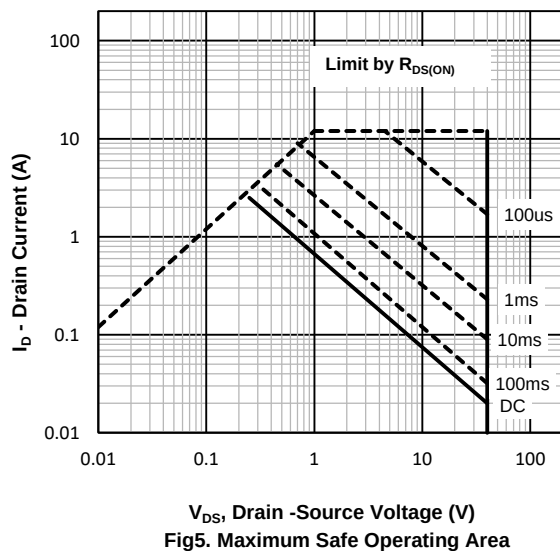
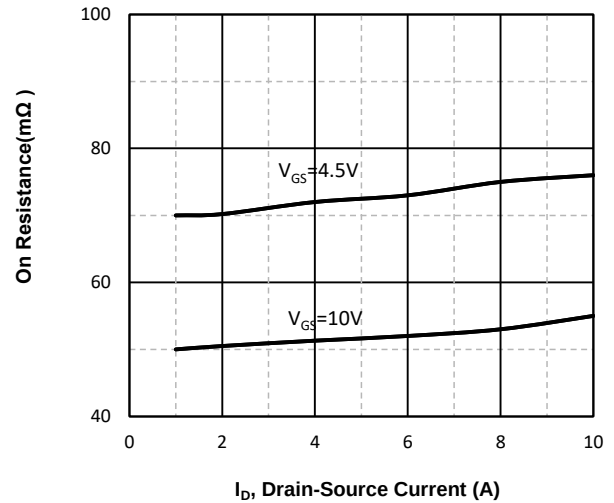
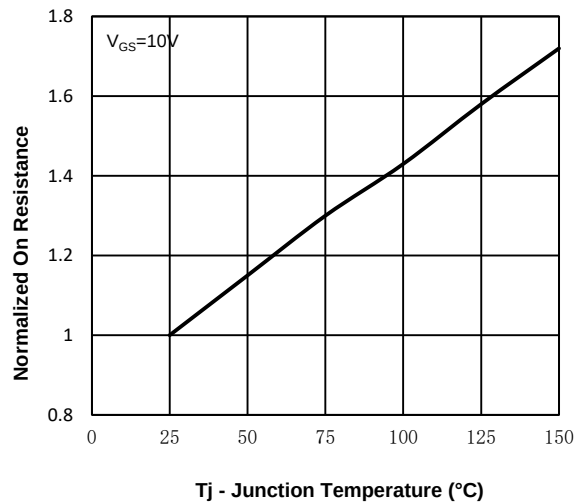
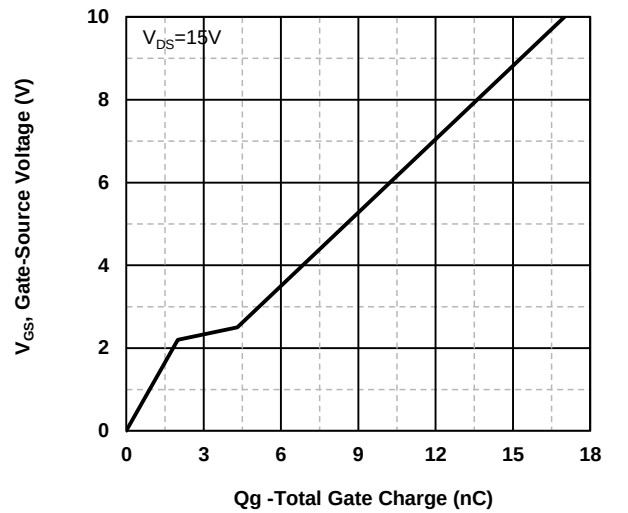
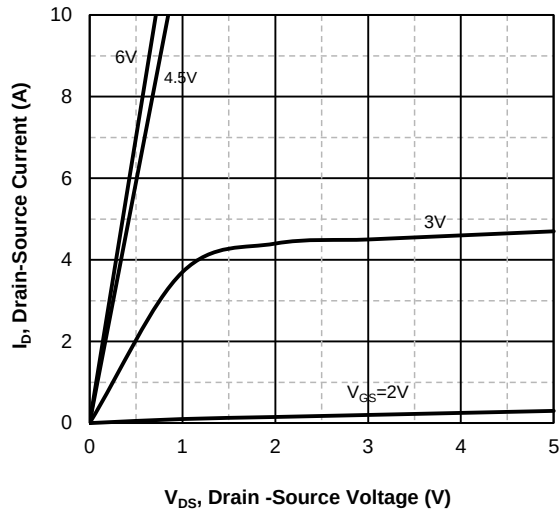
Switching Characteristics

Q _g	Total Gate Charge	V _{DS} =10V, I _D =3A, V _{GS} =24V	--	5.5	--	nC
Q _{gs}	Gate Source Charge		--	1.2	--	nC
Q _{gd}	Gate Drain Charge		--	0.9	--	nC
t _{d(on)}	Turn-on Delay Time	V _{DS} =24V, I _D =2A, V _{GS} =10V, R _G =3Ω	--	4.2	--	nS
t _r	Turn-on Rise Time		--	18.3	--	nS
t _{d(off)}	Turn-Off Delay Time		--	7.9	--	nS
t _f	Turn-Off Fall Time		--	18.8	--	nS

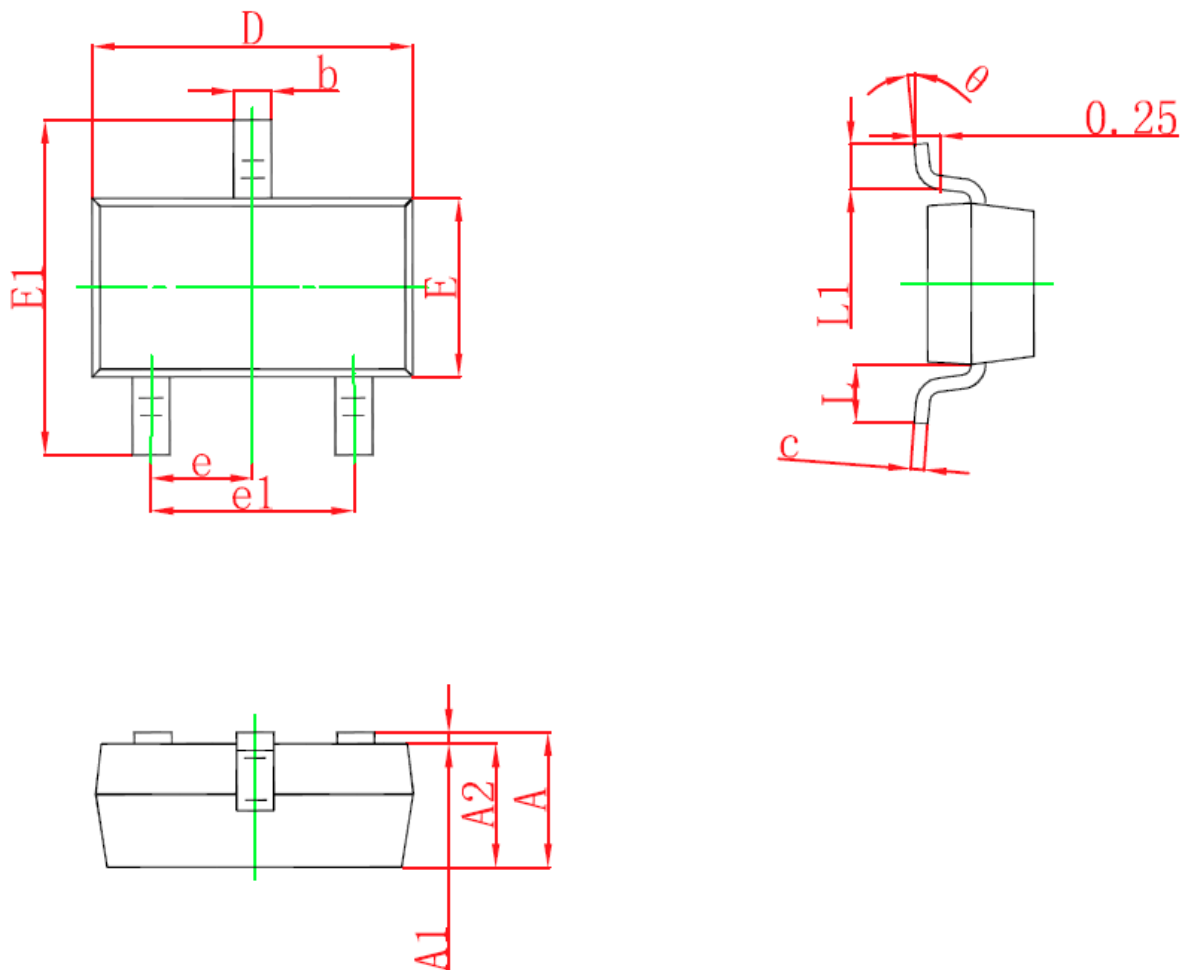
Source- Drain Diode Characteristics

V _{SD}	Forward on voltage	T _J =25°C, I _S =4A	--	--	1.2	V
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Typical Operating Characteristics



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
E1	2.250	2.550	0.088	0.100
E	1.200	1.400	0.047	0.055
e	0.950TYP		0.037TYP	
e1	1.800	2.000	0.071	0.079
L	0.550 REF		0.022 REF	
L1	0.300	0.500	0.012	0.020
θ	0°	8°	0°	8°