

Description

The SX40P04D 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

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

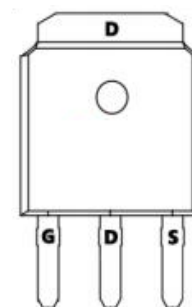
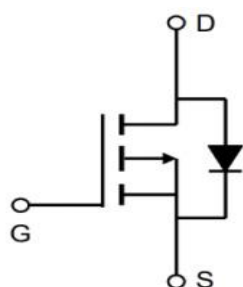
$R_{DS(ON)} < 18m\Omega$ @ $V_{GS} = -10V$

Application

Battery protection

Load switch

Uninterruptible power supply



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

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-40	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D @ T_C = 25^\circ C$	Continuous Drain Current, $V_{GS} @ -10V^1$	-40	A
$I_D @ T_C = 100^\circ C$	Continuous Drain Current, $V_{GS} @ -10V^1$	-23	A
IDM	Pulsed Drain Current ²	-120	A
EAS	Single Pulse Avalanche Energy ³	125	mJ
$P_D @ T_C = 25^\circ C$	Total Power Dissipation ⁴	25	W
$P_D @ T_A = 25^\circ C$	Total Power Dissipation ⁴	16	W
TSTG	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	62	°C/W
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	5	°C/W

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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BVDSS	Drain-Source Breakdown Voltage	V _{GS} =0V , I _D =-250uA	-40	-44	---	V
ΔBVDSS/ΔT _J	BV _{DSS} Temperature Coefficient	Reference to 25°C , I _D =-1mA	---	-0.023	---	V/°C
RDS(ON)	Static Drain-Source On-Resistance ²	V _{GS} =-10V , I _D =-30A	---	13	18	mΩ
		V _{GS} =-4.5V , I _D =-20A	---	16	25	
VGS(th)	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =-250uA	-1.0	-1.6	-2.5	V
ΔVGS(th)	VGS(th) Temperature Coefficient		---	4.74	---	mV/°C
IDSS	Drain-Source Leakage Current	V _{DS} =-40V , V _{GS} =0V , T _J =25°C	---	---	1	uA
		V _{DS} =-40V , V _{GS} =0V , T _J =55°C	---	---	5	
IGSS	Gate-Source Leakage Current	V _{GS} =±20V , V _{DS} =0V	---	---	±100	nA
Q _g	Total Gate Charge (-4.5V)	V _{DS} =-20V , V _{GS} =-4.5V , I _D =-12A	---	25	---	nC
Q _{gs}	Gate-Source Charge		---	11	---	
Q _{gd}	Gate-Drain Charge		---	9.5	---	
Td(on)	Turn-On Delay Time	VDD =-15V, RL=15Ω ID =-1A, VGEN =-10V, RG =6Ω	---	48	---	ns
T _r	Rise Time		---	24	---	
Td(off)	Turn-Off Delay Time		---	88	---	
T _f	Fall Time		---	9.6	---	
Ciss	Input Capacitance	V _{DS} =-20V , V _{GS} =0V , f=1MHz	---	2760	---	pF
Coss	Output Capacitance		---	260	---	
Crss	Reverse Transfer Capacitance		---	85	---	
IS	Continuous Source Current ^{1,5}	V _G =V _D =0V , Force Current	---	---	-40	A
ISM	Pulsed Source Current ^{2,5}		---	---	-90	A
VSD	Diode Forward Voltage ²	V _{GS} =0V , I _S =-1A , T _J =25°C	---	---	-1.3	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 EAS data shows Max. rating . The test condition is VDD=-32V,VGS=-10V,L=0.1mH,IAS=-30A
- 4、The power dissipation is limited by 150°C junction temperature
- 5、The data is theoretically the same as ID and IDM , in real applications , should be limited by total power dissipation.

Typical Characteristics

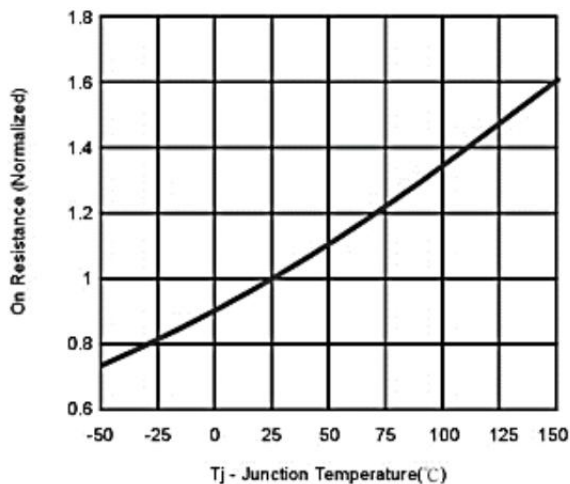


Fig.1 On Resistance Vs Junction Temperature

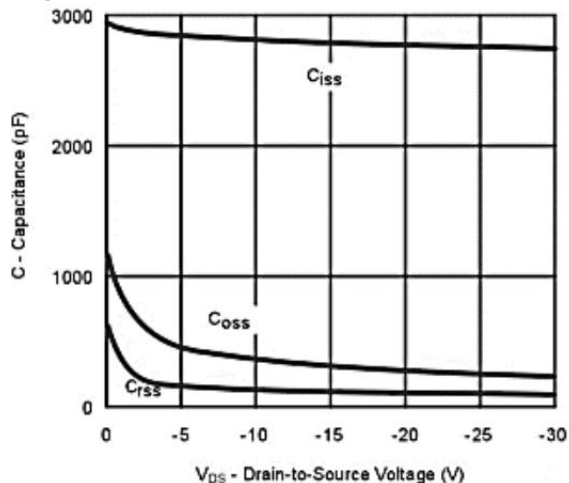


Fig.3 Capacitance

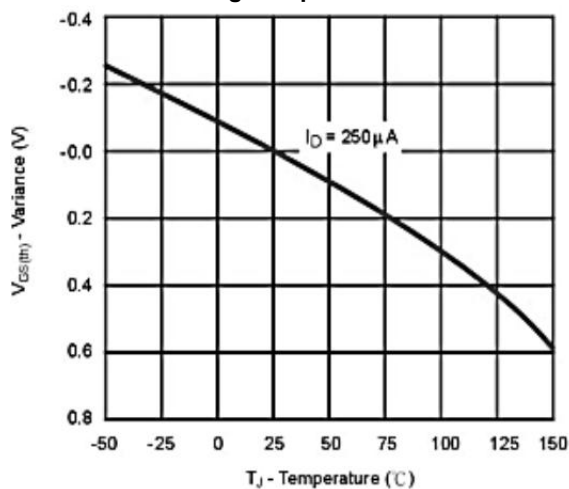


Fig.5 Threshold Voltage

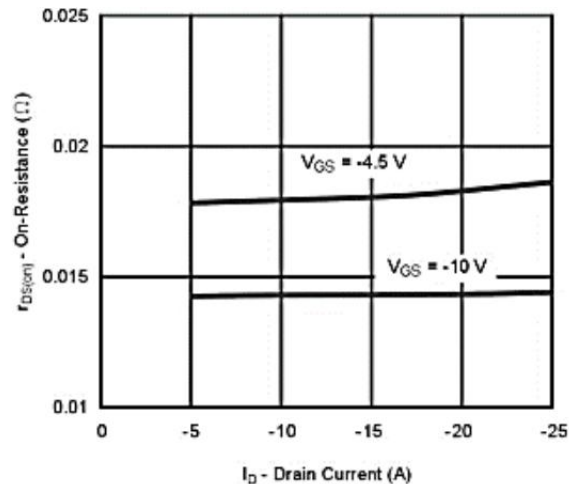


Fig.2 On-Resistance Vs. Drain Current

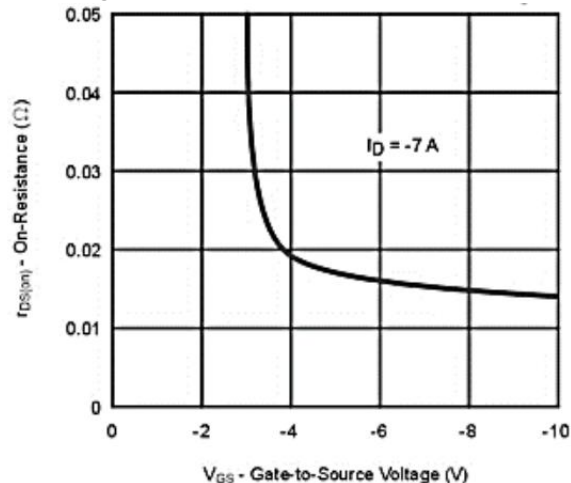


Fig.4 On-Resistance Vs. Gate-to-Source Voltage

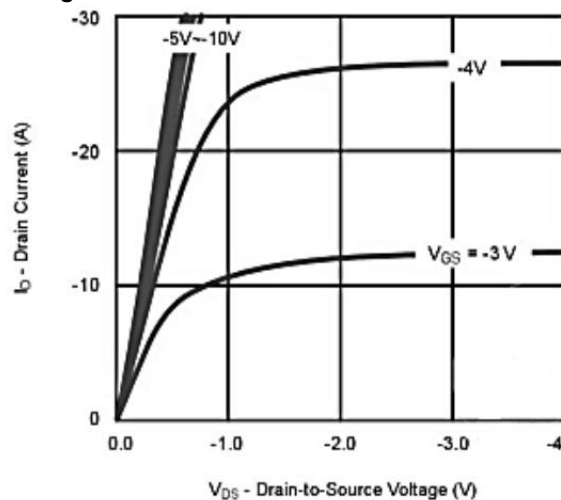
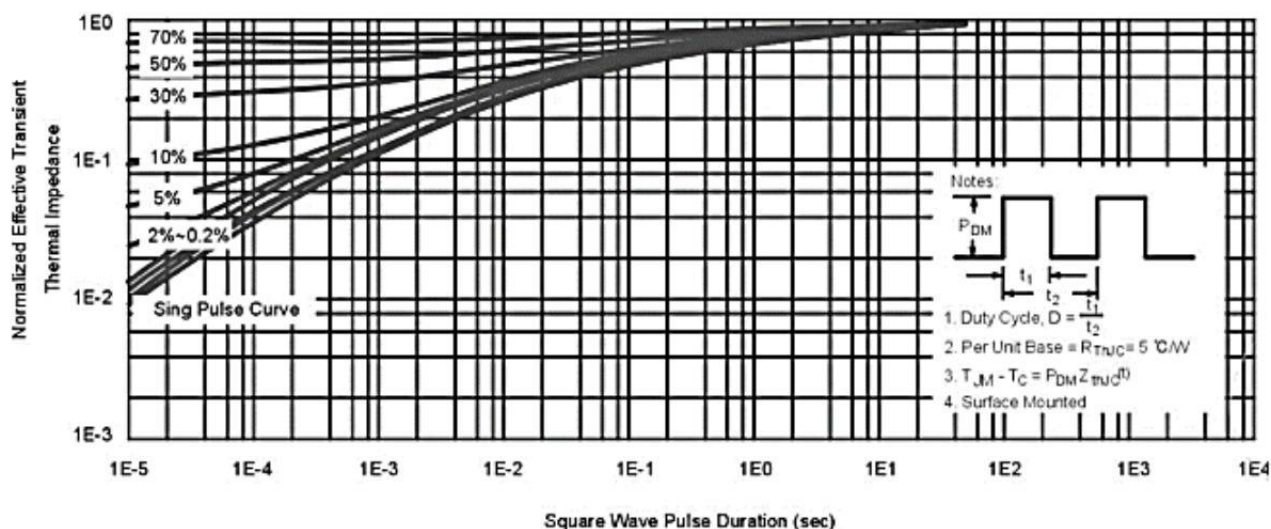
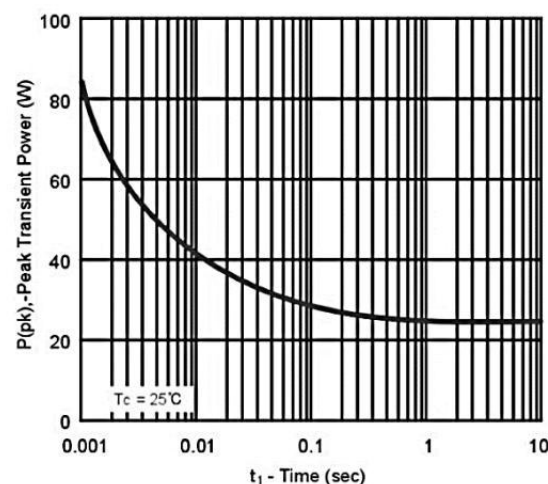
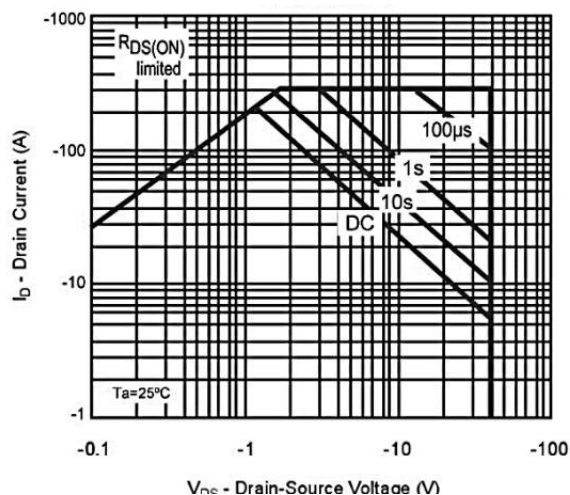
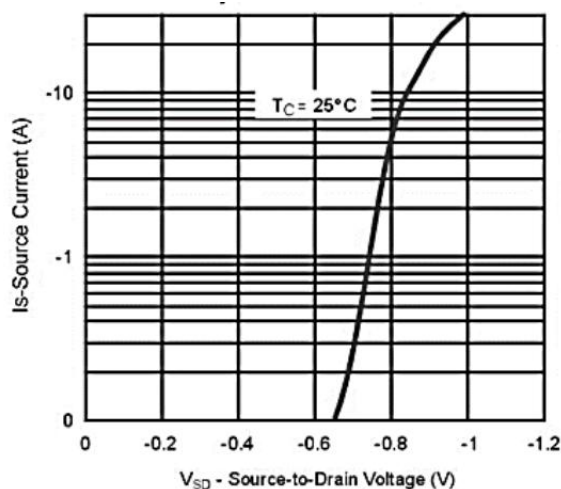
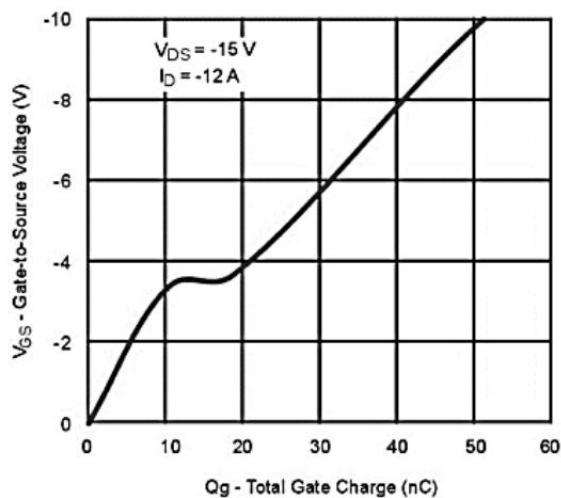
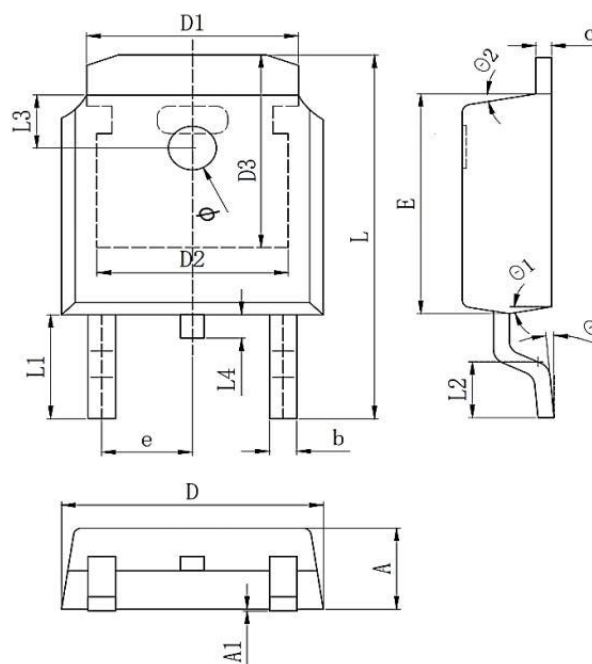


Fig.6 On-Region Characteristics

Typical Characteristics



Package Mechanical Data:TO-252-3L



Symbol	Dim in mm		
	Min	Typ	Max
A	2.1	2.3	2.5
A1	0	0.064	0.128
b	0.64	0.75	0.86
c	0.45	0.52	0.6
D	6.4	6.6	6.8
D1	5.33REF		
D2	4.83REF		
D3	5.25REF		
E	5.9	6.1	6.3
e	2.286TYP		
L	9.8	10.1	10.4
L1	2.888REF		
L2	1.4	1.5	1.7
L3	1.65REF		
L4	0.6	0.8	1
φ	1.1	1.2	1.3
θ	0°		10°
θ1	5°		10°
θ2	5°		10°

Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
TAPING	TO-252-3L		2500