



## -30V P-Channel Enhancement Mode MOSFET

### DESCRIPTION

The up9435 is the P-Channel logic enhancement mode power field effect transistor is produced using high cell density, advanced trench technology to provide excellent  $R_{DS(ON)}$ .

This device is suitable for use as a load switch or in PWM and gate charge for most of the synchronous buck converter applications.

*up9435M-TRG ROHS Compliant This is Halogen Free*

### FEATURE

- ◆ **-30V/-5.8A,  $R_{DS(ON)} = 38m\Omega(typ.)@V_{GS} = -10V$**
- ◆ **-30V/-4.0A,  $R_{DS(ON)} = 60m\Omega(typ.)@V_{GS} = -4.5V$**
- ◆ Super high density cell design for extremely low  $R_{DS(ON)}$
- ◆ Exceptional on-resistance and Maximum DC current capability

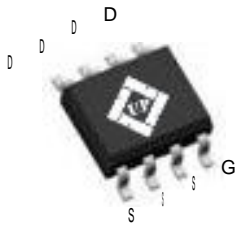
### APPLICATIONS

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

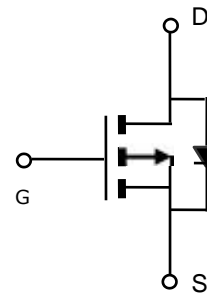


P-Channel Enhancement Mode MOSFET

### PIN CONFIGURATION



SOP-8  
Top View



### PART NUMBER INFORMATION

<p><b>u p 9435 M - 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>g : Lead Plating Code</b> G : Lead-free product.</p> <p style="color: green;"><b><i>This product is Halogen Free</i></b></p>
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■ ORDERING INFORMATION

Part Number	Package Code	Handling Code	Shipping
up9435M-TRG	M : SOP-8	TR : Tape&Reel	2.5K/Reel

- ※ Year Code : 00 ~ 90, 2010 : 00
- ※ Week Code : 01 ~ 54
- ※ SOP-8 : 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	±20	V
I <sub>D</sub>	Continuous Drain Current, V <sub>GS</sub> =10V <sup>A</sup>	T <sub>A</sub> =25°C	-5.8
		T <sub>A</sub> =70°C	-4.2
I <sub>DM</sub>	Pulsed Drain Current <sup>B</sup>	-20	A
E <sub>AS</sub>	Single Pulse Avalanche energy L=0.1mH <sup>C</sup>	60	mJ
P <sub>D</sub>	Power Dissipation	T <sub>A</sub> =25°C	2.05
		T <sub>A</sub> =70°C	1.5
T <sub>J</sub>	Operation Junction Temperature	-55/150	°C
T <sub>STG</sub>	Storage Temperature Range	-55/150	°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	Min	Typ	Max	Unit
R <sub>θJA</sub>	Thermal Resistance-Junction to Ambient			85	°C/W
R <sub>θJC</sub>	Thermal Resistance-Junction to Case			58	°C/W



■ ELECTRICAL CHARACTERISTICS (T<sub>A</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	-1.0		-2.5	V
I <sub>GSS</sub>	Gate Leakage Current	V <sub>DS</sub> = 0V, V <sub>GS</sub> = ±20V			±100	nA
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> = -24V, V <sub>GS</sub> = 0V			-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> = -5.8A V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -4.0A		38 60	48 78	mΩ
G <sub>fs</sub>	Forward Transconductance	V <sub>DS</sub> = -10V, I <sub>D</sub> = -5.8A		6		S
<b>Source-Drain Diode</b>						
V <sub>SD</sub>	Diode Forward Voltage	I <sub>S</sub> = -2.0A, V <sub>GS</sub> = 0V		-0.7	-1.2	V
I <sub>S</sub>	Continuous Source Current <sup>AD</sup>				-6	A
<b>Dynamic Parameters</b>						
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> = -20V, V <sub>GS</sub> = -10V I <sub>D</sub> = -5.8A		6.2		nC
Q <sub>gs</sub>	Gate-Source Charge			2.5		
Q <sub>gd</sub>	Gate-Drain Charge			3.3		
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> = -15V, V <sub>GS</sub> = 0V f = 1MHz		640		pF
C <sub>oss</sub>	Output Capacitance			270		
C <sub>rss</sub>	Reverse Transfer Capacitance			103		
t <sub>d(on)</sub>	Turn-On Time	V <sub>DD</sub> = 15V, V <sub>GS</sub> = -10V, I <sub>D</sub> = -5A, R <sub>G</sub> = 3.3Ω		9.2		nS
t <sub>r</sub>				16.5		
t <sub>d(off)</sub>	Turn-Off Time			21.3		
t <sub>f</sub>				21.5		

Note:

- A. The value of R<sub>θJA</sub> is measured with the device mounted on 1 in 2 FR-4 board with 2oz. Copper, in a still air environment with T<sub>A</sub> = 25 °C.
- B. The data tested by pulsed , pulse width ≅ 300μs , duty cycle ≅ 2%
- C. The EAS data shows Max. rating . The test condition is V<sub>DD</sub> = -25V, V<sub>GS</sub> = -10V, L = 0.1mH.
- D. 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.

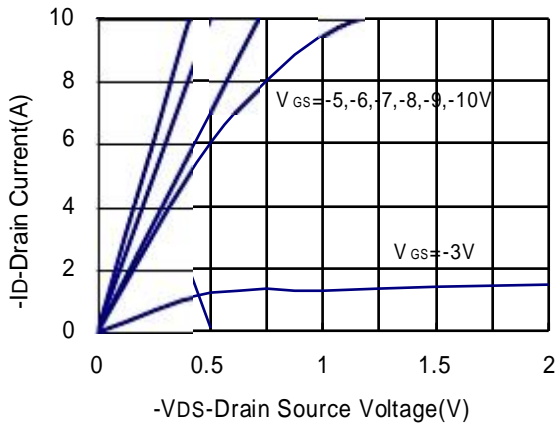
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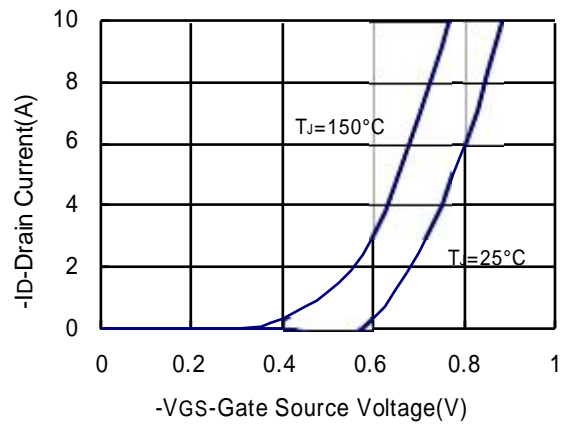


■ TYPICAL CHARACTERISTICS

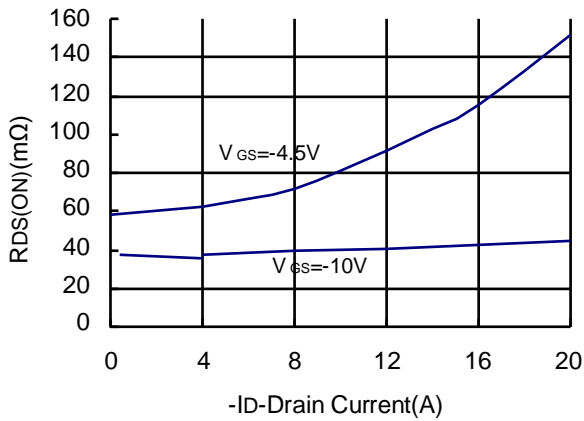
Output Characteristics



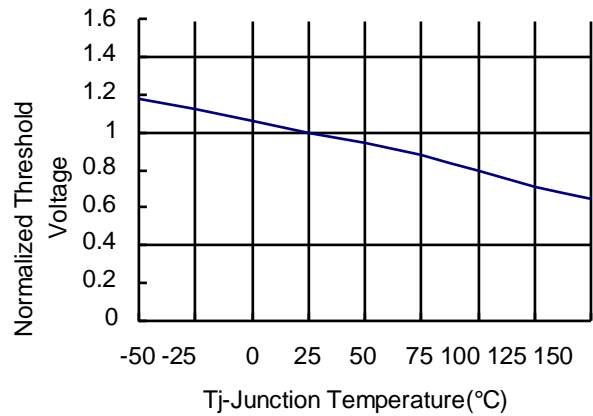
Transfer Characteristics



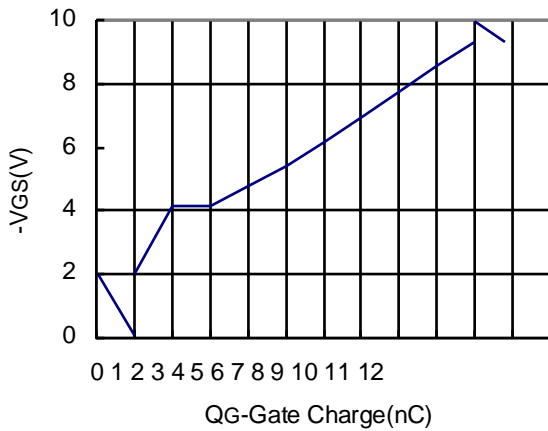
Drain Source On Resistance



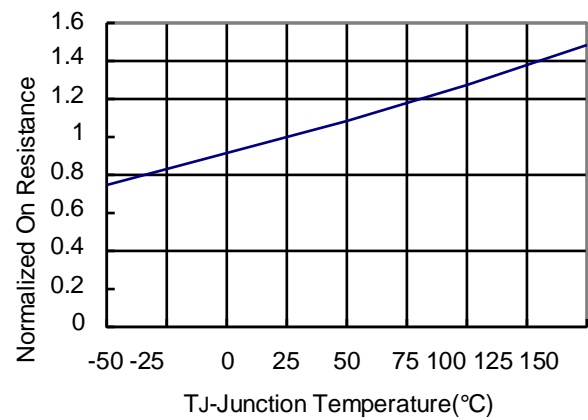
Gate Threshold Voltage



Gate Charge

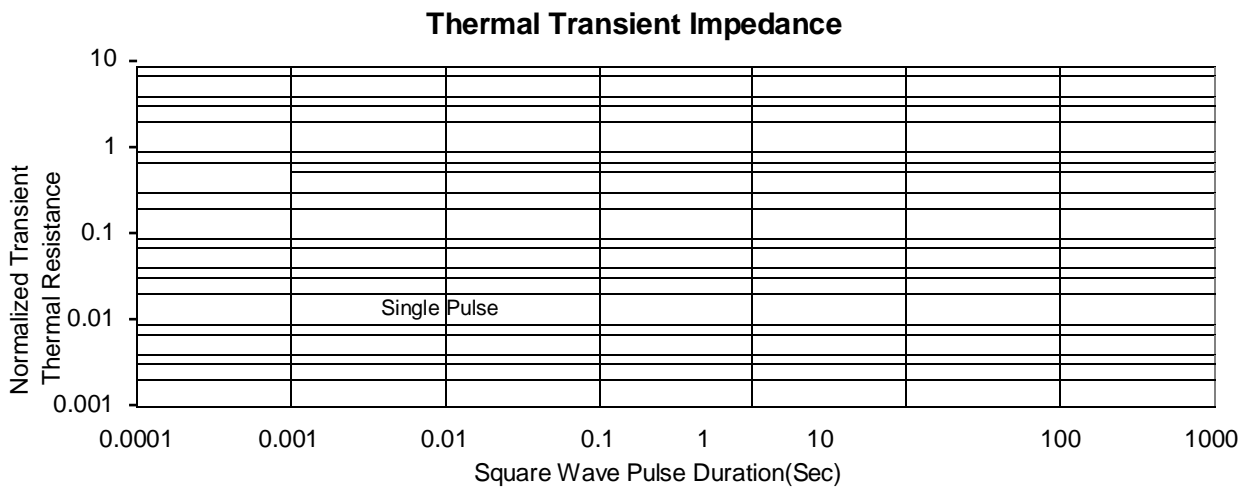
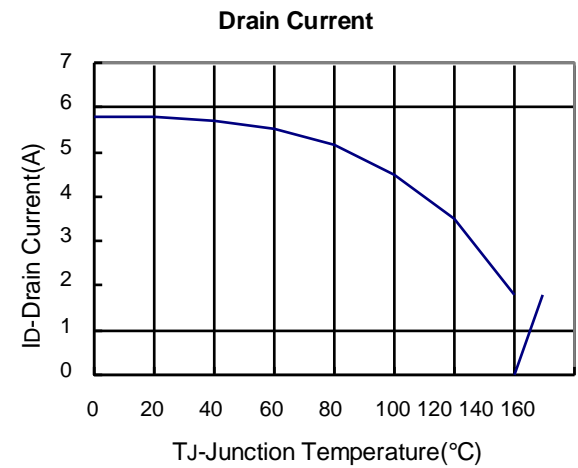
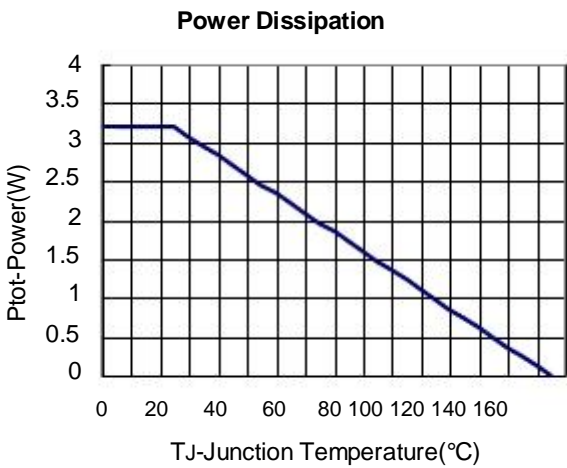
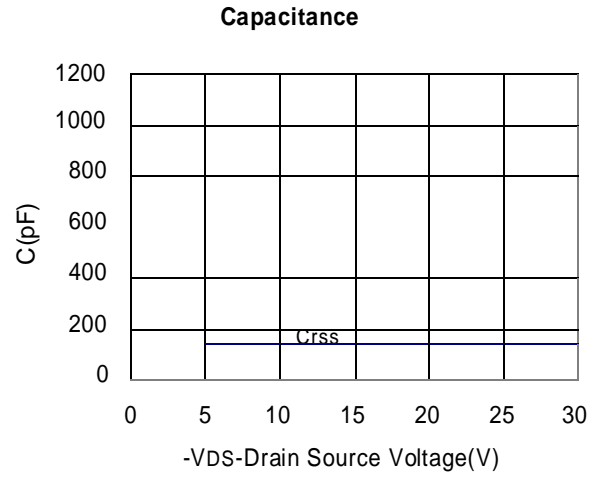
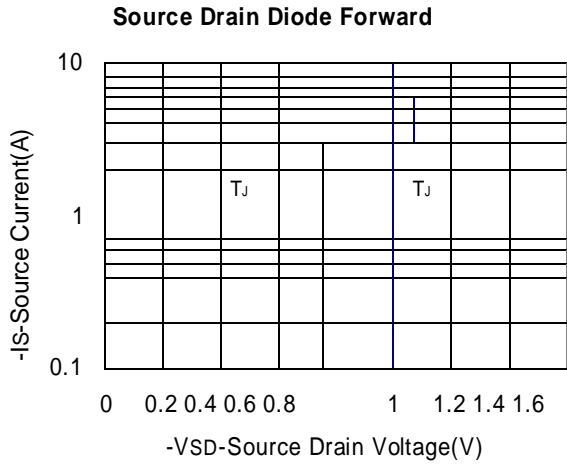


Drain Source On Resistance





■ TYPICAL CHARACTERISTICS





■ SOP-8 PACKAGE DIMENSIONS

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.040	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270 BSC		0.050 BSC	
L	0.400	1.270	0.016	0.050
$\theta$	0°	8°	0°	8°

