



## -30V P-Channel Enhancement Mode MOSFET

### DESCRIPTION

The up8401 is the P-Channel logic enhancement mode power field effect transistor is produced using high cell density. advanced trench technology to provide excellent  $R_{DS(ON)}$ .low gate charge and operation gate as 2.5V.

This device is suitable for use as a load switch or other general applications.

*up8401S-TRG ROHS Compliant This is Halogen Free*

### FEATURE

- ◆ **-30V/-4.3A,  $R_{DS(ON)} = 47m\Omega$ (typ.)@ $V_{GS} = -10V$**
- ◆ **-30V/-3.5A,  $R_{DS(ON)} = 55m\Omega$ (typ.)@ $V_{GS} = -4.5V$**
- ◆ **-30V/-2.5A,  $R_{DS(ON)} = 70m\Omega$ (typ.)@ $V_{GS} = -2.5V$**
- ◆ Super high density cell design for extremely low  $R_{DS(ON)}$
- ◆ Exceptional on-resistance and Maximum DC current capability

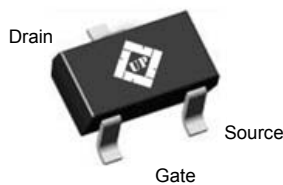
### APPLICATIONS

- ◆ High Frequency Point-of-Load Synchronous Buck Converter for MB/NB/UMPC/VGA
- ◆ DC/DC Converter
- ◆ Load Switch

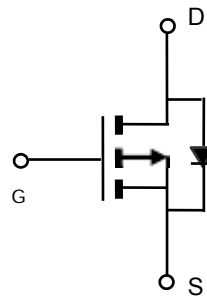


P-Channel Enhancement Mode MOSFET

### PIN CONFIGURATION



SOT-23L  
Top View



### PART NUMBER INFORMATION

<p><b>UP 8401 S - TR G</b></p> <p>a b c d e f</p>	<p>a : Company name.  b : Channel type.  c : Product Serial number.  d : Package Code  e : Handling Code  g : Lead Plating Code  G : Lead-free product.  <b><i>This product is Halogen Free</i></b></p>
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## ■ORDERING INFORMATION

Part Number	Package Code	Handling Code	Shipping
up8401S-TRG	S : SOT-23L	TR : Tape&Reel	3K/Reel

※ Year Code : 0 ~ 9, 2010 : 0

※ Week Code : A(1~2) ~ Z(53~54)

※ SOT-23L : Only available in tape and reel packaging.

## ■ABSOLUTE MAXIMUM RATINGS (T<sub>A</sub> = 25°C Unless otherwise noted )

Symbol	Parameter	Typical	Unit
V <sub>DSS</sub>	Drain-Source Voltage	-30	V
V <sub>GSS</sub>	Gate-Source Voltage	±12	V
I <sub>D</sub>	Continuous Drain Current (T <sub>c</sub> =25°C) <sup>A</sup>	V <sub>GS</sub> =-10V	-4.3
	Continuous Drain Current (T <sub>c</sub> =70°C) <sup>A</sup>		-3.6
I <sub>DM</sub>	Pulsed Drain Current <sup>B</sup>	-20	A
P <sub>D</sub>	Power Dissipation	T <sub>A</sub> =25°C	1.5
		T <sub>A</sub> =70°C	0.9
T <sub>J</sub>	Operation Junction Temperature	-55 to 150	°C
T <sub>STG</sub>	Storage Temperature Range	-55 to 150	°C

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged.

Absolute maximum ratings are stress ratings only and functional device operation is not implied.

## ■THERMAL DATA

Symbol	Parameter	Typ	Max	Unit	
R <sub>θJA</sub>	Thermal Resistance-Junction to Ambient <sup>A</sup>	Steady-State	-	120	°C/W
R <sub>θJL</sub>	Thermal Resistance Junction to Lead <sup>A</sup>	Steady-State	-	80	°C/W

## ■ ELECTRICAL CHARACTERISTICS (T<sub>J</sub> = 25°C Unless otherwise noted )

Symbol	Parameter	Condition	Min	Typ	Max	Unit
<b>Static Parameters</b>						
V <sub>(BR)DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =-250μA	-30			V
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =-250μA	-0.6		-1.2	V
I <sub>GSS</sub>	Gate Leakage Current	V <sub>DS</sub> =0V, V <sub>GS</sub> =±12V			±100	nA
I <sub>DSS</sub>	Zero Gate Voltage, Drain-Source Leakage Current	V <sub>DS</sub> =-24V, V <sub>GS</sub> =0V T <sub>J</sub> =25°C			-1	μA
		V <sub>DS</sub> =-24V, V <sub>GS</sub> =0V T <sub>J</sub> =55°C			-5	
R <sub>DS(ON)</sub>	Drain-source On-Resistance <sup>B</sup>	V <sub>GS</sub> =-10V, I <sub>D</sub> =-4.3A V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-3.5A V <sub>GS</sub> =-2.5V, I <sub>D</sub> =-2.5A		47 55 70	52 60 83	mΩ
G <sub>fs</sub>	Forward Transconductance	V <sub>DS</sub> =-5V, I <sub>D</sub> =-4.0A		10		S
<b>Source-Drain Diode</b>						
V <sub>SD</sub>	Diode Forward Voltage	I <sub>S</sub> =-1.0A, V <sub>GS</sub> =0V		-0.7	-1.0	V
I <sub>S</sub>	Continuous Source Current <sup>AD</sup>				-6	A
<b>Dynamic Parameters</b>						
Q <sub>g</sub> (-4.5V)	Total Gate Charge	V <sub>DS</sub> =-20V		6.2		nC
Q <sub>gs</sub>	Gate-Source Charge	V <sub>GS</sub> =-4.5V		2.8		
Q <sub>gd</sub>	Gate-Drain Charge	I <sub>D</sub> ≐-4.0A		3.0		
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =-12V		672		pF
C <sub>oss</sub>	Output Capacitance	V <sub>GS</sub> =0V		280		
C <sub>rss</sub>	Reverse Transfer Capacitance	f=1MHz		102		
t <sub>d(on)</sub>	Turn-On Time	V <sub>DD</sub> =-12V I <sub>D</sub> =-4A		9		nS
t <sub>r</sub>				15		
t <sub>d(off)</sub>	Turn-Off Time	V <sub>GEN</sub> =-10V R <sub>G</sub> =3.3Ω		23		
t <sub>f</sub>				21		

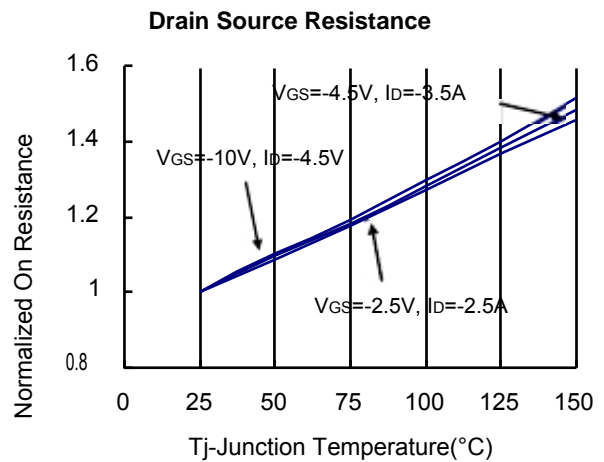
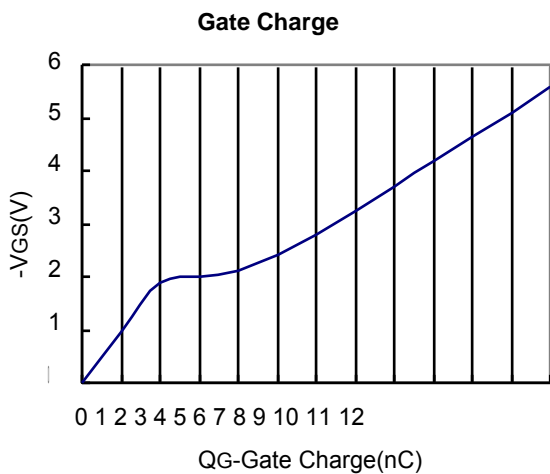
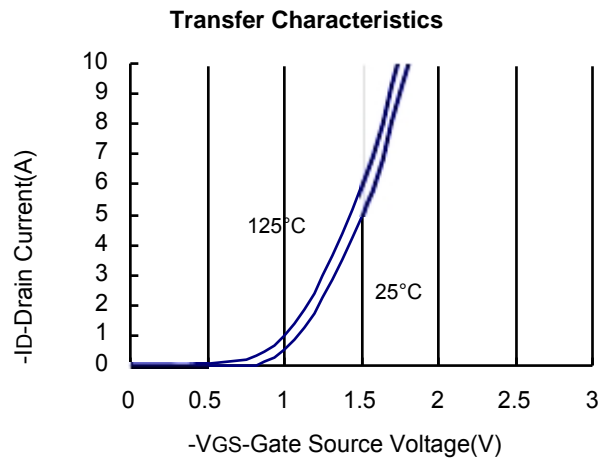
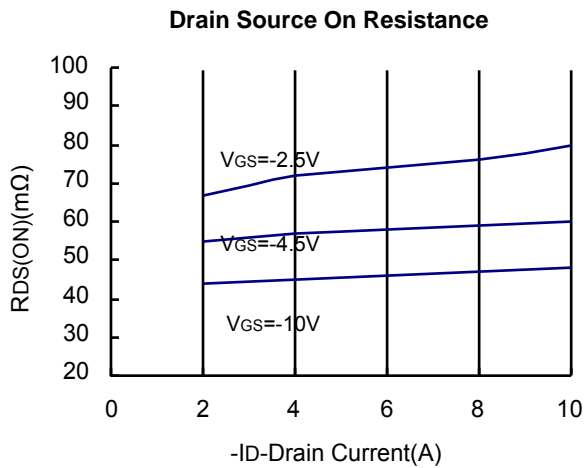
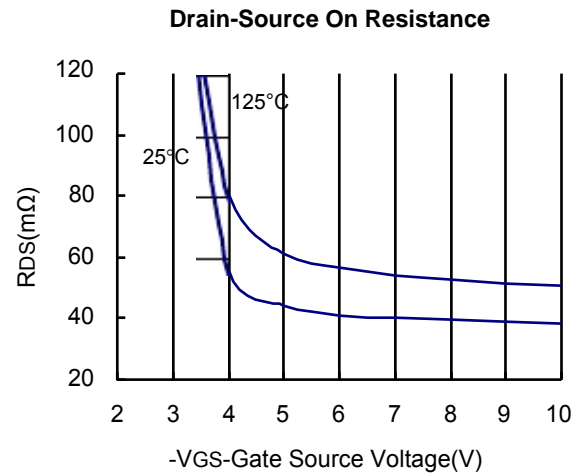
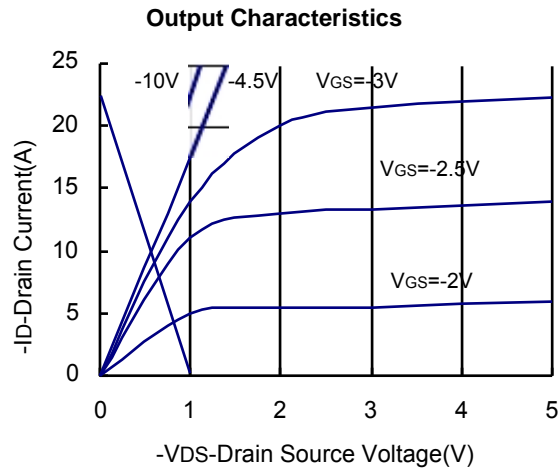
Note:

- The value of R<sub>θJA</sub> is measured with the device mounted on 1in 2 FR-4 board with 2oz. Copper, in a still air environment with T<sub>A</sub>=25°C.
- The data tested by pulsed , pulse width ≐ 300uS , duty cycle ≐ 2%
- The EAS data shows Max. rating . The test condition is V<sub>DD</sub>=-25V, V<sub>GS</sub>=-10V, L=0.1mH.
- The data is theoretically the same as I<sub>D</sub> and I<sub>DM</sub> , in real applications , should be limited by total power dissipation.

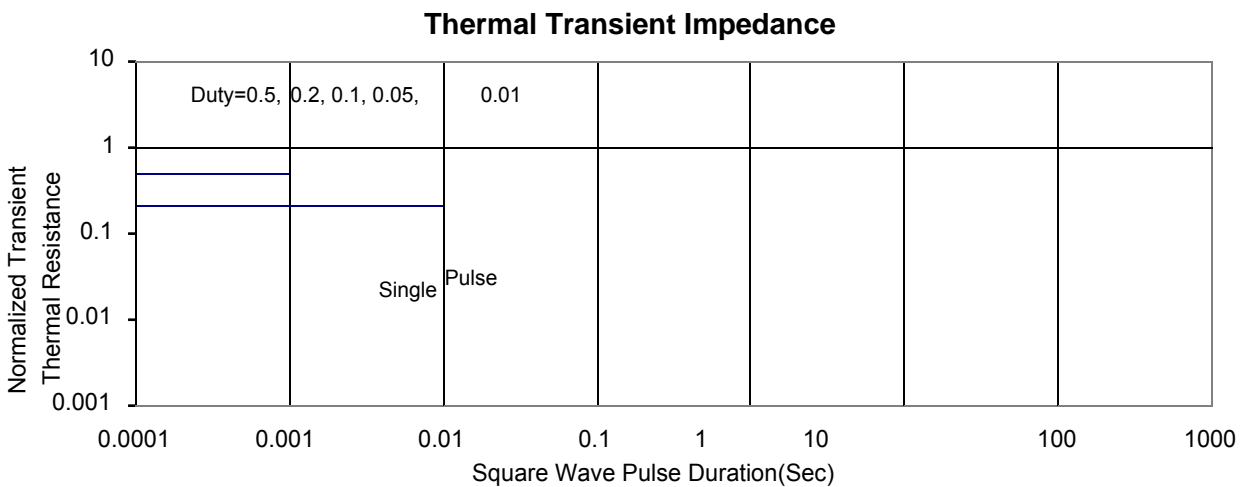
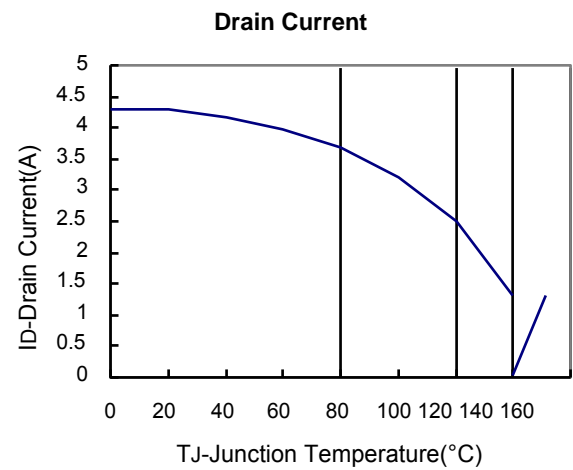
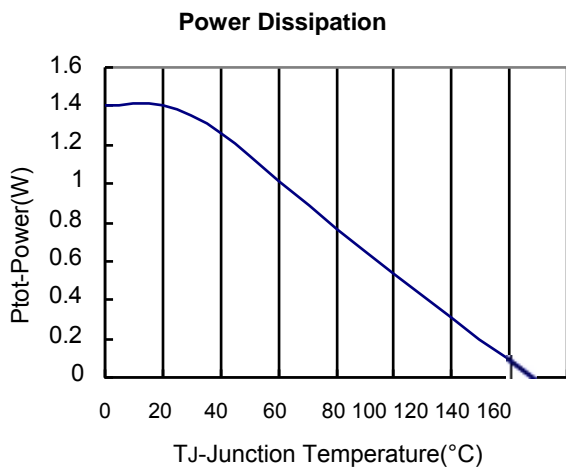
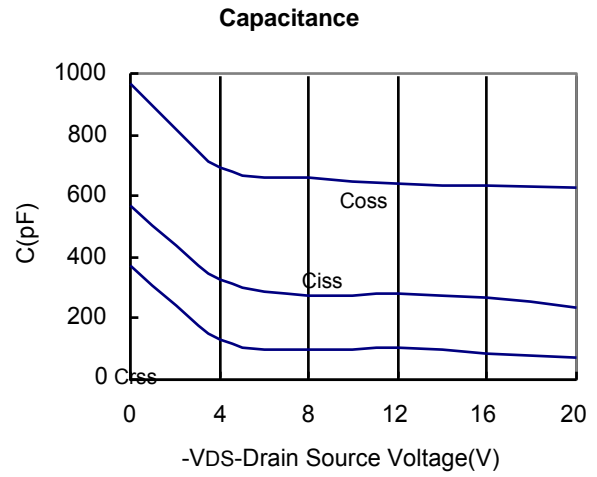
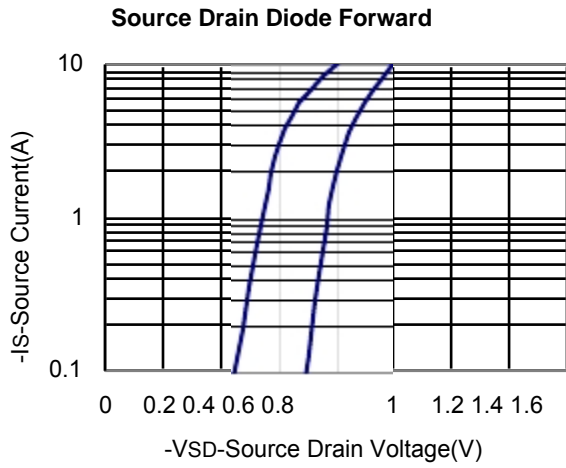
The products and product specifications contained herein are subject to change without notice to improve performance characteristics. Consult us, or our representatives before use, to confirm that the information in this datasheet is up to date

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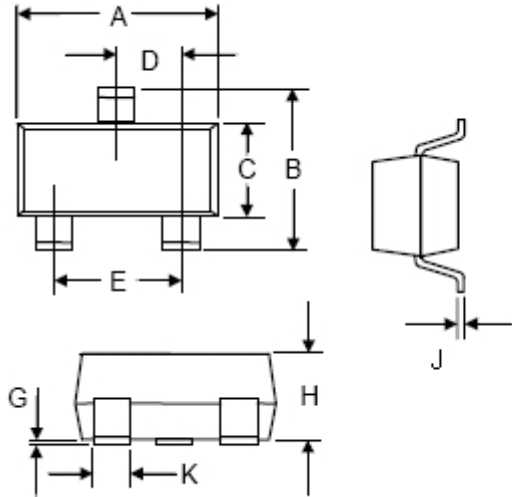
## ■ TYPICAL CHARACTERISTICS (25°C Unless Note)



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## ■ SOT-23L PACKAGE DIMENSIONS



Symbol	Dimensions			
	Inches		Millimeters	
	Min	Max	Min	Max
A	0.110	0.120	2.80	3.04
B	0.104	0.116	2.65	2.95
C	0.059	0.067	1.50	1.70
D	0.037 TYP		0.95 TYP	
E	0.70	0.081	1.78	2.05
G	---	0.004	---	0.10
H	0.041	0.045	1.05	1.15
J	0.004	0.008	0.10	0.20
K	0.012	0.16	0.30	0.40