

**Features**

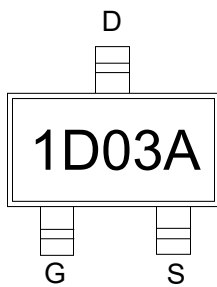
- Trench Power LV MOSFET technology
- High Density Cell Design for Low  $R_{DS(ON)}$
- High Speed switching

**Product Summary**

$V_{DS}$	$R_{DS(ON)}$ TYP	$I_D$
130V	220mΩ@10V	3A
	245mΩ@4.5V	

**Application**

- CoBattery protection
- Load switch
- Power management

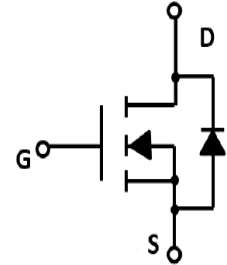


1D03A: Device code

Marking and pin assignment



SOT-23-3L top view



Schematic diagram



Pb-Free



RoHS



Halogen-Free

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

Symbol	Parameter	Rating	Unit
<b>Common Ratings (TC=25°C Unless Otherwise Noted)</b>			
$V_{DS}$	Drain-Source Breakdown Voltage	130	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	$T_c=25^\circ\text{C}$ 3	A
<b>Mounted on Large Heat Sink</b>			
$I_{DM}$	Pulse Drain Current Tested	$T_c=25^\circ\text{C}$ 12	A
$I_D$	Continuous Drain Current	$T_c=25^\circ\text{C}$ 3	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
MLSK1D03A	SOT-23-3L	1D03A	3,000	45,000	180,000	7" reel

Electrical Characteristics (T <sub>J</sub> =25°C unless otherwise noted)						
Symbol	Parameter	Condition	Min	Typ	Max	Unit
<b>Static Electrical Characteristics @ T<sub>J</sub> = 25°C (unless otherwise stated)</b>						
B <sub>V(BR)DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	130	--	--	V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> =100V, V <sub>GS</sub> =0V	--	--	1	μA
I <sub>GSS</sub>	Gate-Body Leakage Current	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V	--	--	±100	nA
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	1.0	1.8	2.5	V
R <sub>DS(on)</sub>	Drain-Source On-State Resistance	V <sub>GS</sub> =10V, I <sub>D</sub> =3A	--	220	270	mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =2A	--	245	300	mΩ
<b>Dynamic Electrical Characteristics @ T<sub>J</sub> = 25°C (unless otherwise stated)</b>						
C <sub>ISS</sub>	Input Capacitance	V <sub>DS</sub> =60V, V <sub>GS</sub> =0V, f=1MHz	--	123	--	pF
C <sub>OSS</sub>	Output Capacitance		--	18	--	pF
C <sub>RSS</sub>	Reverse Transfer Capacitance		--	4.5	--	pF
<b>Switching Characteristics</b>						
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =50V, I <sub>D</sub> =2A, V <sub>GS</sub> =10V	--	14	--	nC
Q <sub>gs</sub>	Gate Source Charge		--	4	--	nC
Q <sub>gd</sub>	Gate Drain Charge		--	1	--	nC
t <sub>d(on)</sub>	Turn-on Delay Time	V <sub>DS</sub> =50V, I <sub>D</sub> =2A, V <sub>GS</sub> =10V, R <sub>G</sub> =2Ω	--	13.7	--	nS
t <sub>r</sub>	Turn-on Rise Time		--	2.5	--	nS
t <sub>d(off)</sub>	Turn-Off Delay Time		--	10.1	--	nS
t <sub>f</sub>	Turn-Off Fall Time		--	1.2	--	nS
<b>Source- Drain Diode Characteristics</b>						
V <sub>SD</sub>	Forward on voltage	T <sub>J</sub> =25°C, I <sub>S</sub> =2A	--	--	1.3	V

**Typical Operating Characteristics**

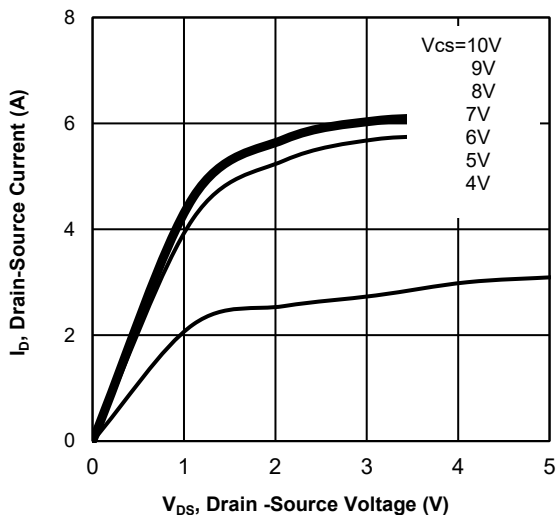


Fig1. Typical Output Characteristics

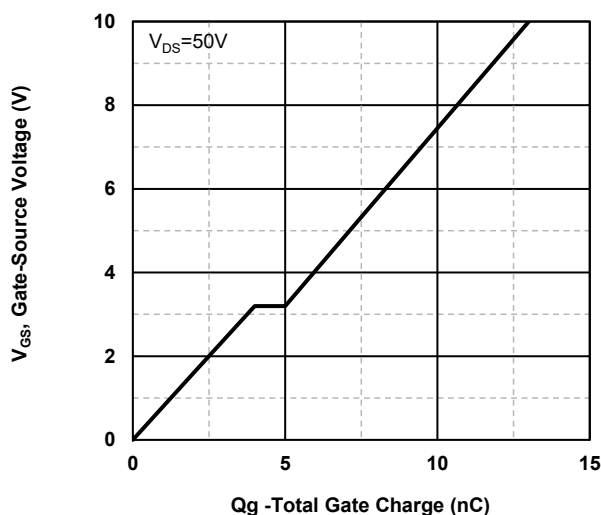


Fig2. Typical Gate Charge Vs. Gate-Source Voltage

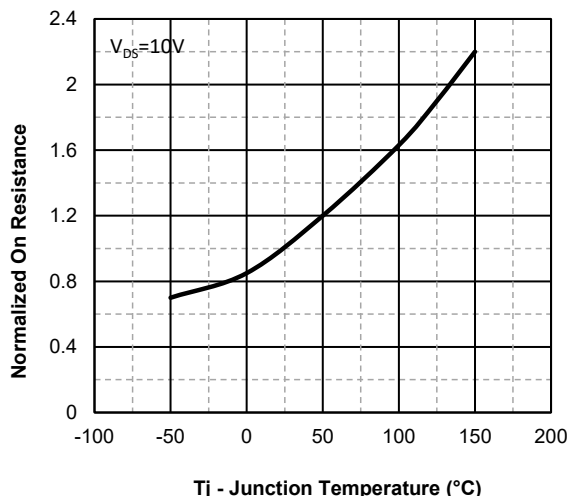


Fig3. Normalized On-Resistance Vs. Temperature

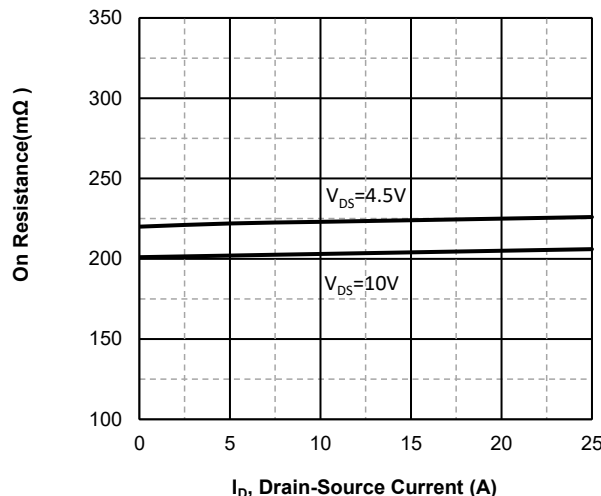


Fig4. On-Resistance Vs. Drain-Source Current

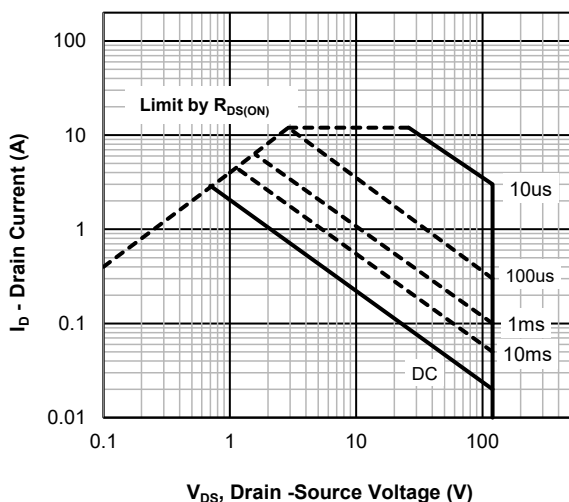


Fig5. Maximum Safe Operating Area

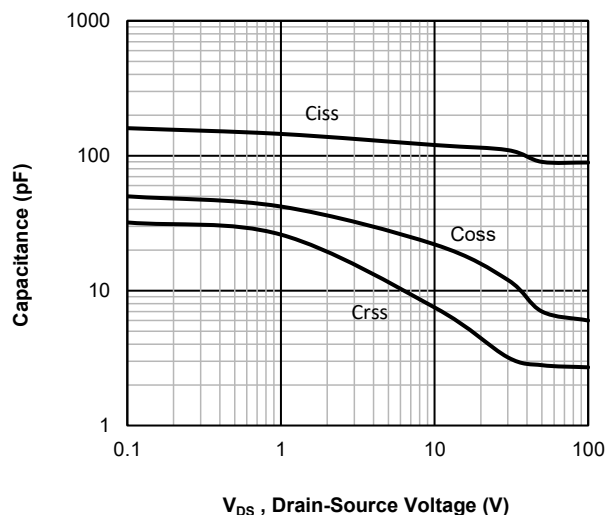
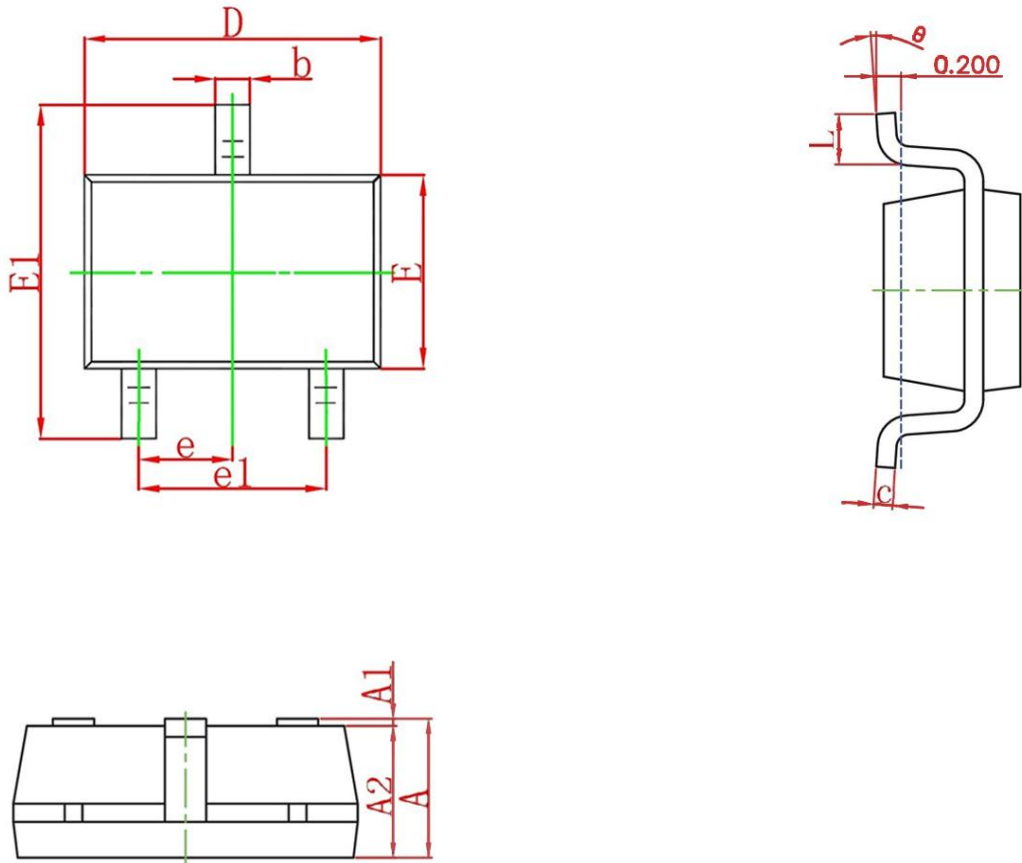


Fig6. Typical Capacitance Vs. Drain-Source Voltage

**SOT-23-3L Package information**


Symbol	Dimensions in Millimeters(mm)		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.042	0.050
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.042	0.046
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.112	0.120
E	1.500	1.700	0.060	0.068
E1	2.650	2.950	0.106	0.118
e	0.950TYP		0.037TYP	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°