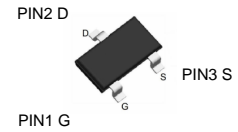
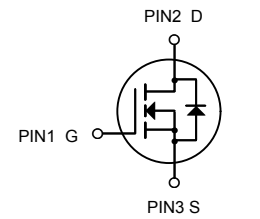


The 5N04 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a Battery protection or in other Switching application.


SOT23-3L


N-Channel MOSFET

General Features

 $V_{DS} = 40V$ $I_D = 5.0A$
 $R_{DS(ON)} < 37m\Omega @ V_{GS}=10V$

Application

Battery protection

Load switch

Uninterruptible power supply

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

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	40	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D@T_A=25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	5.0	A
$I_D@T_A=70^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	3.5	A
I_{DM}	Pulsed Drain Current ²	14	A
$P_D@T_A=25^\circ C$	Total Power Dissipation ³	1	W
T_{STG}	Storage Temperature Range	-55 to 150	°C
T_J	Operating Junction Temperature Range	-55 to 150	°C
$R_{\theta JA}$	Thermal Resistance Junction-ambient ¹	125	°C/W
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	80	°C/W

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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V , I _D =250uA	40	---	---	V
ΔBV _{DSS} /ΔT _J	BVDSS Temperature Coefficient	Reference to 25°C , I _D =1mA	---	0.032	---	V/°C
R _{DS(ON)}	Static Drain-Source On-Resistance ²	V _{GS} =10V , I _D =4A	---	30	37	mΩ
		V _{GS} =4.5V , I _D =3A	---	40	50	
V _{GS(th)}	Gate Threshold Voltage		1.0	1.5	2.5	V
ΔV _{GS(th)}	V _{GS(th)} Temperature Coefficient	V _{GS} =V _{DS} , I _D =250uA	---	-4.5	---	mV/°C
I _{DSS}	Drain-Source Leakage Current	V _{DS} =32V , V _{GS} =0V , T _J =25°C	---	---	1	uA
		V _{DS} =32V , V _{GS} =0V , T _J =55°C	---	---	5	
I _{GSS}	Gate-Source Leakage Current	V _{GS} =±20V , V _{DS} =0V	---	---	±100	nA
g _{fs}	Forward Transconductance	V _{DS} =5V , I _D =4A	---	8	---	S
R _g	Gate Resistance	V _{DS} =0V , V _{GS} =0V , f=1MHz	---	2.4	4.8	Ω
Q _g	Total Gate Charge (4.5V)		---	5	---	nC
Q _{gs}	Gate-Source Charge	V _{DS} =15V , V _{GS} =4.5V , I _D =3A	---	1.54	---	
Q _{gd}	Gate-Drain Charge		---	1.84	---	
T _{d(on)}	Turn-On Delay Time		---	7.8	---	ns
T _r	Rise Time	V _{DD} =15V , V _{GS} =10V , R _G =3.3	---	2.1	---	
T _{d(off)}	Turn-Off Delay Time	I _D =1A	---	29	---	
T _f	Fall Time		---	2.1	---	
C _{iss}	Input Capacitance		---	452	---	pF
C _{oss}	Output Capacitance	V _{DS} =15V , V _{GS} =0V , f=1MHz	---	51	---	
C _{rss}	Reverse Transfer Capacitance		---	38	---	
I _S	Continuous Source Current ^{1,4}	V _G =V _D =0V , Force Current	---	---	4.5	A
I _{SM}	Pulsed Source Current ^{2,4}		---	---	14	A
V _{SD}	Diode Forward Voltage ²	V _{GS} =0V , I _S =1A , T _J =25°C	---	---	1.2	V

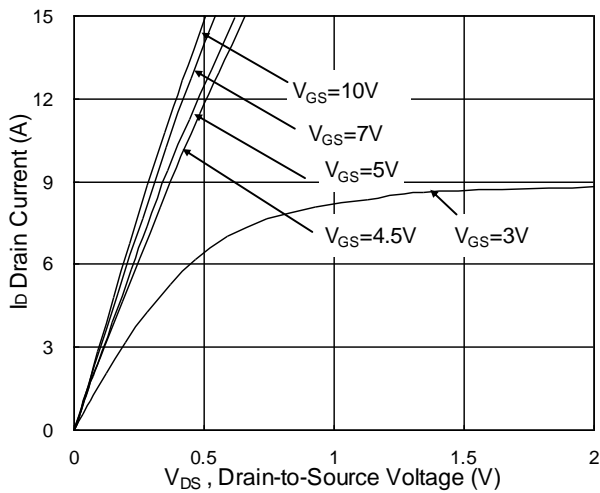
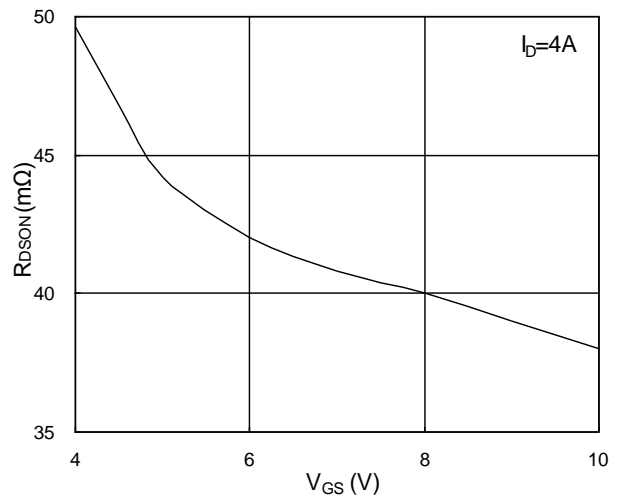
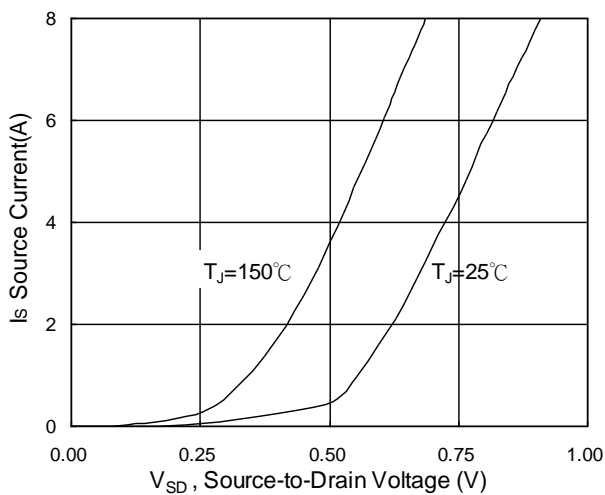
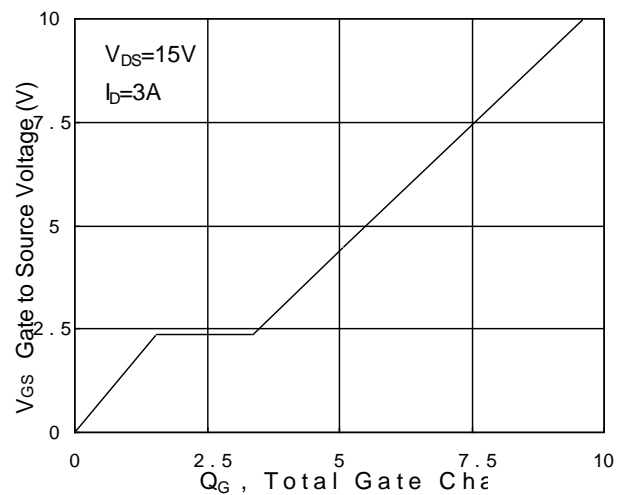
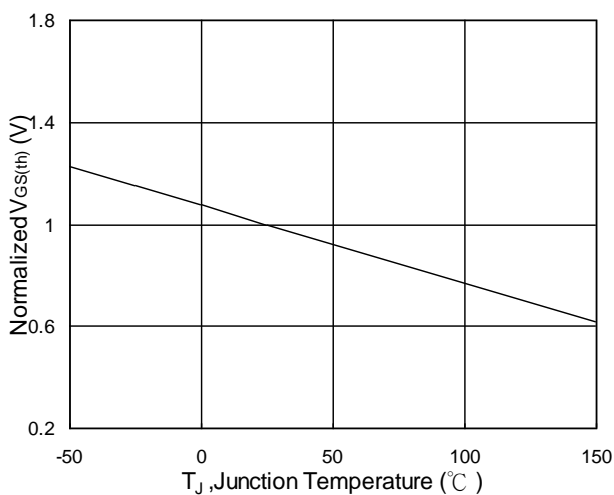
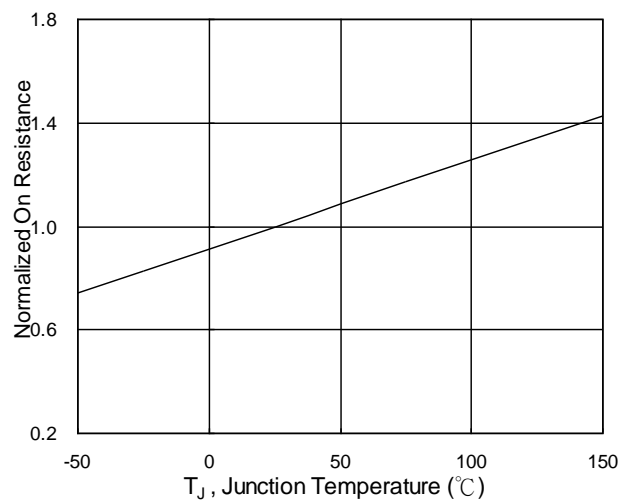
Note :

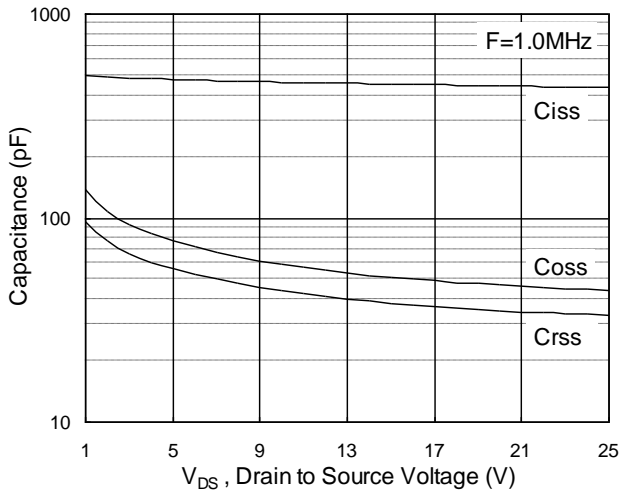
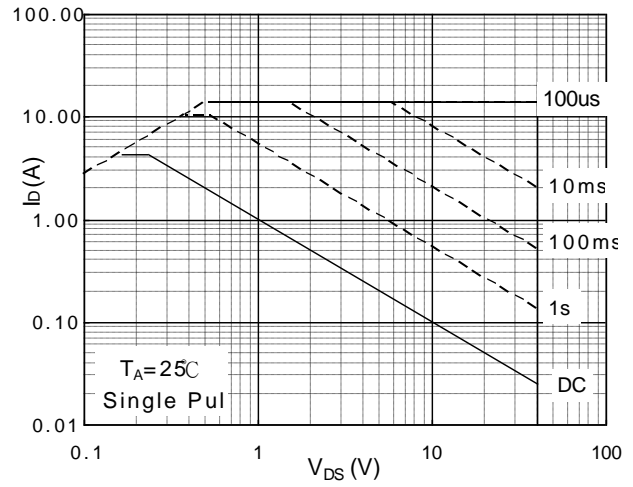
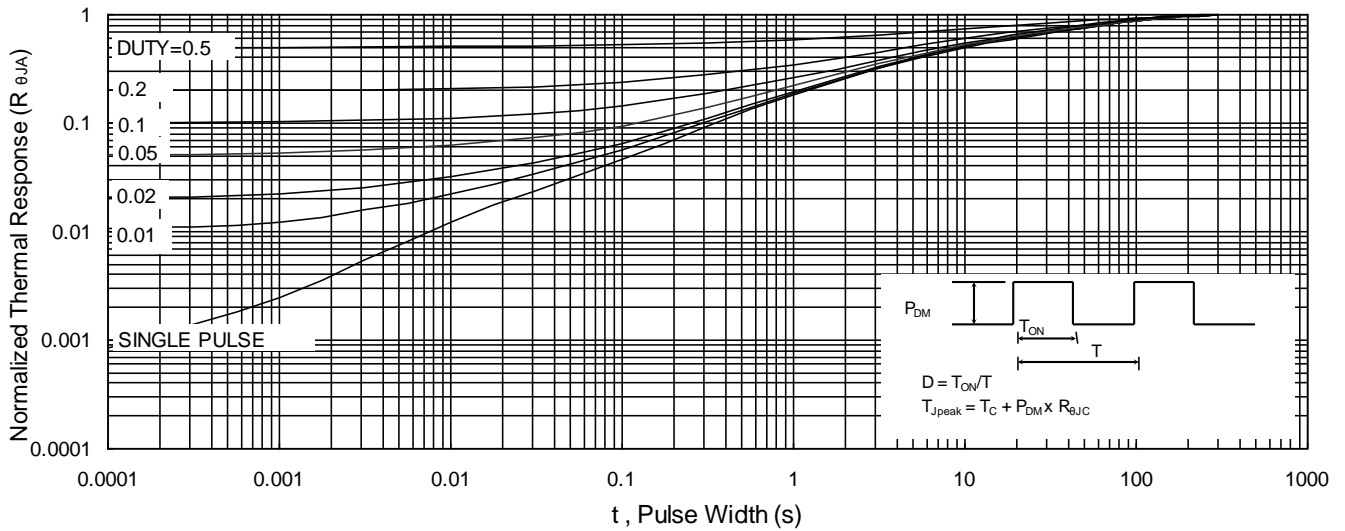
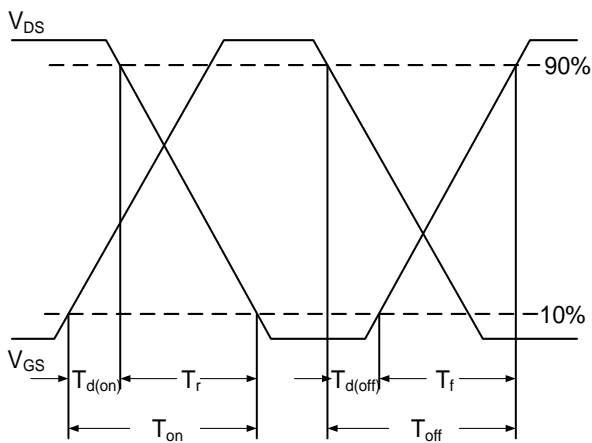
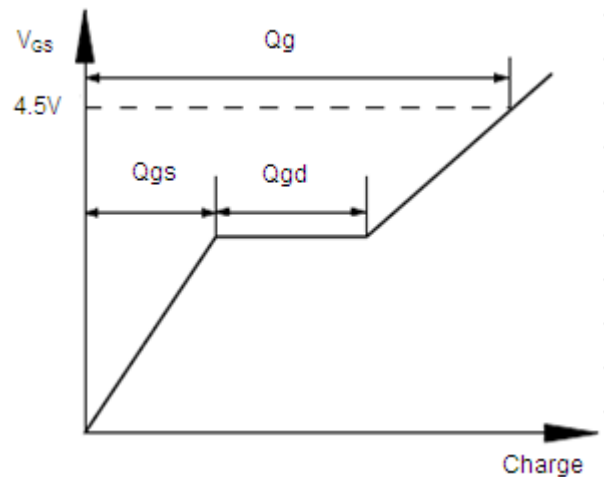
 1 .The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.

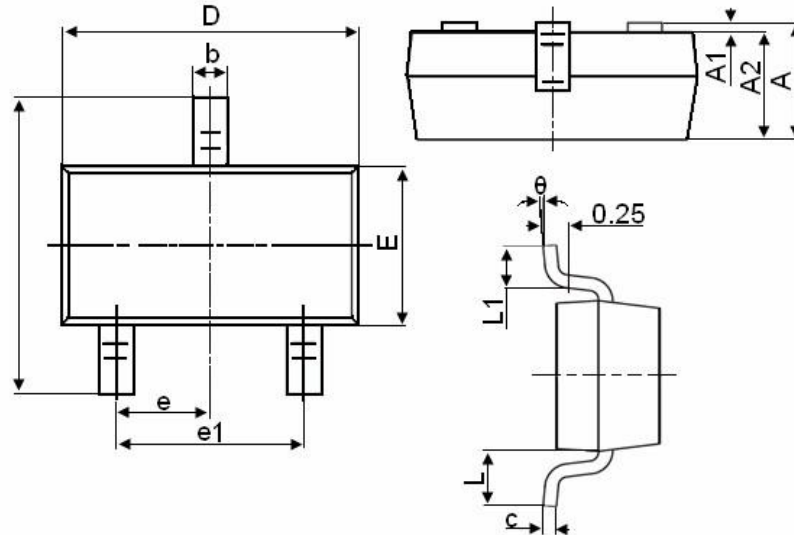
2.The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%

3 .The power dissipation is limited by 150°C junction temperature

 4.The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

Typical Characteristics

Fig.1 Typical Output Characteristics

Fig.2 On-Resistance vs. Gate-Source

Fig.3 Forward Characteristics Of Reverse

Fig.4 Gate-Charge Characteristics

Fig.5 Normalized V_{GS(th)} vs. T_J

Fig.6 Normalized R_{DS(on)} vs. T_J


Fig.7 Capacitance

Fig.8 Safe Operating Area

Fig.9 Normalized Maximum Transient Thermal Impedance

Fig.10 Switching Time Waveform

Fig.11 Gate Charge Waveform

SOT23-3L Package Information


Symbol	Dimensions in Millimeters	
	MIN.	MAX.
A	0.900	1.150
A1	0.000	0.100
A2	0.900	1.050
b	0.300	0.500
c	0.080	0.150
D	2.800	3.000
E	1.200	1.400
E1	2.250	2.550
e	0.950TYP	
e1	1.800	2.000
L	0.550REF	
L1	0.300	0.500
θ	0°	8°