

Description

The 3401MI 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.



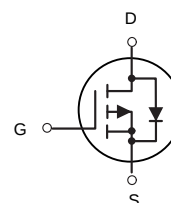
SOT23-3L

General Features

$V_{DS} = -30V$ $I_D = -4.2A$
 $R_{DS(ON)} < 54m\Omega @ V_{GS}=10V$
 $R_{DS(ON)} < 77m\Omega @ V_{GS}=4.5V$

Application

Battery protection
 Load switch
 Uninterruptible power supply



P-Channel MOSFET

Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
3401MI	SOT23-3L	X1KX	3000

Absolute Maximum Ratings ($T_A=25^{\circ}C$ unless otherwise noted)

Symbol	Parameter	Limit	Unit
V_{DS}	Drain-Source Voltage	-30	V
V_{GS}	Gate-Source Voltage	± 12	V
I_D	Drain Current-Continuous	-4.2	A
I_{DM}	Drain Current-Pulsed (Note 1)	-30	A
P_D	Maximum Power Dissipation	1.2	W
T_J, T_{STG}	Operating Junction and Storage Temperature Range	-55 To 150	$^{\circ}C$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient (Note 2)	104	$^{\circ}C/W$



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

Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =-24V, V _{GS} =0V	-	-	-1	μA
Gate-Body Leakage Current	I _{GSS}	V _{GS} =±10V, V _{DS} =0V	-	-	±100	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =-250μA	-0.7	-1	-1.3	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =-10V, I _D =-4.2A	-	46	54	mΩ
		V _{GS} =-4.5V, I _D =-4A	-	58	77	mΩ
		V _{GS} =-2.5V, I _D =-1A		74	130	mΩ
Forward Transconductance	g _{FS}	V _{DS} =-5V, I _D =-4.2A	-	10	-	S
Dynamic Characteristics (Note4)						
Input Capacitance	C _{iss}	V _{DS} =-15V, V _{GS} =0V, F=1.0MHz	-	880	-	PF
Output Capacitance	C _{oss}		-	105	-	PF
Reverse Transfer Capacitance	C _{rss}		-	65	-	PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	t _{d(on)}	V _{DD} =-15V, I _D =-4.2A V _{GS} =-10V, R _{GEN} =6Ω	-	7	-	nS
Turn-on Rise Time	t _r		-	3	-	nS
Turn-Off Delay Time	t _{d(off)}		-	30	-	nS
Turn-Off Fall Time	t _f		-	12	-	nS
Total Gate Charge	Q _g	V _{DS} =-15V, I _D =-4.2A, V _{GS} =-4.5V	-	8.5	-	nC
Gate-Source Charge	Q _{gs}		-	1.8	-	nC
Gate-Drain Charge	Q _{gd}		-	2.7	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V _{SD}	V _{GS} =0V, I _S =-4.2A	-	-	-1.2	V

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production

Typical Electrical and Thermal Characteristics

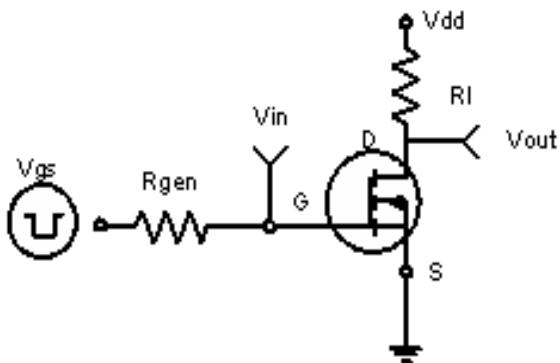


Figure 1: Switching Test Circuit

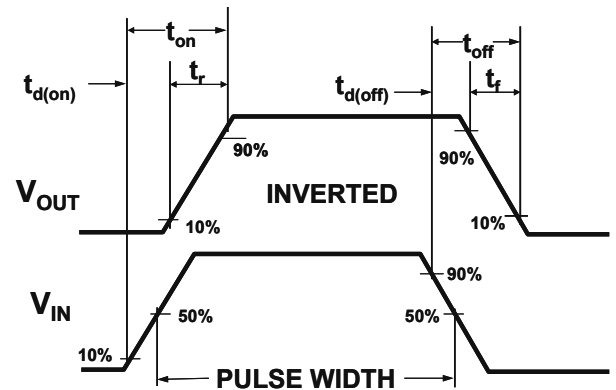


Figure 2: Switching Waveforms

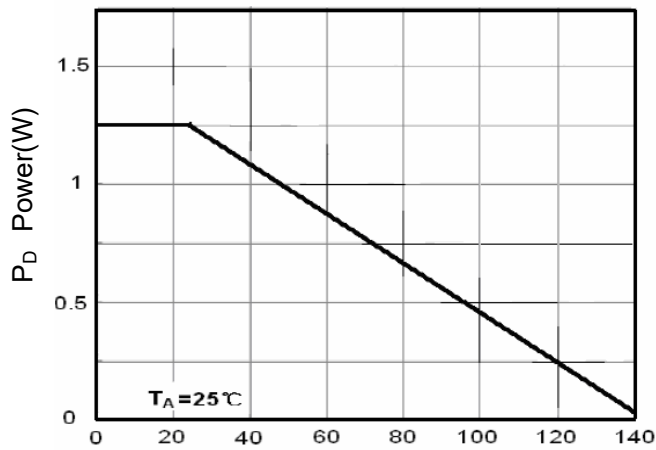


Figure 3 Power Dissipation

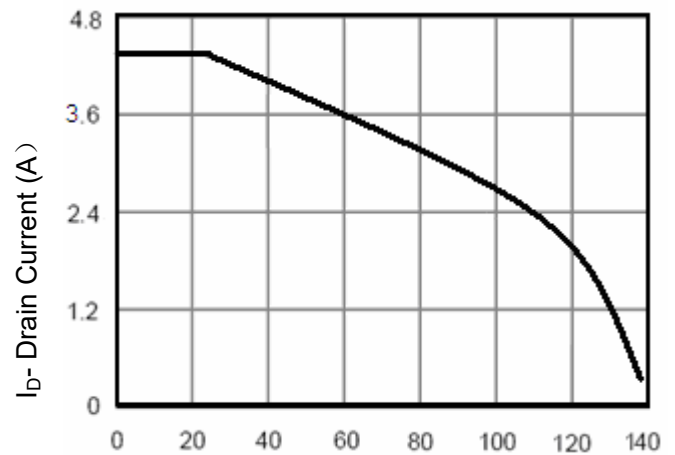


Figure 4 Drain Current

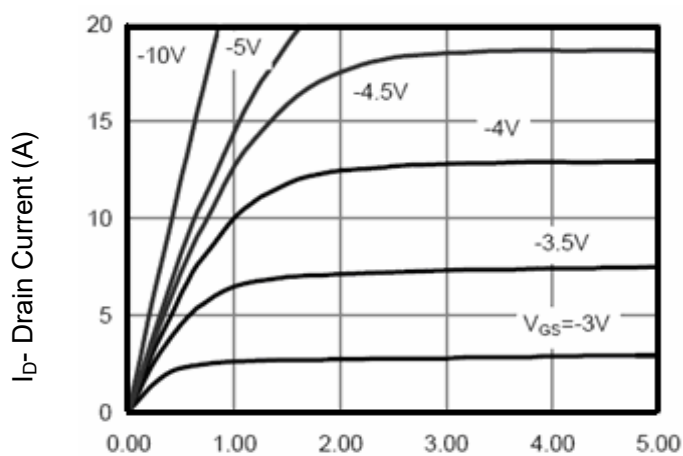


Figure 5 Output Characteristics

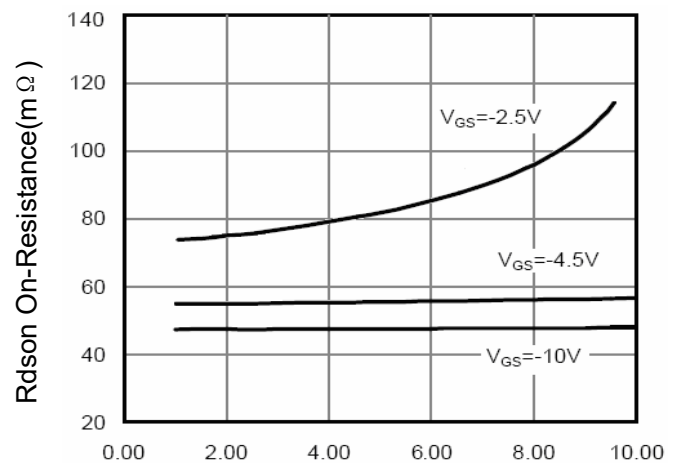


Figure 6 Drain-Source On-Resistance



3401MI

P-Channel Enhancement Mode MOSFET

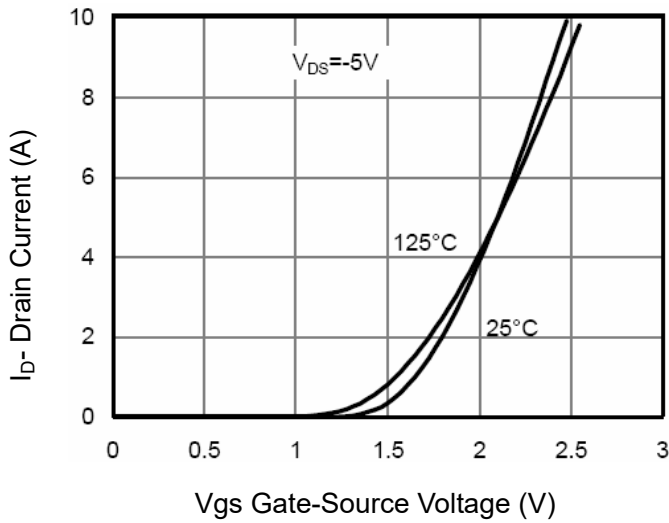


Figure 7 Transfer Characteristics

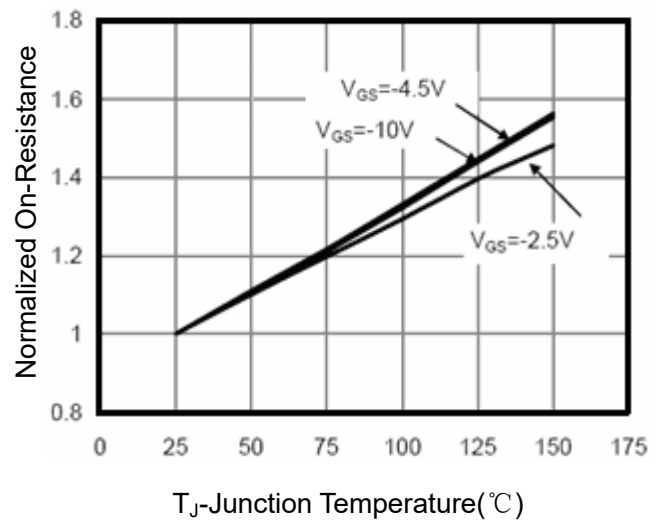


Figure 8 Drain-Source On-Resistance

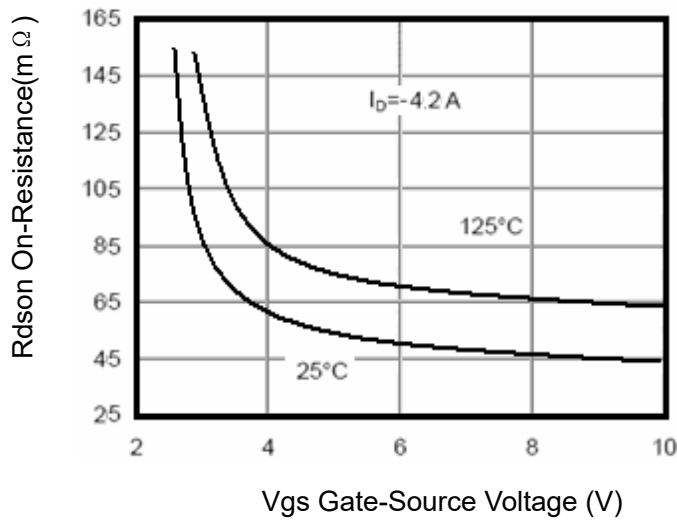


Figure 9 $R_{DS(on)}$ vs V_{GS}

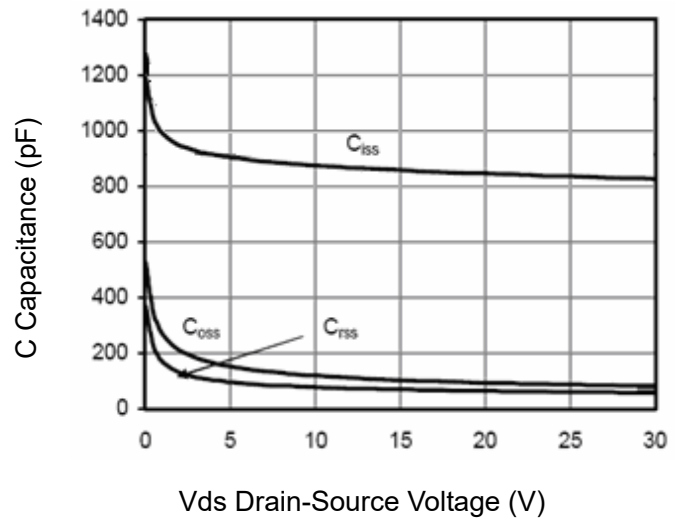


Figure 10 Capacitance vs V_{DS}

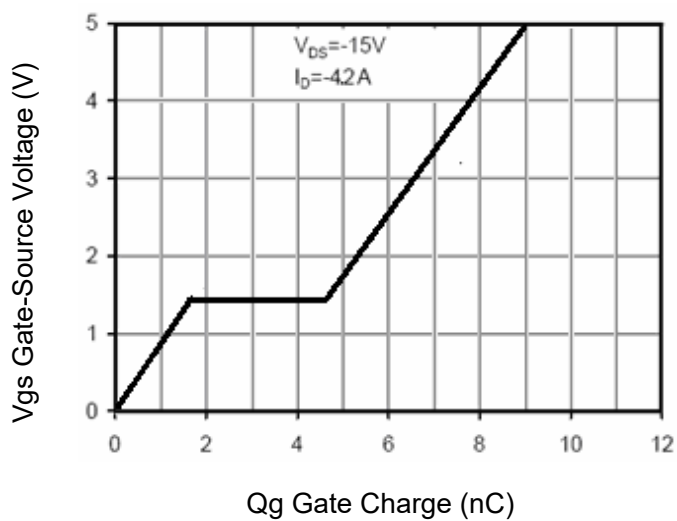


Figure 11 Gate Charge

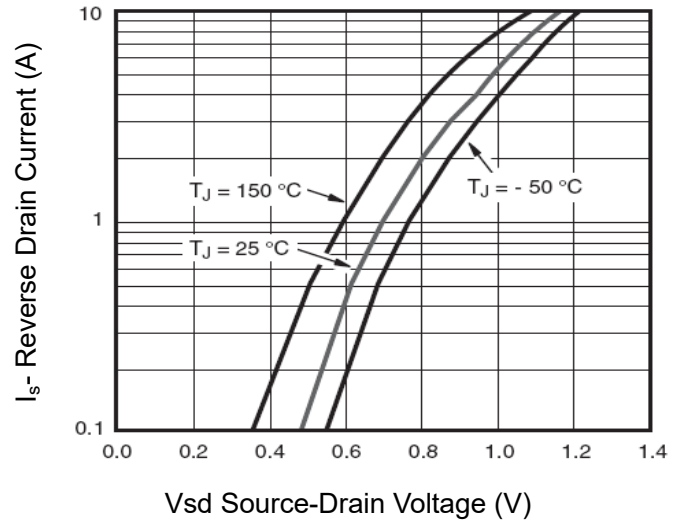
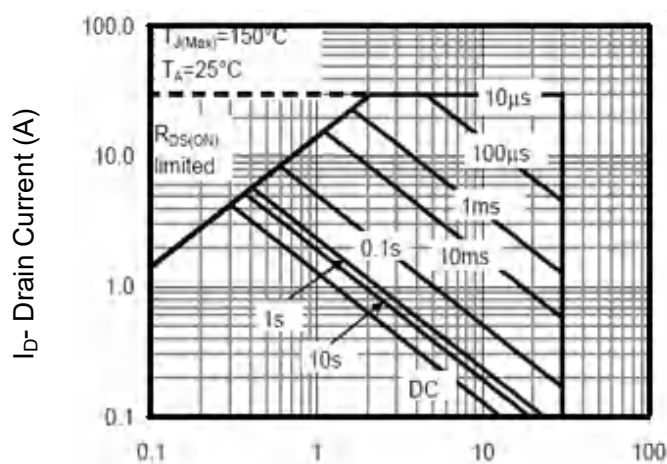


Figure 12 Source-Drain Diode Forward



V_{DS} Drain-Source Voltage (V)

Figure 13 Safe Operation Area

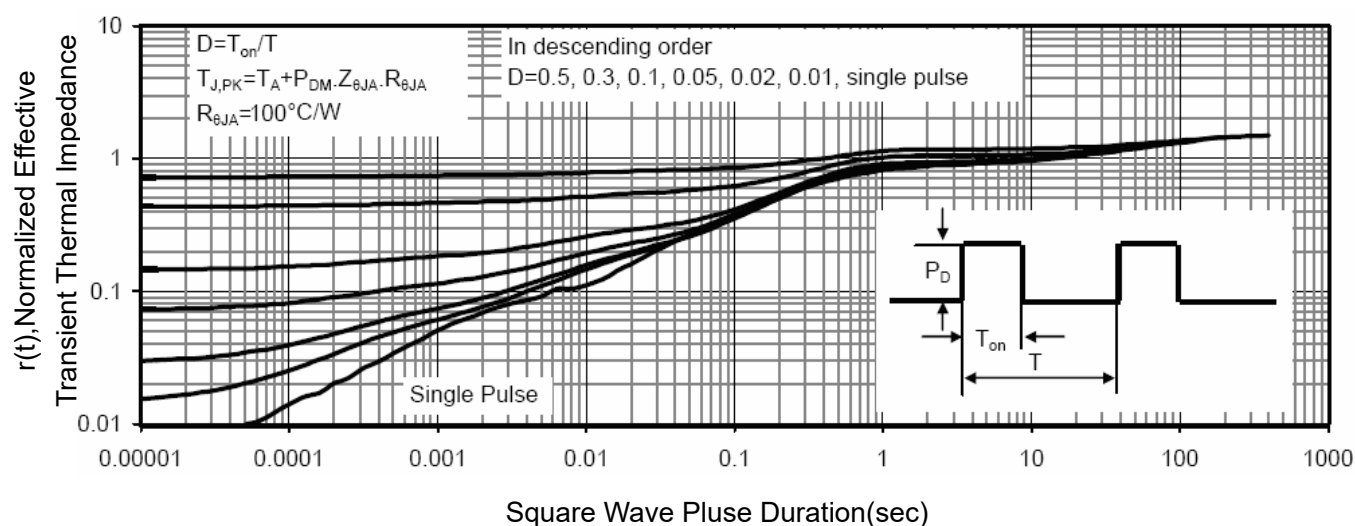
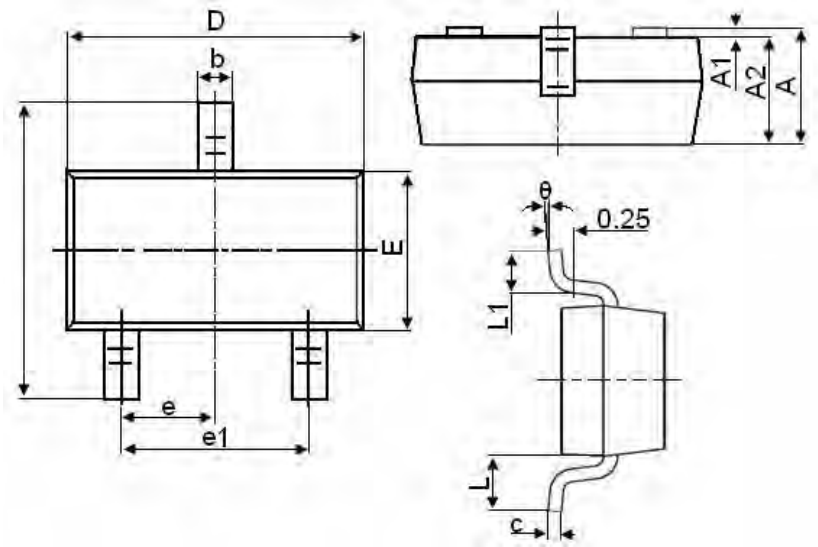


Figure 14 Normalized Maximum Transient Thermal Impedance

SOT23-3L Package Information



Symbol	Dimensions in Millimeters	
	MIN.	MAX.
A	1.050	1.250
A1	0.000	0.100
A2	1.050	1.150
b	0.300	0.500
c	0.100	0.200
D	2.800	3.000
E	1.500	1.700
E1	2.650	2.950
e	0.950TYP	
e1	1.800	2.000
L	0.550REF	
L1	0.300	0.600
θ	0°	8°