

P-Ch 30V Fast Switching MOSFETs

- ★ Green Device Available
- ★ Super Low Gate Charge
- ★ Excellent CdV/dt effect decline
- ★ Advanced high cell density Trench technology

Product Summary



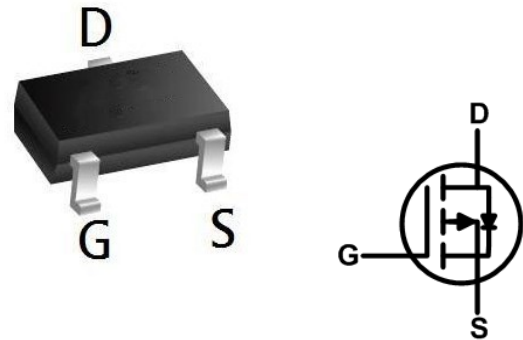
BVDSS	RDSON	ID
-30V	41mΩ	-4.5A

Description

The UD3401AL is the high cell density trenched P-ch MOSFETs, which provides excellent RDSON and efficiency for most of the small power switching and load switch applications.

The UD3401AL meet the RoHS and Green Product requirement with full function reliability approved.

SOT23-3L Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-30	V
V_{GS}	Gate-Source Voltage	± 12	V
$I_D@T_A=25^\circ\text{C}$	Continuous Drain Current	-4.5	A
$I_D@T_A=70^\circ\text{C}$	Continuous Drain Current	-3.6	A
I_{DM}	Pulsed Drain Current ²	-16	A
$P_D@T_A=25^\circ\text{C}$	Total Power Dissipation ³	1.4	W
$P_D@T_A=70^\circ\text{C}$	Total Power Dissipation ³	0.9	W
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ\text{C}$
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ\text{C}$

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-Ambient ¹	---	105	$^\circ\text{C/W}$
$R_{\theta JA}$	Thermal Resistance Junction-Ambient ¹ (t ≤ 10s)	---	---	$^\circ\text{C/W}$

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

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} = 0V, I _D = -250μA	-30	-	-	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = -30V, V _{GS} = 0V	-	-	-1	μA
Gate-Body Leakage Current	I _{GSS}	V _{DS} = 0V, V _{GS} = ±12V	-	-	±100	nA
Gate-Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = -250μA	-0.7	-1	-1.3	V
Drain-Source on-Resistance ³	R _{DS(on)}	V _{GS} = -10V, I _D = -4.2A	-	41	60	mΩ
		V _{GS} = -4.5V, I _D = -4A	-	51	75	
		V _{GS} = -2.5V, I _D = -1A	-	60	90	
Dynamic Characteristics ⁴						
Input Capacitance	C _{iss}	V _{DS} = -15V, V _{GS} =0V, f =1MHz	-	745	-	pF
Output Capacitance	C _{oss}		-	70	-	
Reverse Transfer Capacitance	C _{rss}		-	57	-	
Switching Characteristics ⁴						
Total Gate Charge	Q _g	V _{GS} = -4.5V, V _{DS} = -15V, I _D = -4.2A	-	8	-	nC
Gate–Source Charge	Q _{gs}		-	1.8	-	
Gate–Drain Charge	Q _{gd}		-	2.7	-	
Turn-on Delay Time	t _{d(on)}	V _{GS} = -10V, V _{DD} = -15V, I _D = -4.2A, R _{GEN} = 6Ω	-	7	-	ns
Rise Time	t _r		-	3	-	
Turn-off Delay Time	t _{d(off)}		-	30	-	
Fall Time	t _f		-	12	-	
Drain-Source Diode Characteristics						
Diode Forward Voltage ³	V _{SD}	I _S = -4.2A, V _{GS} = 0V	-	-	-1.2	V
Continuous Source Current	I _S		-	-	-4.2	A

Notes:

1. Repetitive rating, pulse width limited by junction temperature T_{J(MAX)}=150°C
2. The data tested by surface mounted on a 1 inch² FR-4 board with 20Z copper, The value in any given application depends on the user's specific board design.
3. Pulse Test: Pulse width≤300μs, duty cycle≤2%.
4. This value is guaranteed by design hence it is not included in the production test.

Typical Characteristics

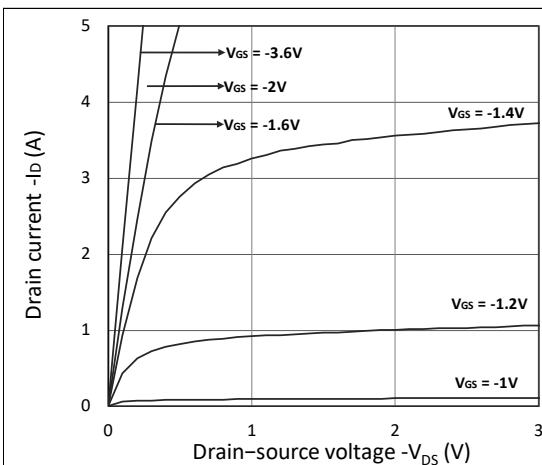


Figure 1. Output Characteristics

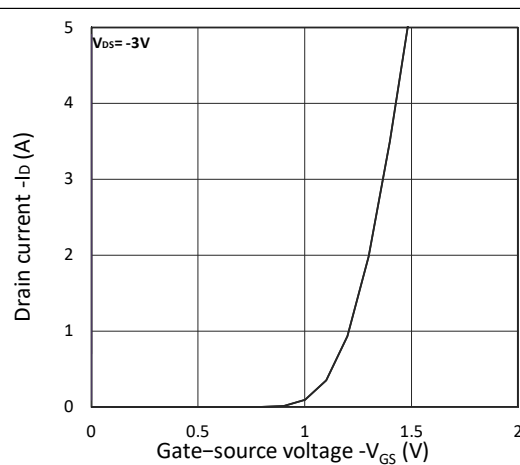


Figure 2. Transfer Characteristics

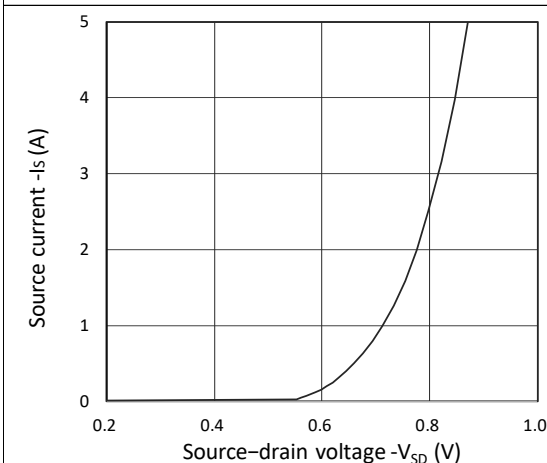


Figure 3. Forward Characteristics of Reverse

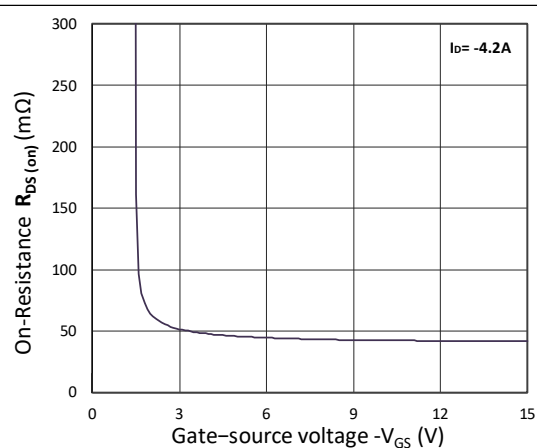


Figure 4. $R_{DS(ON)}$ vs. V_{GS}

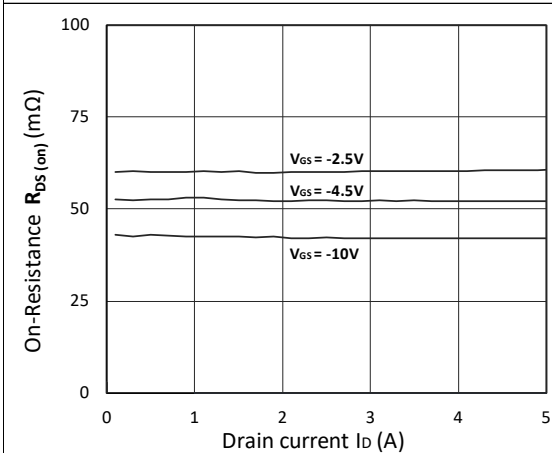


Figure 5. $R_{DS(ON)}$ vs. I_D

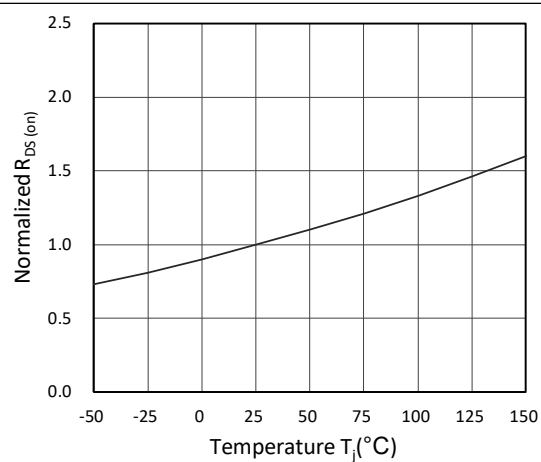


Figure 6. Normalized $R_{DS(ON)}$ vs. Temperature

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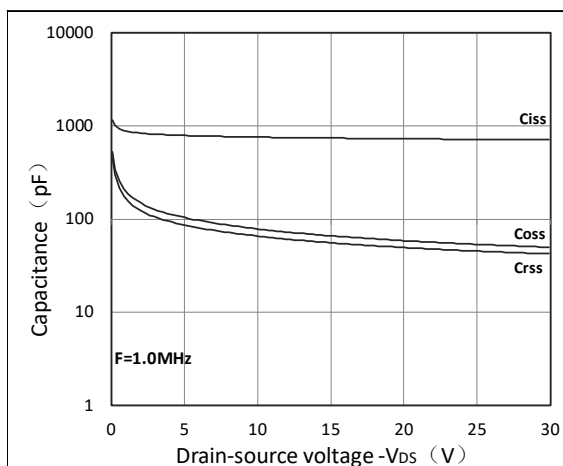


Figure 7. Capacitance Characteristics

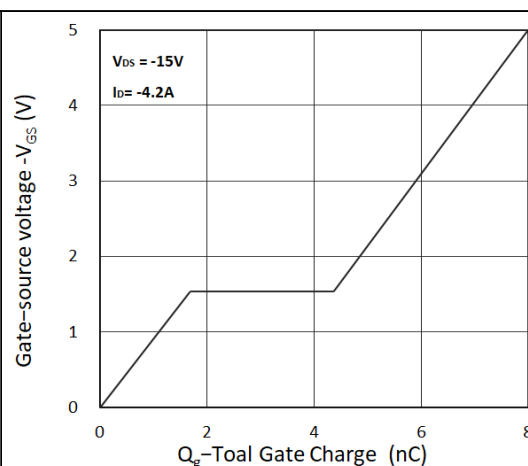


Figure 8. Gate Charge Characteristics

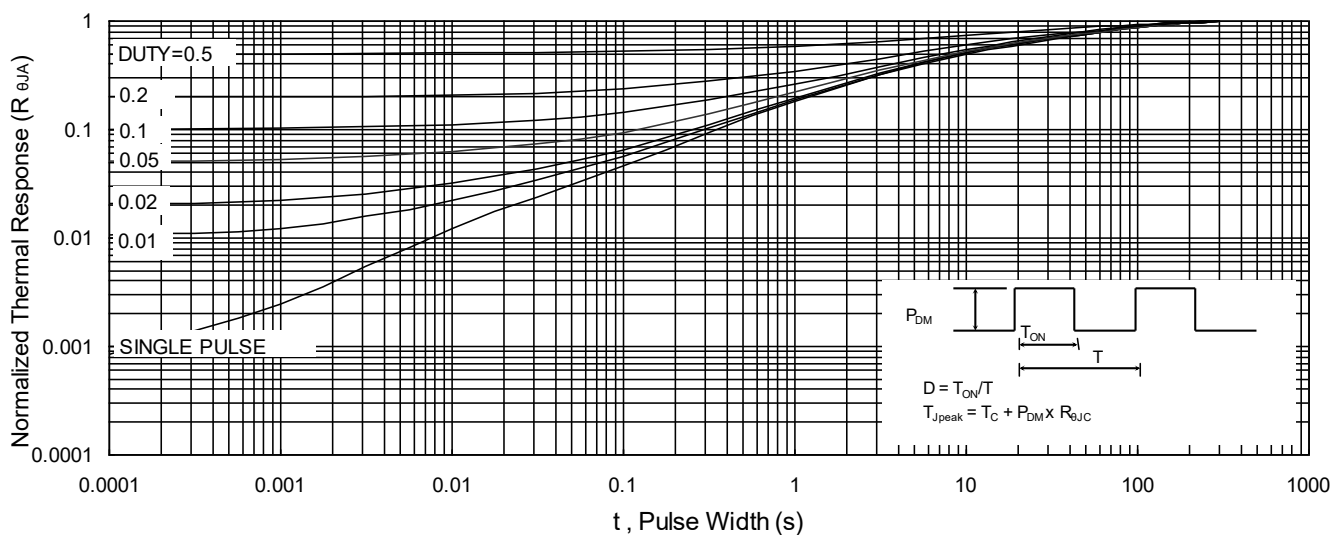


Fig.9 Normalized Maximum Transient Thermal Impedance

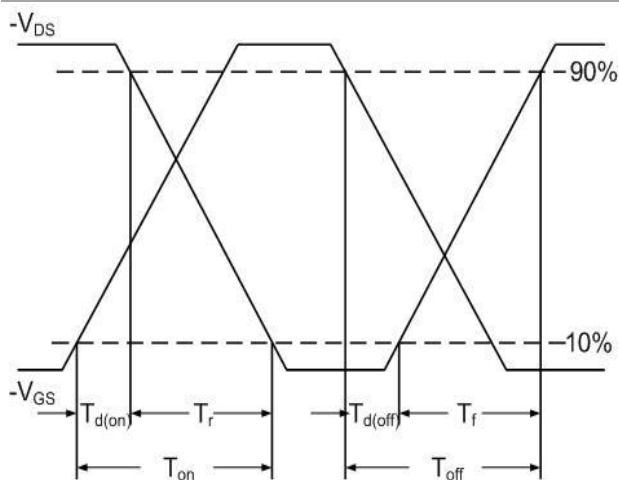


Fig.10 Switching Time Waveform

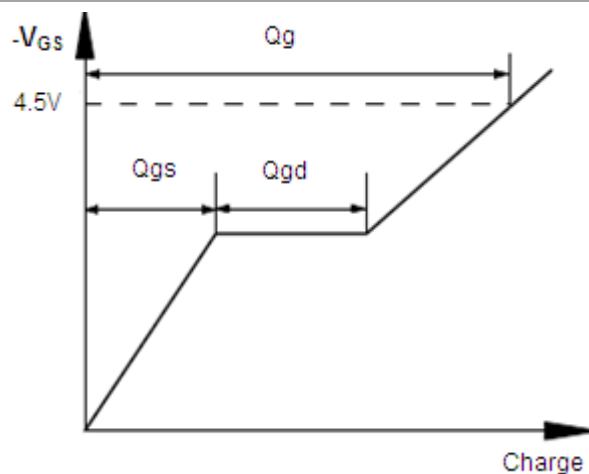
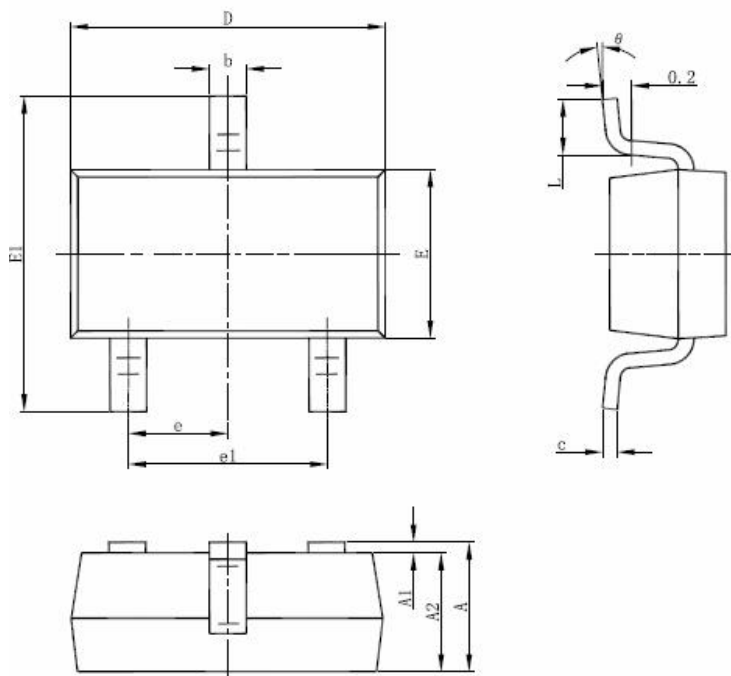


Fig.11 Gate Charge Waveform

Package Mechanical Data-SOT-23-3L



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°