

Description

The SX40N03S 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.

General Features

$V_{DS} = 30V$ $I_D = 40A$

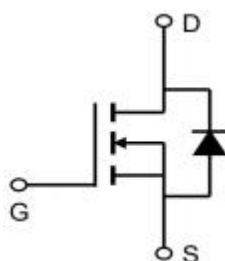
$R_{DS(ON)} < 9m\Omega$ @ $V_{GS}=10V$

Application

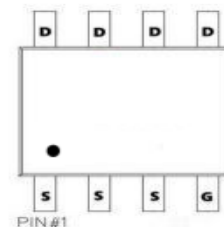
Battery protection

Load switch

Uninterruptible power supply



SOP-8



Absolute Maximum Ratings

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, $V_{GS} @ 10V^1$	40	A
$I_D @ T_A=70^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	8.2	A
I_{DM}	Pulsed Drain Current ²	82	A
EAS	Single Pulse Avalanche Energy ³	61	mJ
I_{AS}	Avalanche Current	35	A
$P_D @ T_A=25^\circ C$	Total Power Dissipation ⁴	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	36	$^\circ C/W$

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	---	0.027	---	V/°C
R _{DS(ON)}	Static Drain-Source On-Resistance ²	V _{GS} =10V , I _D =10A	---	7.5	9	mΩ
		V _{GS} =4.5V , I _D =8A	---	11	14	
V _{GS(th)}	Gate Threshold Voltage		1.2	1.5	2.5	V
ΔV _{GS(th)}	V _{GS(th)} Temperature Coefficient	V _{GS} =V _{DS} , I _D =250uA	---	-5.8	---	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 =10A	---	5.8	---	S
R _g	Gate Resistance	V _{DS} =0V , V _{GS} =0V , f=1MHz	---	2.2	3.8	
Q _g	Total Gate Charge (4.5V)	V _{DS} =15V , V _{GS} =4.5V , I _D =10A	---	12.6	17.6	nC
Q _{gs}	Gate-Source Charge		---	4.2	5.9	
Q _{gd}	Gate-Drain Charge		---	5.1	7.1	
T _{d(on)}	Turn-On Delay Time	V _{DD} =15V , V _{GS} =10V , R _G =3.3 I _D =10A	---	6.2	12.4	ns
T _r	Rise Time		---	59	106	
T _{d(off)}	Turn-Off Delay Time		---	27.6	55	
T _f	Fall Time		---	8.4	16.8	
C _{iss}	Input Capacitance	V _{DS} =15V , V _{GS} =0V , f=1MHz	---	1317	1845	pF
C _{oss}	Output Capacitance		---	163	228.2	
C _{rss}	Reverse Transfer Capacitance		---	131	183.4	
I _S	Continuous Source Current ^{1,5}	V _G =V _D =0V , Force Current	---	---	10.3	A
I _{SM}	Pulsed Source Current ^{2,5}		---	---	42	A
V _{SD}	Diode Forward Voltage ²	V _{GS} =0V , I _S =1A , T _J =25°C	---	---	1.2	V
t _{rr}	Reverse Recovery Time	I _F =10A , di/dt=100A/μs ,	---	12.5	---	nS
Q _{rr}	Reverse Recovery Charge	T _J =25°C	---	5	---	nC

Note :

1 .The data tested by surface mounted on a 1 inch² FR-4 board with 20Z copper.

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

3 .The EAS data shows Max. rating . The test condition is V_{DD}=25V,V_{GS}=10V,L=0.1mH,I_{AS}=35A

4.The power dissipation is limited by 150°Cjunction temperature 5.The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

Typical Characteristics

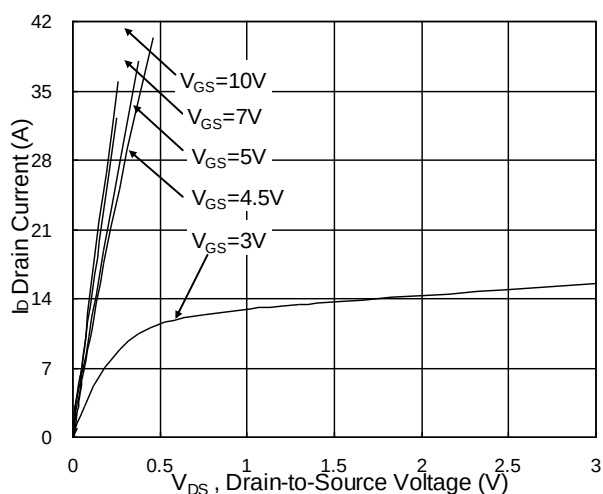


Fig.1 Typical Output Characteristics

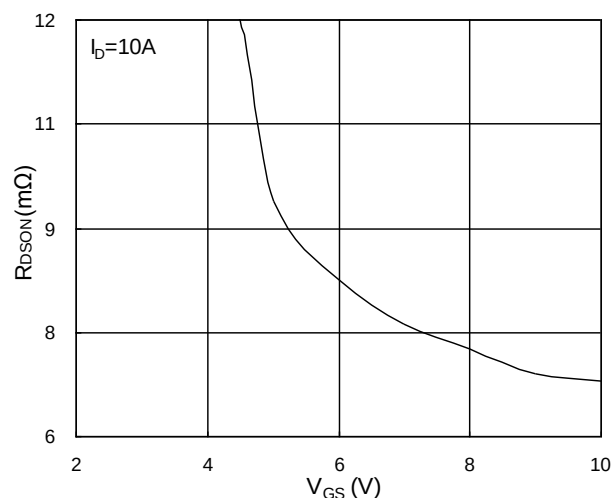


Fig.2 On-Resistance vs. Gate-Source

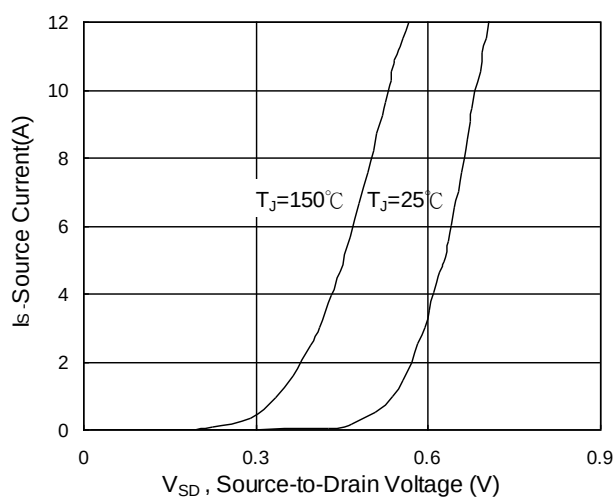


Fig.3 Forward Characteristics of reverse

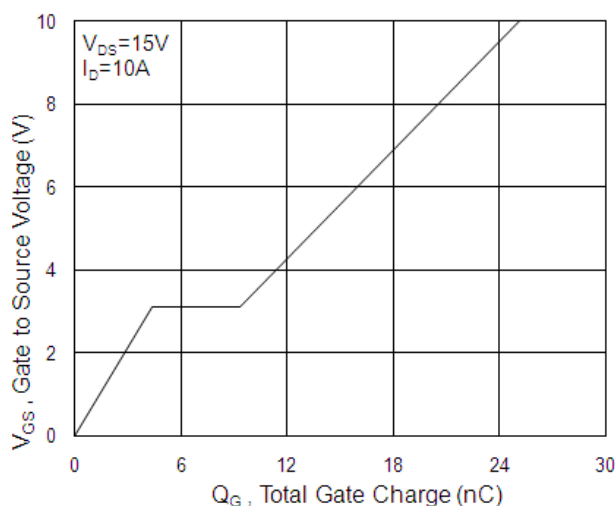


Fig.4 Gate-Charge Characteristics

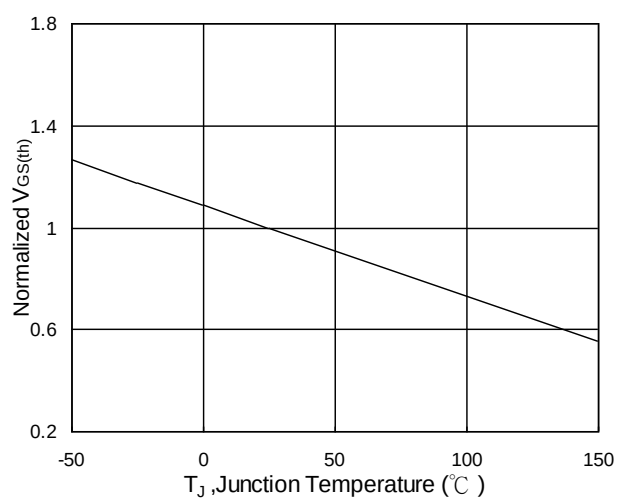


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

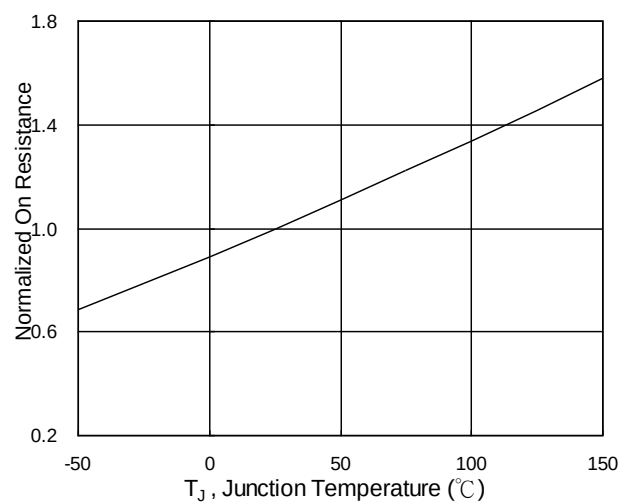
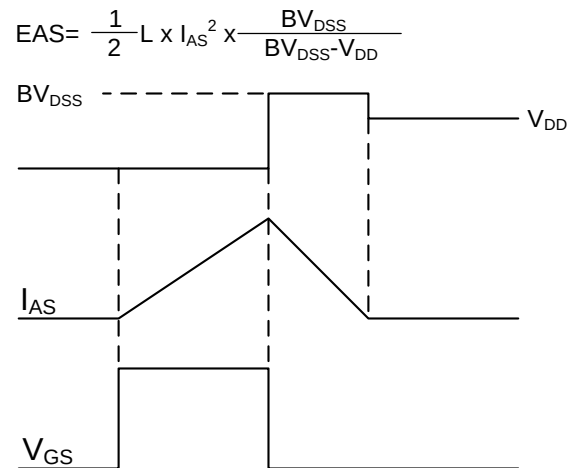
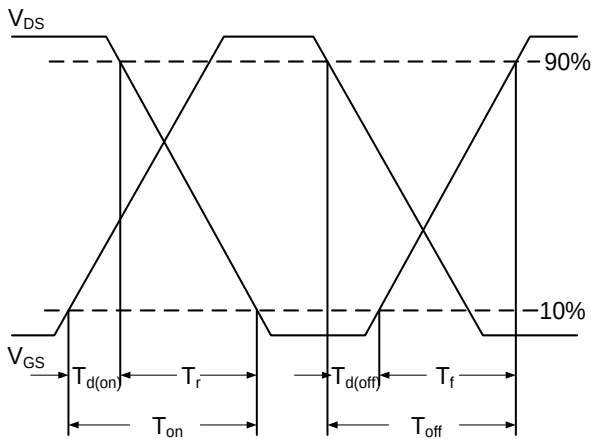
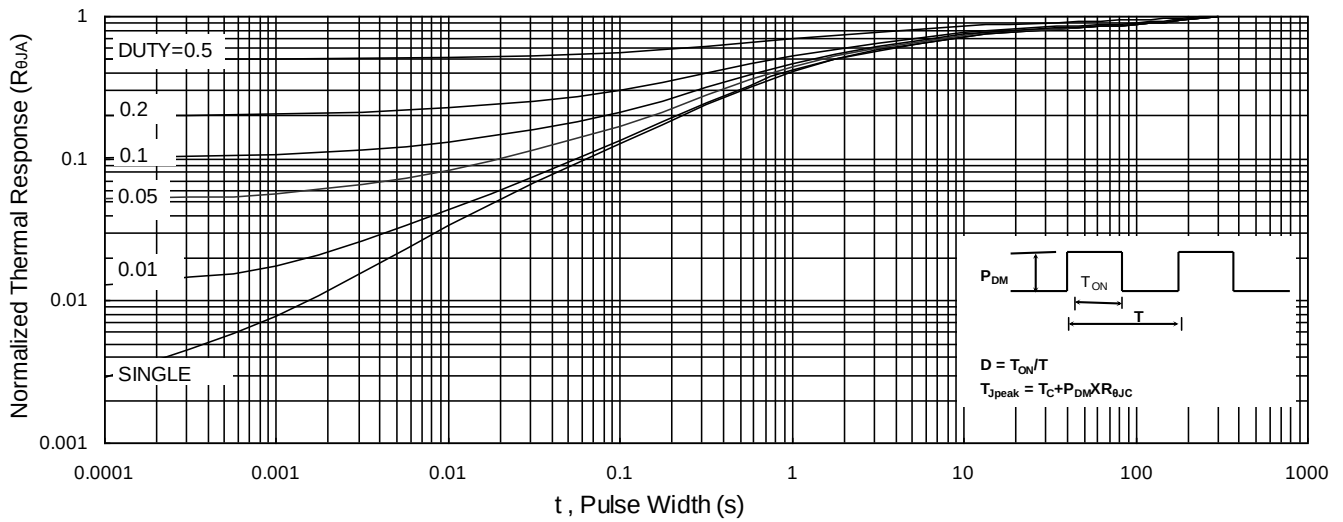
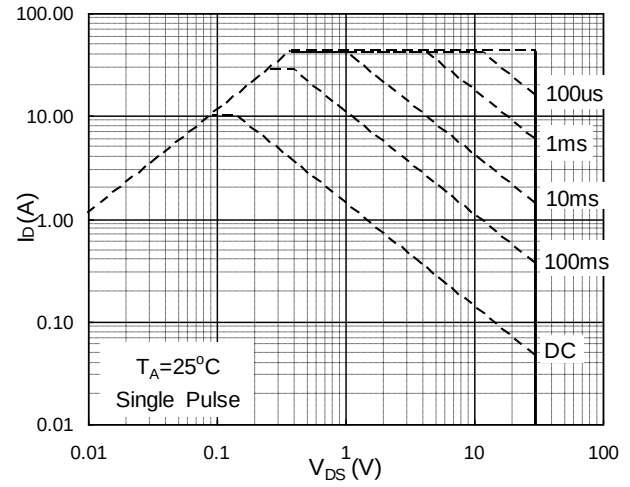
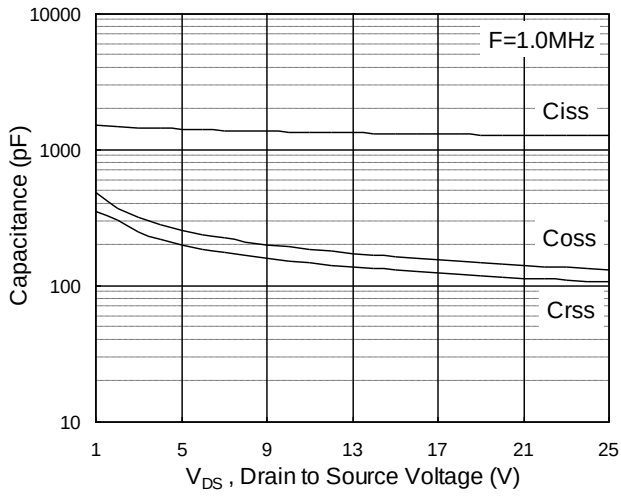
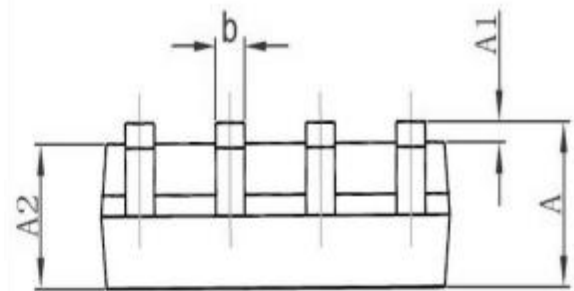
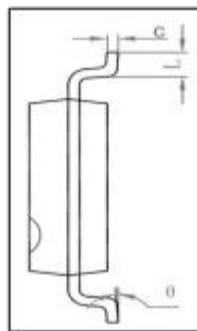
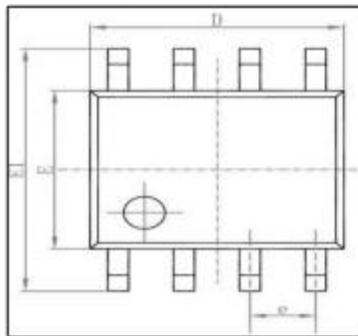


Fig.6 Normalized $R_{DS(on)}$ vs. T_J

Typical Characteristics



Package Mechanical Data-SOP-8



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270 (BSC)		0.050 (BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°

Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
TAPING	SOP-8		3000