

Description

The SX38N10D uses advanced 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

$V_{DS} = 100V$ $I_D = 38A$

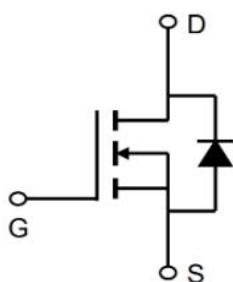
$R_{DS(ON)} < 25m\Omega$ @ $V_{GS}=10V$

Application

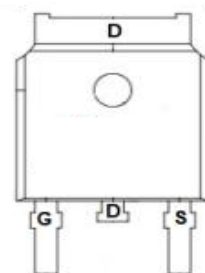
DC/DC Converter

LED Backlighting

Power Management Switches



TO-252-3L



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

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	100	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D @ T_c=25^\circ C$	Continuous Drain Current, V_{GS} @ 10V	38	A
$I_D @ T_c=100^\circ C$	Continuous Drain Current, V_{GS} @ 10V	18	A
I_{DM}	Pulsed Drain Current	100	A
E_{AS}	Single Pulse Avalanche Energy	160	mJ
I_{AS}	Avalanche Current	53.4	A
$P_D @ T_c=25^\circ C$	Total Power Dissipation ⁴	27	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	4.65	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Case	62	$^\circ C/W$

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

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
BVDSS	Drain-Source Breakdown Voltage	V _{GS} = 0V, I _D = 250μA	100	108	-	V
IDSS	Drain-Source Leakage Current	V _{DS} = 80V, V _{GS} = 0V	-	-	1	μA
IGSS	Gate to Body Leakage Current	V _{DS} = 0V, V _{GS} = ±20V	-	-	±100	nA
VGS(th)	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = 250μA	1.2	1.8	2.6	V
RDS(on)	Static Drain-Source On-Resistance	V _{GS} = 10V, I _D = 15A	-	18	25	mΩ
		V _{GS} = 4.5V, I _D = 10A	-	28	38	mΩ
g _{fs}	Forward Threshold Voltage	V _{DS} = 10V, I _D = 20A	-	22	-	S
R _g	Gate Resistance	V _{DS} = V _{GS} = 0V, f = 1.0MHz	-	1.62	-	Ω
Ciss	Input Capacitance	V _{DS} = 50V, V _{GS} = 0V, f = 1.0MHz	-	822	-	pF
Coss	Output Capacitance		-	310	-	pF
Crss	Reverse Transfer Capacitance		-	23.5	-	pF
Q _g	Total Gate Charge	V _{DS} = 50V, I _D = 20A, V _{GS} = 10V	-	22.7	-	nC
Q _{gs}	Gate-Source Charge		-	6.2	-	
Q _{gd}	Gate-Drain("Miller") Charge		-	5.3	-	
td(on)	Turn-On Delay Time	V _{DS} = 50V, I _D = 20A, R _G = 3Ω, V _{GS} = 10V	-	15	-	ns
t _r	Turn-On Rise Time		-	3.2	-	
td(off)	Turn-Off Delay Time		-	30	-	
t _f	Turn-Off Fall Time		-	7.6	-	
I _s	Continuous Source Current		-	-	25	A
VSD	Diode Forward Voltage	I _S = 20A, V _{GS} = 0V	-	0.88	1.0	V
t _{rr}	Reverse Recovery Time	I _{SD} = 20A, dI _{SD} /dt = 100A/μs	-	45	-	ns
Q _{rr}	Reverse Recovery Charge		-	59	-	nC

Notes:

- 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 V_{DD}=50V, V_{GS}=10V, L=0.5mH, I_{AS}=8A
- 4、The power dissipation is limited by 150°C junction 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

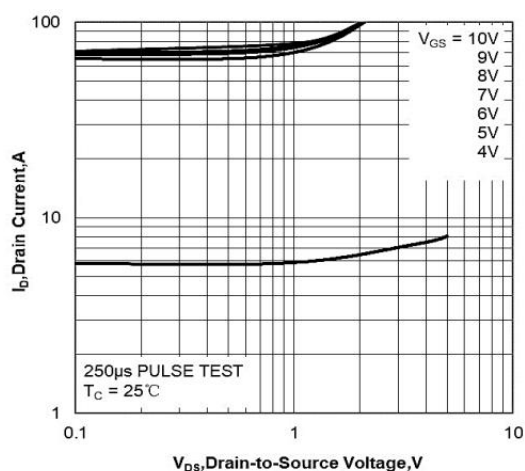


Figure 1. Output Characteristics

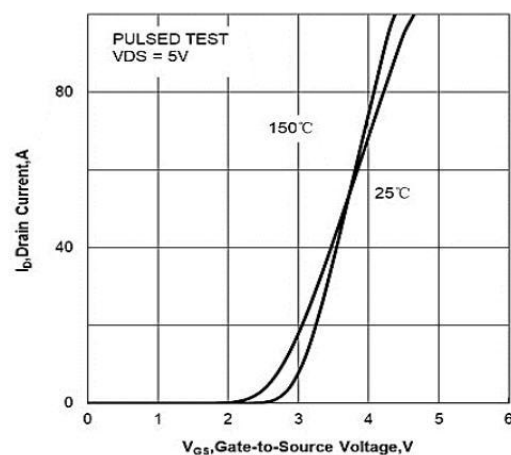


Figure 2. Transfer Characteristics

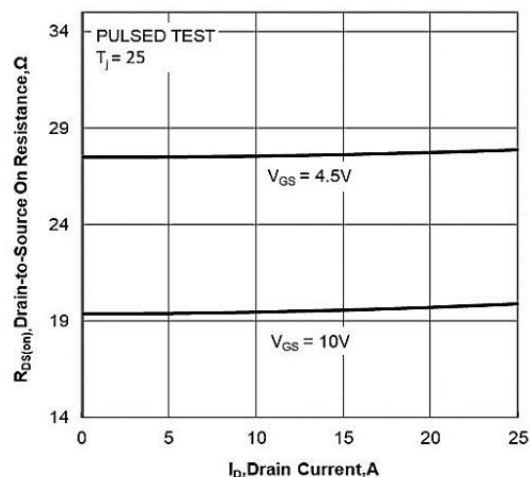


Figure 3. Drain-to-Source On Resistance
vs Drain Current

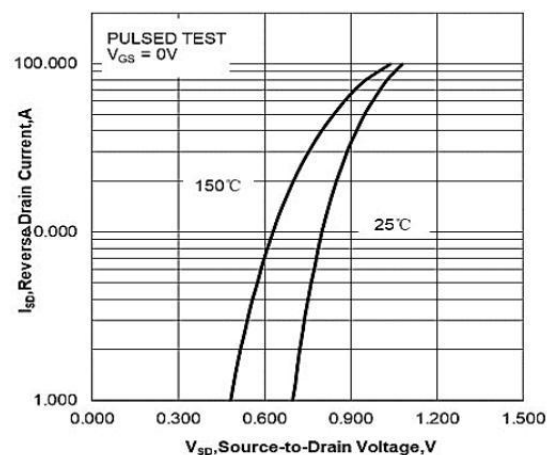


Figure 4. Body Diode Forward Voltage vs
Source Current and Temperature

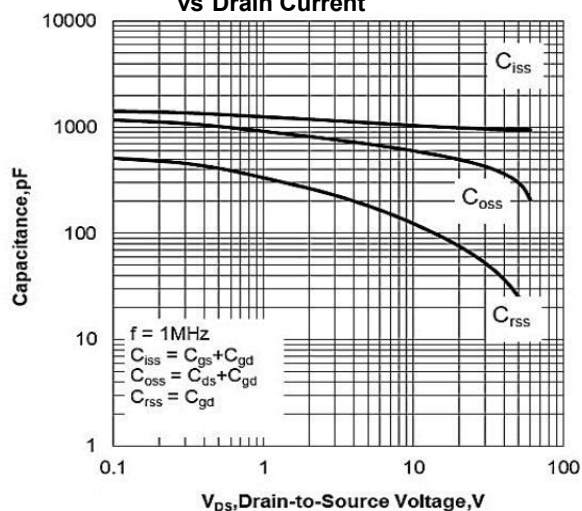


Figure 5. Capacitance Characteristics

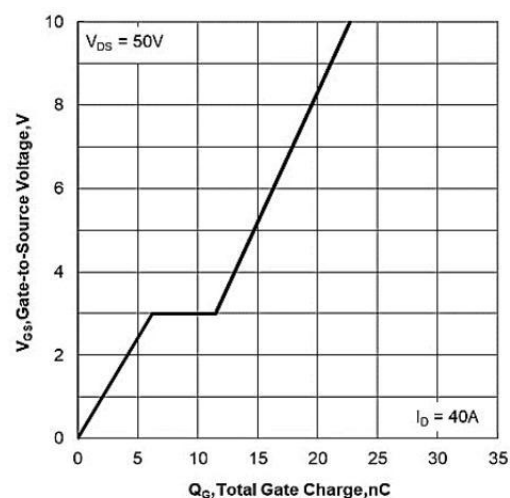


Figure 6. Gate Charge Characteristics

Typical Characteristics

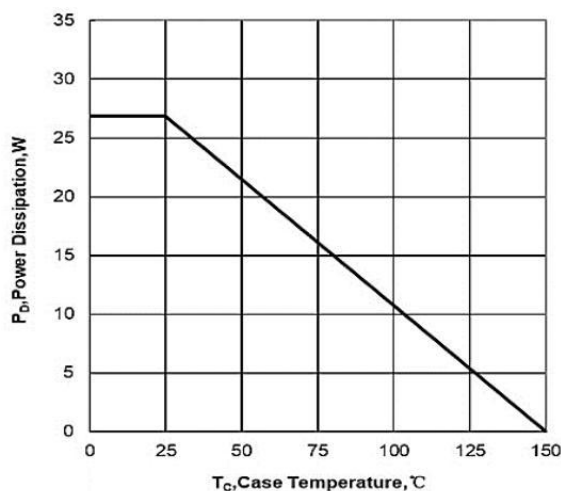


Figure 9. Maximum Continuous Drain Current vs Case Temperature

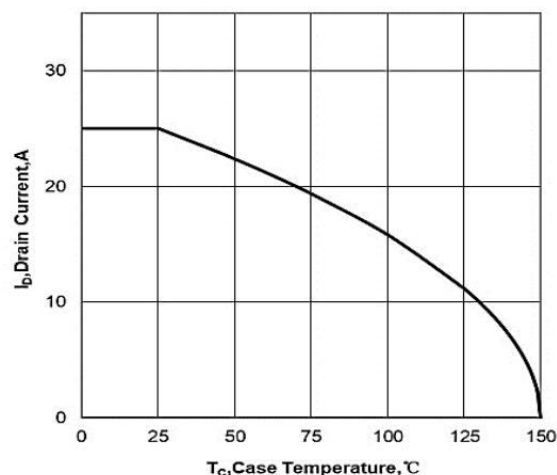


Figure 10. Maximum Power Dissipation vs Case Temperature

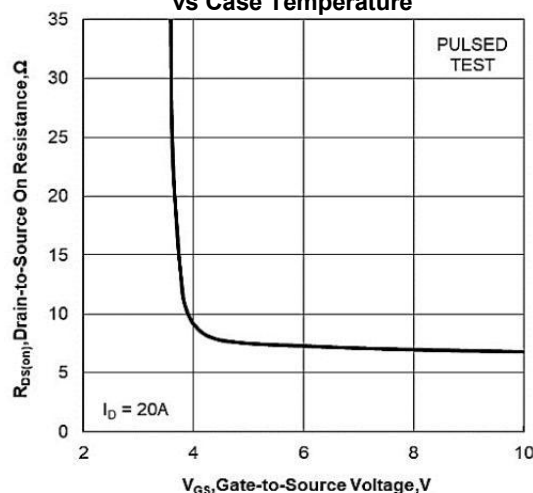


Figure 11. Drain-to-Source On Resistance vs Gate Voltage and Drain Current

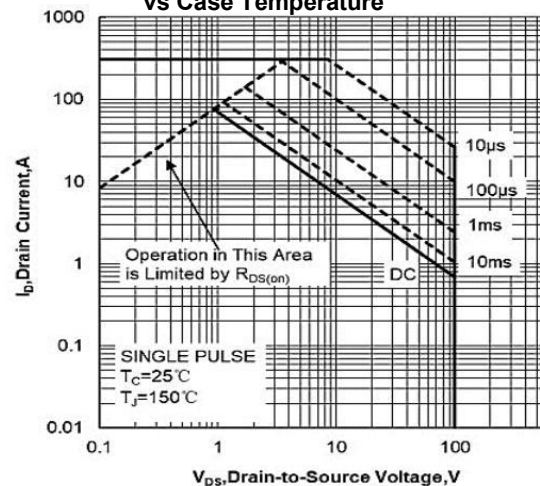


Figure 12. Maximum Safe Operating Area

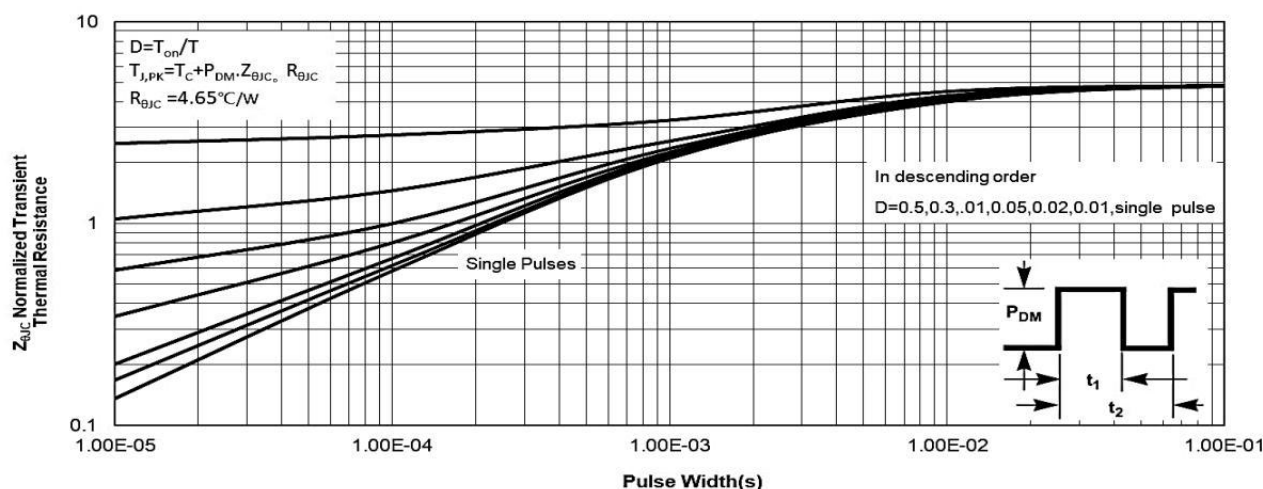
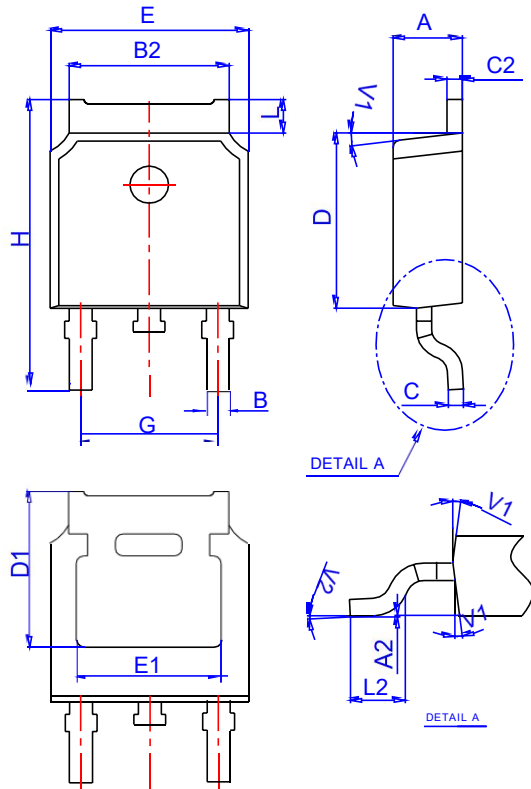


Figure 13. Maximum Effective Transient Thermal Impedance, Junction-to-Case

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