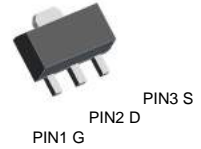


Description

The 6N03 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 2.5V. This device is suitable for use as a Battery protection or in other Switching application.

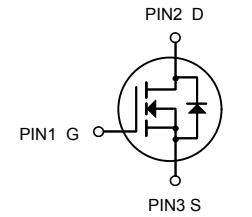


SOT89

General Features

$V_{DS} = 30V$ $I_D = 6A$

$R_{DS(ON)} < 28m\Omega$ @ $V_{GS} = 10V$



N-Channel MOSFET

Application

Battery protection

Load switch

Uninterruptible power supply

Absolute Maximum Ratings ($T_C = 25^\circ C$ unless otherwise noted)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	30	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D @ T_A = 25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	6	A
$I_D @ T_A = 70^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	4.7	A
I_{DM}	Pulsed Drain Current ²	30	A
$P_D @ T_A = 25^\circ C$	Total Power Dissipation ³	1.5	W
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ C$
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ C$
$R_{\theta JA}$	Thermal Resistance Junction-ambient ¹	85	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	30	$^\circ C/W$

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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V , I _D =250uA	30	---	---	V
ΔBV _{DSS} /ΔT _J	BVDSS Temperature Coefficient	Reference to 25°C , I _D =1mA	---	0.021	---	V/°C
R _{DS(ON)}	Static Drain-Source On-Resistance ²	V _{GS} =10V , I _D =5A	---	24	28	mΩ
		V _{GS} =4.5V , I _D =4A	---	34	40	
V _{GS(th)}	Gate Threshold Voltage		0.5	0.9	1.5	V
ΔV _{GS(th)}	V _{GS(th)} Temperature Coefficient	V _{GS} =V _{DS} , I _D =250uA	---	-5	---	mV/°C
I _{DSS}	Drain-Source Leakage Current	V _{DS} =24V , V _{GS} =0V , T _J =25°C	---	---	1	uA
		V _{DS} =24V , 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 =5A	---	7	---	S
R _g	Gate Resistance	V _{DS} =0V , V _{GS} =0V , f=1MHz	---	2.5	5	Ω
Q _g	Total Gate Charge (4.5V)		---	6	8.4	nC
Q _{gs}	Gate-Source Charge	V _{DS} =15V , V _{GS} =4.5V , I _D =5A	---	2.5	3.5	
Q _{gd}	Gate-Drain Charge		---	2.1	2.9	
T _{d(on)}	Turn-On Delay Time		---	2.4	4.8	ns
T _r	Rise Time	V _{DD} =15V , V _{GS} =10V , R _G =3.3	---	7.8	14	
T _{d(off)}	Turn-Off Delay Time	I _D =5A	---	22	44	
T _f	Fall Time		---	4	8	
C _{iss}	Input Capacitance		---	572	800	pF
C _{oss}	Output Capacitance	V _{DS} =15V , V _{GS} =0V , f=1MHz	---	81	112	
C _{rss}	Reverse Transfer Capacitance		---	65	91	
I _S	Continuous Source Current ^{1,4}		---	---	5.8	A
I _{SM}	Pulsed Source Current ^{2,4}	V _G =V _D =0V , Force Current	---	---	30	A
V _{SD}	Diode Forward Voltage ²	V _{GS} =0V , I _S =3A , T _J =25°C	---	---	1.2	V
t _{rr}	Reverse Recovery Time	I _F =5A , di/dt=100A/μs , T _J =25°C	---	19	---	nS
Q _{rr}	Reverse Recovery Charge		---	1.04	---	nC

Note :

- 1.The data tested by surface mounted on a 1 inch²FR-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

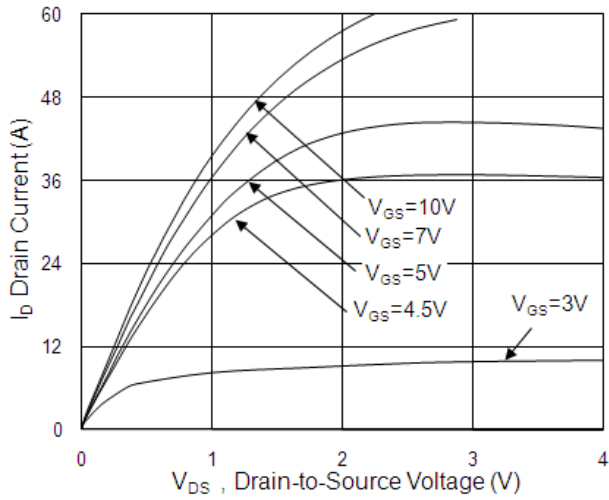


Fig.1 Typical Output Characteristics

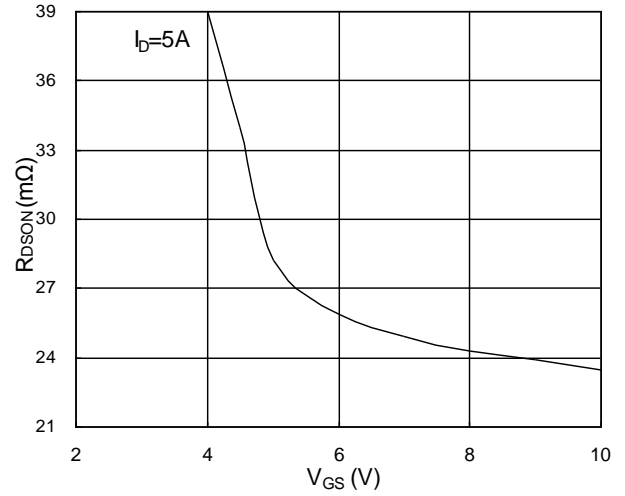


Fig.2 On-Resistance vs. G-S Voltage

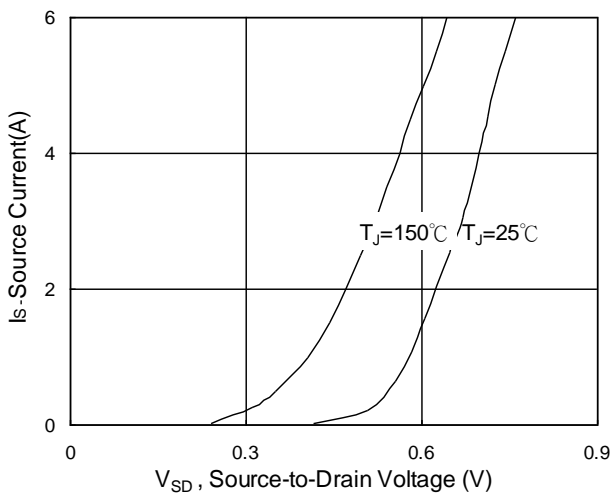


Fig.3 Forward Characteristics Of Reverse

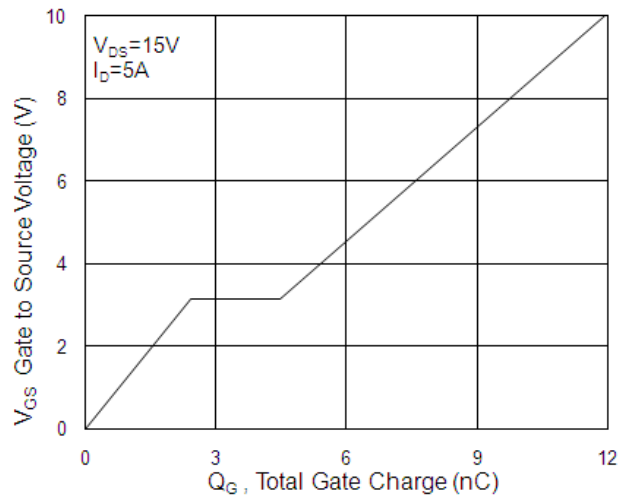


Fig.4 Gate-Charge Characteristics

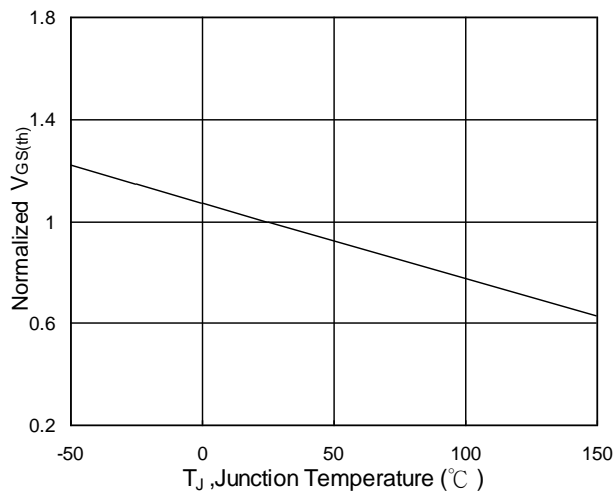


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

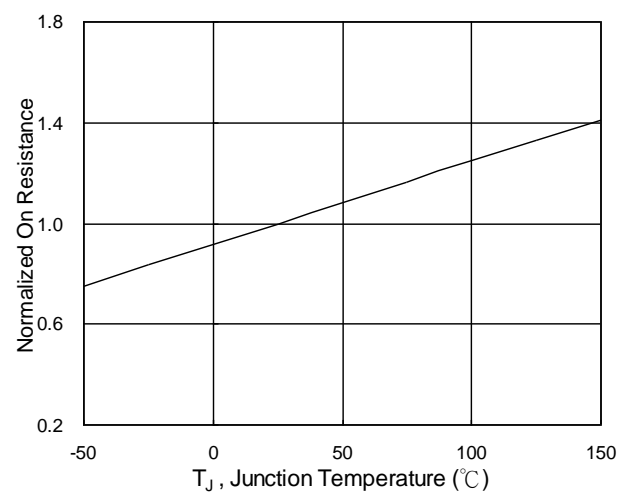


Fig.6 Normalized $R_{DS(on)}$ vs. T_J

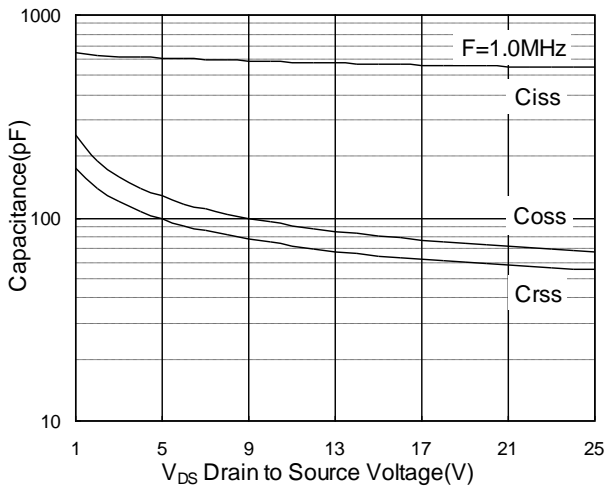


Fig.7 Capacitance

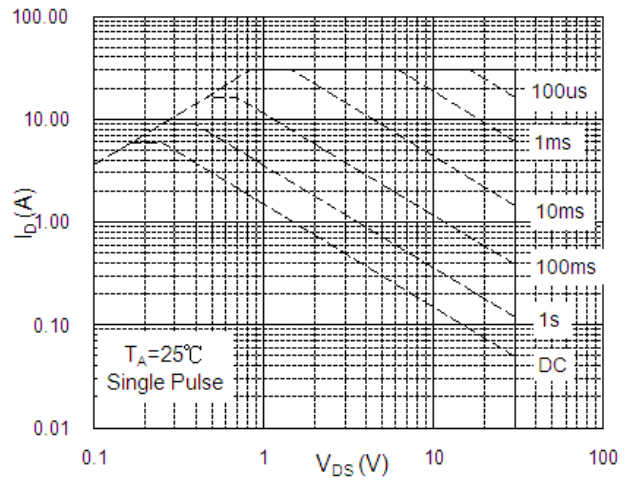


Fig.8 Safe Operating Area

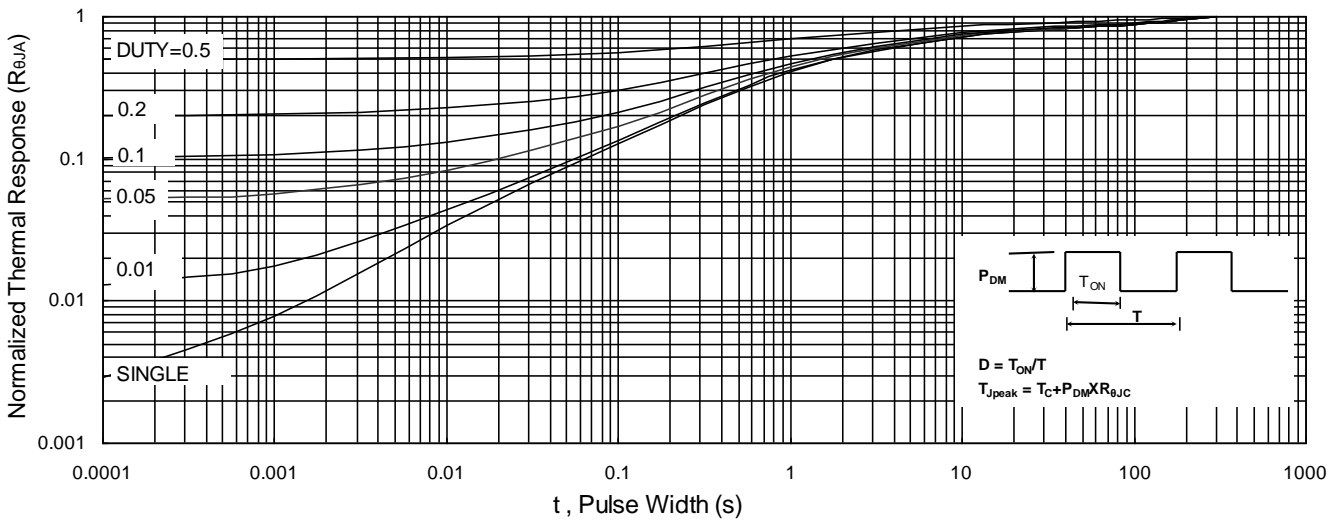


Fig.9 Normalized Maximum Transient Thermal Impedance

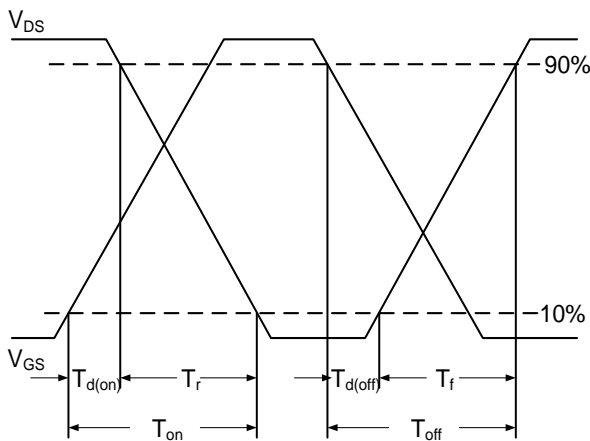


Fig.10 Switching Time Waveform

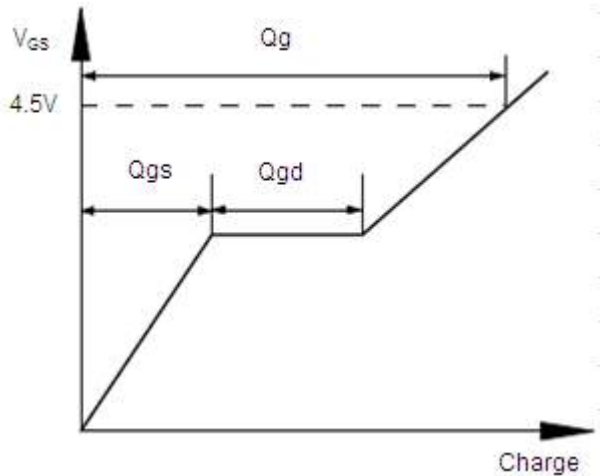
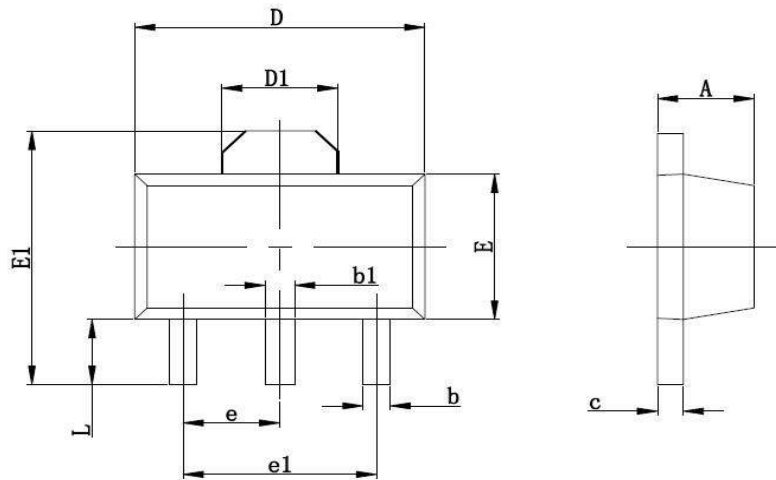


Fig.11 Gate Charge Waveform

SOT89-3L Package Outline Dimensions


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.400	1.600	0.055	0.063
b	0.350	0.520	0.013	0.197
b1	0.400	0.580	0.016	0.023
c	0.350	0.440	0.014	0.017
D	4.400	4.600	0.173	0.181
D1	1.550 REF		0.061 REF	
E	2.350	2.550	0.091	0.102
E1	3.940	4.250	0.155	0.167
e	1.500 TYP		0.060TYP	
e1	3.000 TYP		0.118TYP	
L	0.900	1.100	0.035	0.047