

Description

The SX60P02D 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.

General Features

$V_{DS} = -20V$ $I_D = -65A$

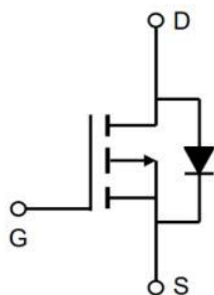
$R_{DS(ON)} < 8.5m\Omega$ @ $V_{GS}=4.5V$

Application

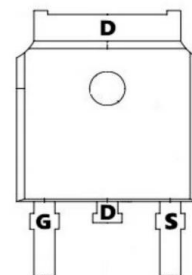
Battery protection

Load switch

Uninterruptible power supply



TO-252-3L



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

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-20	V
V_{GS}	Gate-Source Voltage	± 12	V
$I_D @ T_c=25^\circ C$	Continuous Drain Current, V_{GS} @ -4.5V ¹	-65	A
$I_D @ T_c=70^\circ C$	Continuous Drain Current, V_{GS} @ -4.5V ¹	-38	A
I_{DM}	Pulsed Drain Current ²	-25	A
$P_D @ T_c=25^\circ C$	Total Power Dissipation ³	75	W
$P_D @ T_c=70^\circ C$	Total Power Dissipation ³	55	W
TSTG	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	62.5	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	2.0	$^\circ C/W$

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

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V(BR)DSS	Drain-Source Breakdown Voltage	V _{GS} = 0V, I _D = -250μA	-20	-22	-	V
IGSS	Gate-body Leakage current	V _{DS} = 0V, V _{GS} = ±10V	-	-	±100	nA
IDSS	Zero Gate Voltage Drain Current T _J =25°C	V _{DS} = -20V, V _{GS} = 0V	-	-	-1	μA
	Zero Gate Voltage Drain Current T _J =100°C		-	-	-100	
VGS(th)	Gate-Threshold Voltage	V _{DS} = V _{GS} , I _D = -250μA	-0.5	0.7	-1.2	V
RDS(on)	Drain-Source on-Resistance ⁴	V _{GS} = -4.5V, I _D = -20A	-	6.8	8.5	mΩ
		V _{GS} = -2.5V, I _D = -15A	-	7.5	9.0	
gfs	Forward Transconductance ⁴	V _{DS} = -5V, I _D = -15A	-	78	-	S
Ciss	Input Capacitance	V _{DS} = -10V, V _{GS} = 0V, f = 1MHz	-	3560	-	pF
Coss	Output Capacitance		-	500	-	
Crss	Reverse Transfer Capacitance		-	430	-	
R _g	Gate Resistance	f = 1MHz	-	11	-	Ω
Q _g	Total Gate Charge	V _{GS} = -4.5V, V _{DS} = -10V, I _D = -15A	-	43	-	nC
Q _{gs}	Gate-Source Charge		-	7.9	-	
Q _{gd}	Gate-Drain Charge		-	11.2	-	
td(on)	Turn-on Delay Time	V _{GS} = -4.5V, V _{DD} = -10V, R _G = 3Ω, I _D = -15A,	-	14.5	-	ns
t _r	Rise Time		-	20.2	-	
td(off)	Turn-off Delay Time		-	93	-	
t _f	Fall Time		-	161	-	
t _{rr}	Body Diode Reverse Recovery Time	I _F = -15A, dI _F /dt = 100A/μs	-	28	-	ns
Q _{rr}	Body Diode Reverse Recovery Charge		-	25.7	-	nC
VSD	Diode Forward Voltage ⁴	I _S = -1A, V _{GS} = 0V	-	-	-1.2	V
IS	Continuous Source Current	T _C = 25°C	-	-	-65	A

Note :

- 1、The data tested by surface mounted on a 1 inch 2 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 EAS data shows Max. rating . The test condition is VDD=-16V,VGS=-10V,L=0.1mH,IAS=12A
- 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

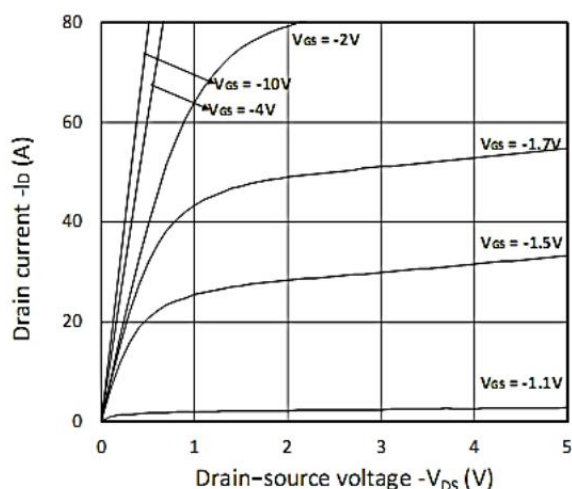


Figure 1. Output Characteristics

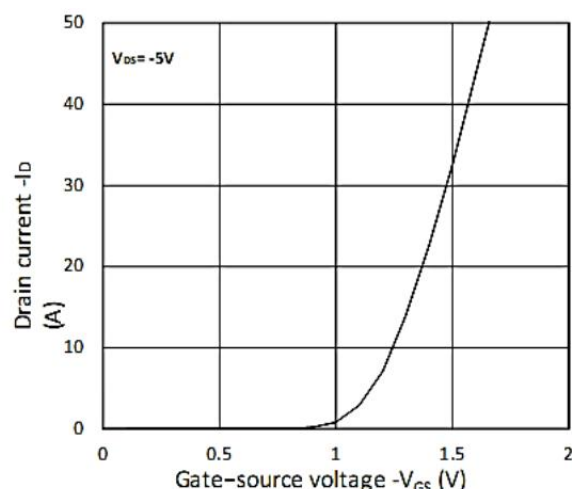


Figure 2. Transfer Characteristics

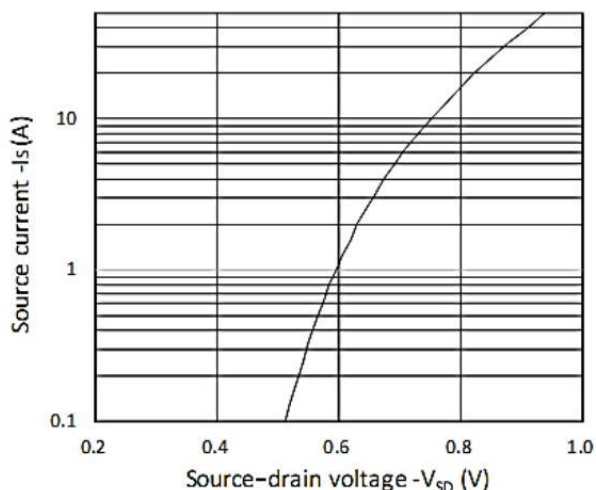


Figure 3. Forward Characteristics of Reverse

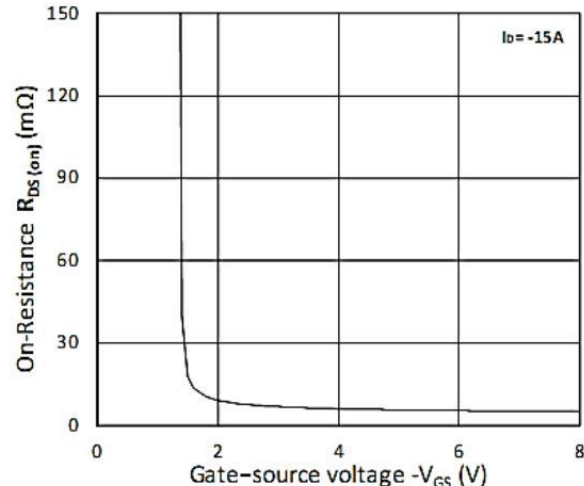


Figure 4. R_DS(ON) vs. V_GS

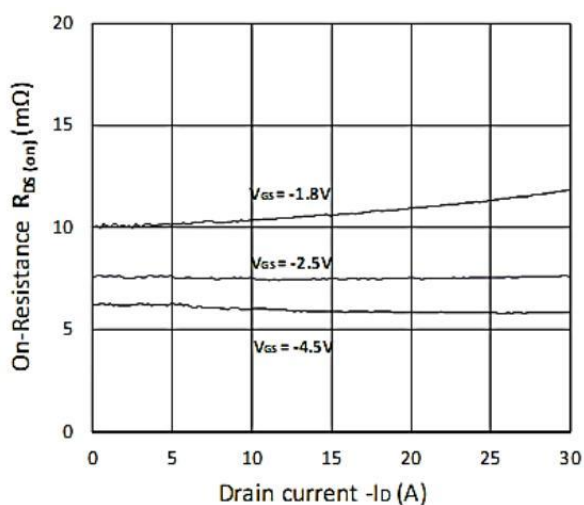


Figure 5. R_DS(ON) vs. I_D

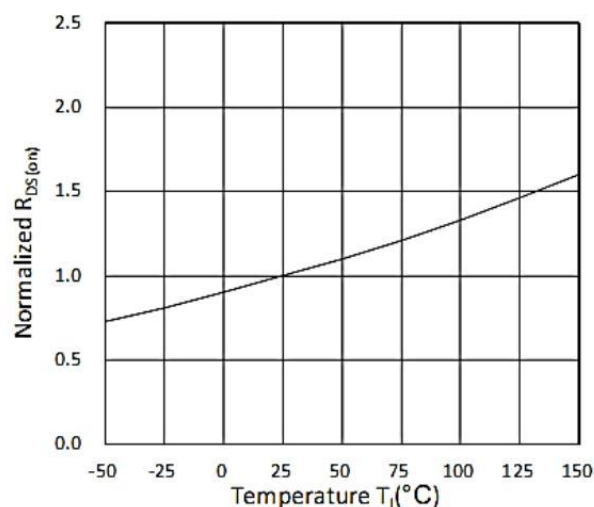


Figure 6. Normalized R_DS(on) vs. Temperature

Typical Characteristics

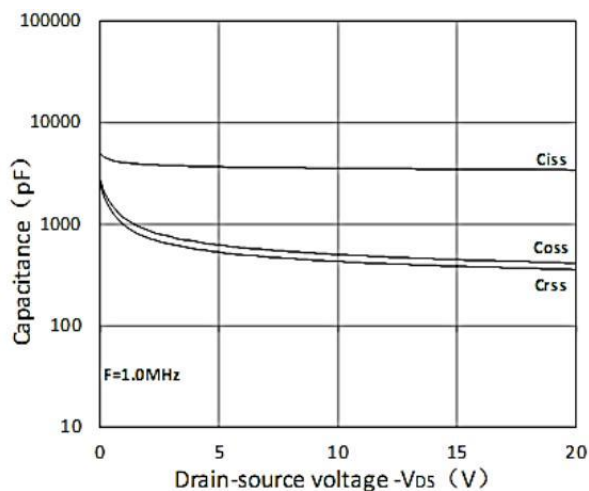


Figure 7. Capacitance Characteristics

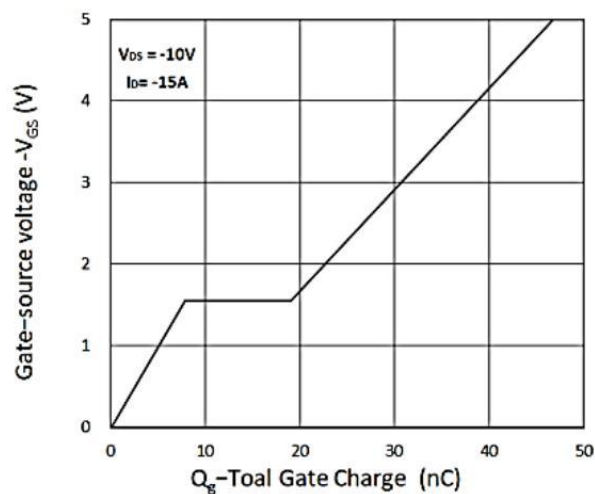


Figure 8. Gate Charge Characteristics

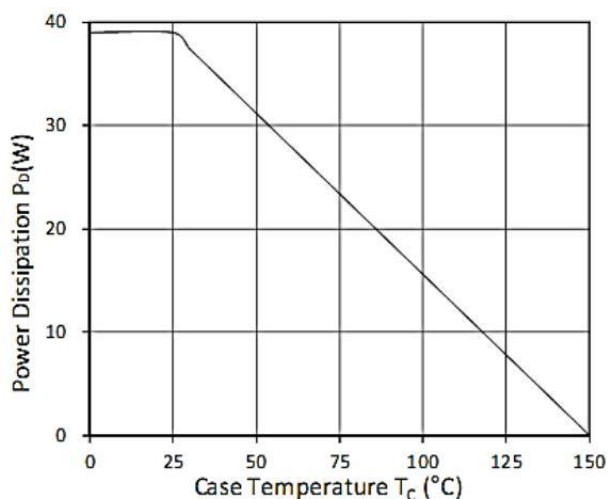


Figure 9. Power Dissipation

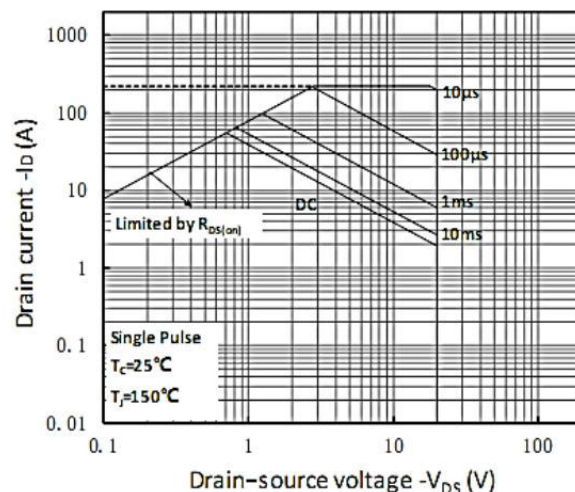


Figure 10. Safe Operating Area

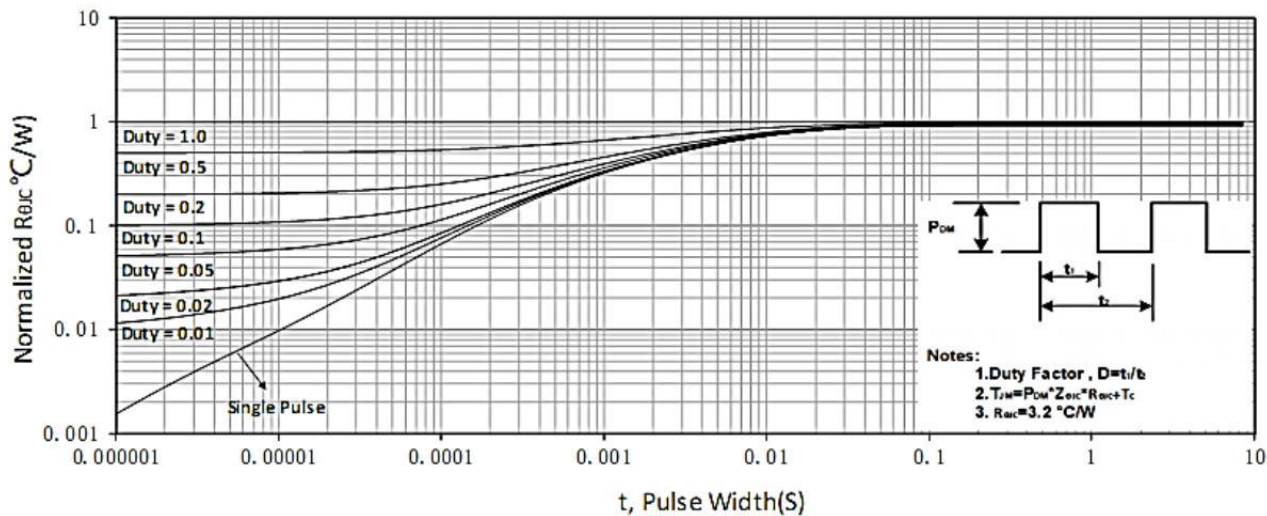
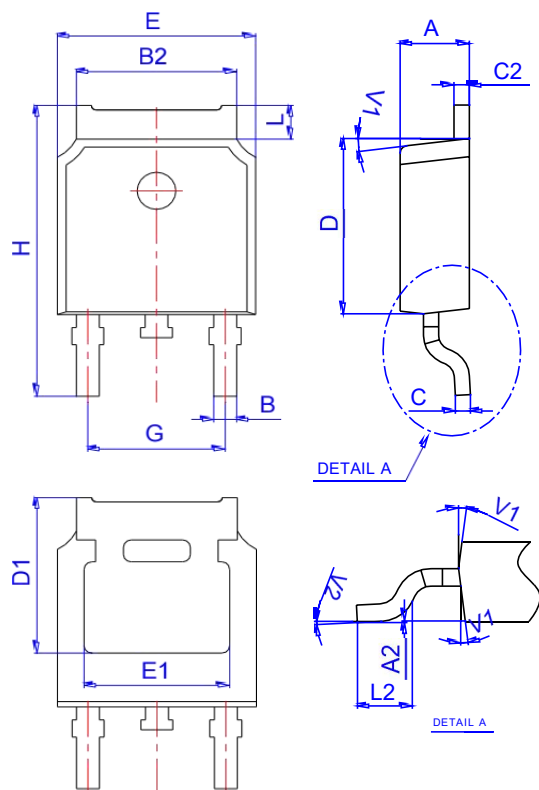


Figure 11 Normalized Maximum Transient Thermal Impedance

Package Mechanical Data: TO-252-3L



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.10		2.50	0.083		0.098
A2	0		0.10	0		0.004
B	0.66		0.86	0.026		0.034
B2	5.18		5.48	0.202		0.216
C	0.40		0.60	0.016		0.024
C2	0.44		0.58	0.017		0.023
D	5.90		6.30	0.232		0.248
D1	5.30REF			0.209REF		
E	6.40		6.80	0.252		0.268
E1	4.63			0.182		
G	4.47		4.67	0.176		0.184
H	9.50		10.70	0.374		0.421
L	1.09		1.21	0.043		0.048
L2	1.35		1.65	0.053		0.065
V1		7°			7°	
V2	0°		6°	0°		6°

Package Marking and Ordering Information

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