

## 30V N-Channel Enhancement Mode MOSFET

### DESCRIPTION

The UP8406 is the N-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.

*UP8406 S-TRG ROHS Compliant This is Halogen Free*

### FEATURE

- ◆ 30V/5.6A,  $R_{DS(ON)} = 23m\Omega$ (typ.) @  $V_{GS} = 10V$
- ◆ 30V/5.0A,  $R_{DS(ON)} = 28m\Omega$ (typ.) @  $V_{GS} = 4.5V$
- ◆ 30V/3.2A,  $R_{DS(ON)} = 38m\Omega$ (typ.) @  $V_{GS} = 2.5V$
- ◆ Super high density cell design for extremely low  $R_{DS(ON)}$
- ◆ Exceptional on-resistance and Maximum DC current capability

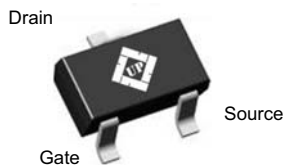
### APPLICATIONS

- ◆ Power Management in Note book
- ◆ Portable Equipment
- ◆ DSC
- ◆ LCD Display inverter
- ◆ Battery Powered System
- ◆ DC/DC Converter

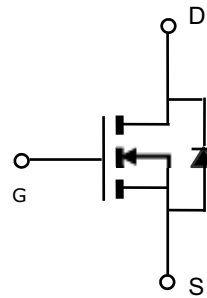


N-Channel Enhancement Mode MOSFET

### PIN CONFIGURATION



SOT-23  
Top View



### PART NUMBER INFORMATION

<p><b>u p 8406 S - TR G</b></p> <p>a b c d e f</p>	<p><b>a : Company name.</b></p> <p><b>b : Channel type.</b></p> <p><b>c : Product Serial number.</b></p> <p><b>d : Package Code</b></p> <p><b>e : Handling Code</b></p> <p><b>f : Lead Plating Code</b></p> <p style="padding-left: 20px;">G : Lead-free product.</p> <p style="padding-left: 20px;">This product is Halogen Free</p>
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## ■ ORDERING INFORMATION

Part Number	Package Code	Handling Code	Shipping
UP8406S-TRG	S : SOT-23	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	?2	V
I <sub>D</sub>	Continuous Drain Current (T <sub>c</sub> =25°C) <sup>A</sup>	V <sub>GS</sub> =10V	5.6
	Continuous Drain Current (T <sub>c</sub> =70°C) <sup>A</sup>		5.0
I <sub>DM</sub>	Pulsed Drain Current <sup>B</sup>	20	A
P <sub>D</sub>	Power Dissipation	T <sub>A</sub> =25°C	1.25
		T <sub>A</sub> =70°C	0.8
T <sub>J</sub>	Operation Junction Temperature	-55 to 150	
T <sub>STG</sub>	Storage Temperature Range	-55 to 150	

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 <del>100</del>	/W
R <sub>θJL</sub>	Thermal Resistance Junction to Lead <sup>A</sup> Steady-State	-	80 <del>60</del>	/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> =2V			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			1	μA
		V <sub>DS</sub> =24V, V <sub>GS</sub> =0V T <sub>J</sub> =55			5	
R <sub>DS(ON)</sub>	Drain-source On-Resistance <sup>B</sup>	V <sub>GS</sub> =10V, I <sub>D</sub> =5.6A		18	23	mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =5.0A		24	28	
		V <sub>GS</sub> =2.5V, I <sub>D</sub> =3.2A		30	38	
G <sub>fs</sub>	Forward Transconductance	V <sub>DS</sub> =15V, I <sub>D</sub> =5.0A		12		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>				5.8	A
<b>Dynamic Parameters</b>						
Q <sub>g</sub> (4.5V)	Total Gate Charge	V <sub>DS</sub> =20V V <sub>GS</sub> =4.5V I <sub>D</sub> ≅5.8A		12	21	nC
Q <sub>gs</sub>	Gate-Source Charge			1.9		
Q <sub>gd</sub>	Gate-Drain Charge			3.5		
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =15V V <sub>GS</sub> =0V f=1MHz		468		pF
C <sub>oss</sub>	Output Capacitance			272		
C <sub>rss</sub>	Reverse Transfer Capacitance			46		
t <sub>d(on)</sub>	Turn-On Time	V <sub>DD</sub> =15V I <sub>D</sub> =4A		9	18	nS
t <sub>r</sub>				12	25	
t <sub>d(off)</sub>	Turn-Off Time	V <sub>GEN</sub> =10V R <sub>G</sub> =3.3Ω		23	46	
t <sub>f</sub>				14	25	

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.

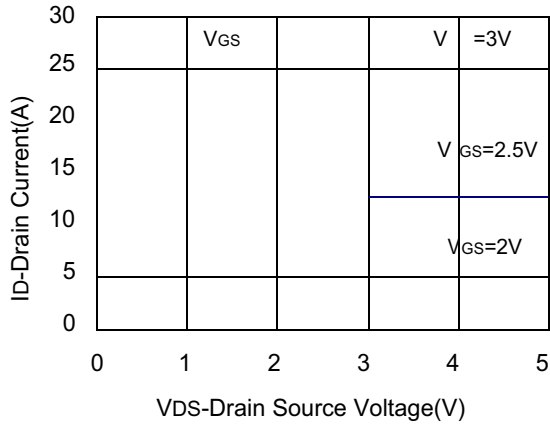
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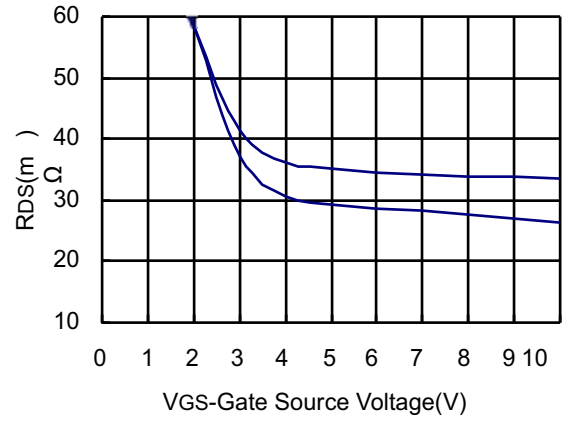


■ TYPICAL CHARACTERISTICS (25°C Unless Note)

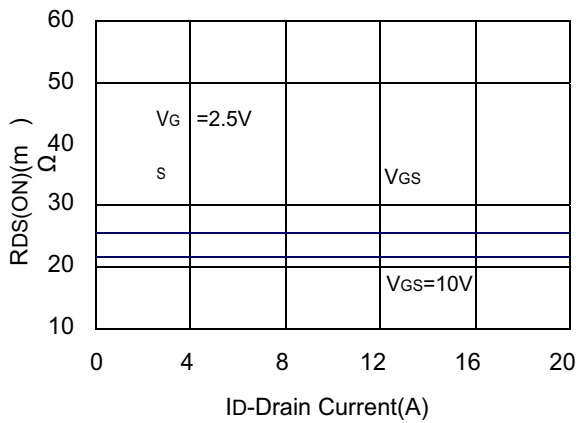
Output Characteristics



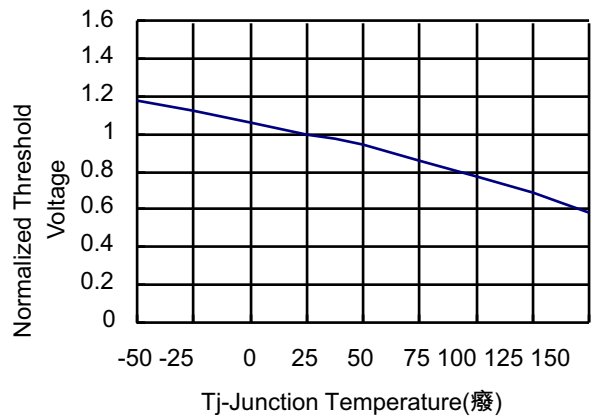
Drain-Source On Resistance



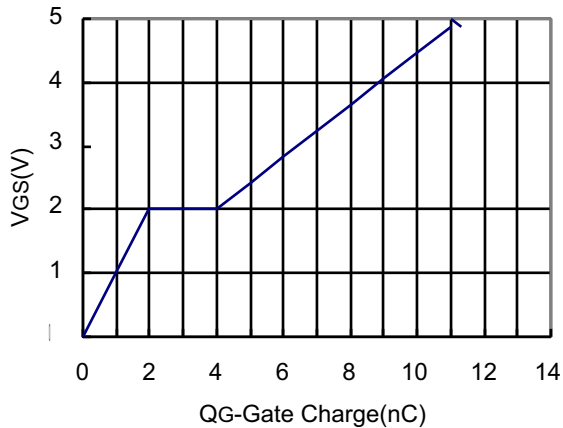
Drain Source On Resistance



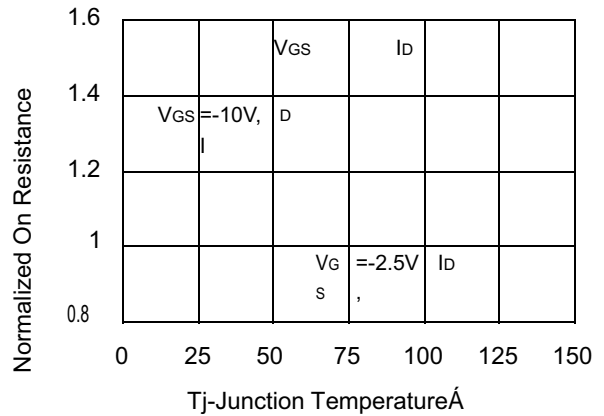
Gate Threshold Voltage



Gate Charge



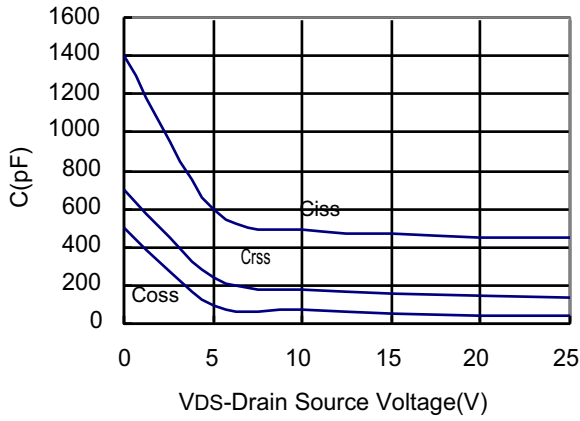
Drain Source Resistance



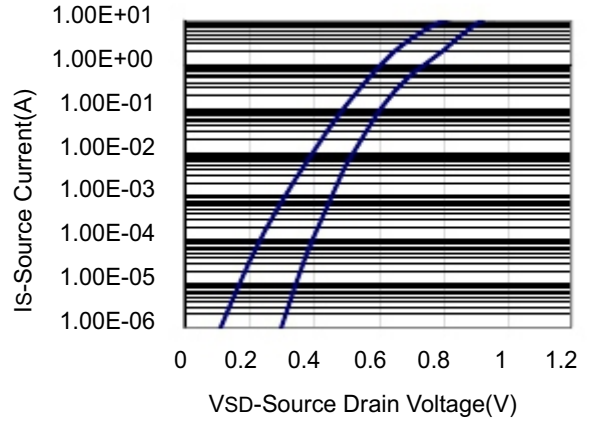


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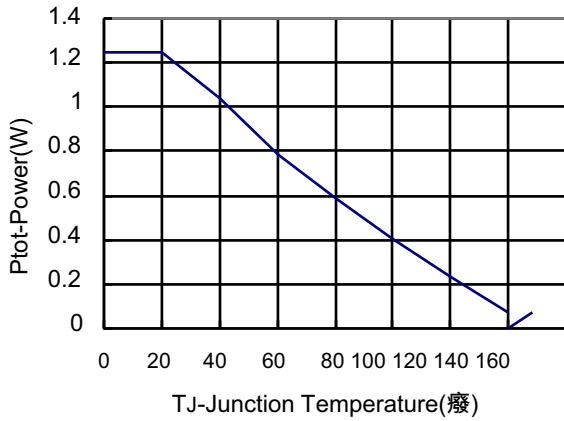
Capacitance



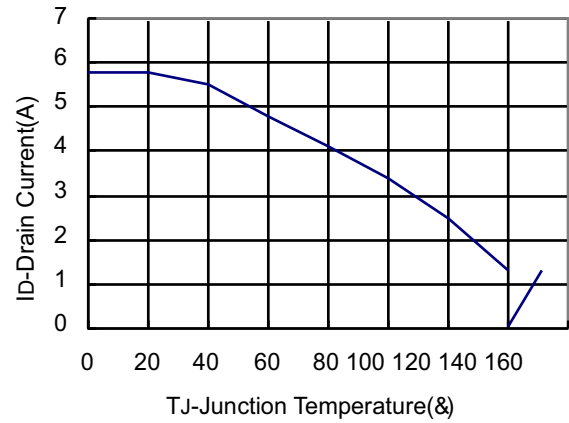
Source Drain Diode Forward



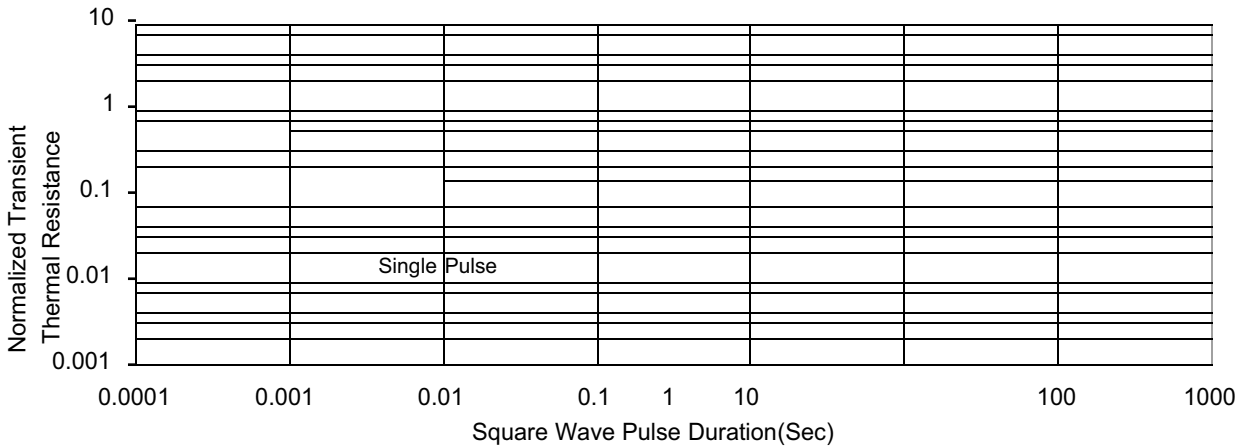
Power Dissipation



Drain Current



Thermal Transient Impedance





■ SOT-23 PACKAGE DIMENSIONS

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.900	1.150	0.035	0.045
A1	0.000	0.100	0.000	0.004
A2	0.900	1.050	0.035	0.041
b	0.300	0.500	0.012	0.020
c	0.080	0.150	0.003	0.006
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950 TYP.		0.037 TYP	
e1	1.800	2.000	0.071	0.079
L1	0.550 REF.		0.022 REF.	
L1	0.300	0.500	0.012	0.020
θ	0°	8°	0°	8°

