

1.Description

STN4438 is the N-Channel logiceenhancement mode power field effect transistor which is produced using high cell density, DMOS trench technology. This high density process is especially tailored to minimize on-state resistance. These devices are particularly suited for low voltage application such as power management and other battery powered circuits where high-side switching.

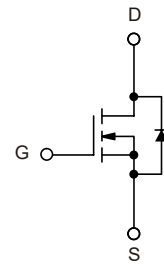
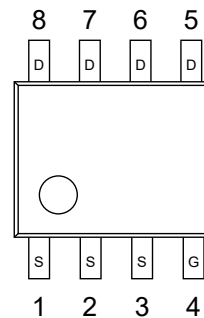
2.Features

- $V_{DS(V)}=60V$
- $R_{DS(ON)}<32m\Omega(V_{GS}=10V)$
- $R_{DS(ON)}<37m\Omega(V_{GS}=4.5V)$

3.Pinning information

Pin	Symbol	Description
4	G	GATE
1,2,3	S	SOURCE
5,6,7,8	D	DRAIN

SOP-8



4.Absolute Maximum Ratings $T_A=25^{\circ}C$

Parameter		Symbol	Value	Units
Drain-Source Voltage		V_{DSS}	60	V
Gate-Source Voltage		V_{GSS}	± 20	V
Continuous Drain Current ($T_J=150^{\circ}C$)	$T_A=25^{\circ}C$	I_D	8.2	A
	$T_A=70^{\circ}C$		6.6	
Pulsed Drain Current		I_{DM}	40	
Continuous Source Current (Diode Conduction)		I_S	3	
Power Dissipation	$T_A=25^{\circ}C$	P_D	3.1	W
	$T_A=70^{\circ}C$		2	$^{\circ}C$
Operation Junction Temperature		T_J	150	$^{\circ}C$
Storage Temperature Range		T_{STG}	-55 to 150	$^{\circ}C/W$
Thermal Resistance-Junction to Ambient		$R_{\theta JA}$	70	



5. $T_A=25^{\circ}\text{C}$ unless otherwise noted

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Static						
Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu A$	60			V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1		3	V
Gate-source leakage	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$			± 100	nA
Zero gate voltage drain current	I_{DSS}	$V_{DS}=48V, V_{GS}=0V$			1	μA
		$V_{DS}=48V, V_{GS}=0V, T_J=5^{\circ}\text{C}$			5	μA
On-State Drain Current	$I_{D(ON)}$	$V_{DS}\geq 5V, V_{GS}=10V$	40			A
Drain-source On Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=10A$		25	32	m Ω
		$V_{GS}=4.5V, I_D=8A$		30	37	m Ω
Forward Transconductance	g_{FS}	$V_{DS}=5V, I_D=6.2A$		24		S
Diode Forward Voltage	V_{SD}	$I_S=1A, V_{GS}=0V$		0.8	1.2	V
Dynamic						
Total gate charge	Q_g	$V_{DS}=30V, V_{GS}=10V, I_D=8.2A$		48	58	nC
Gate-Source Charge	Q_{gs}			24.2	30	nC
Gate-Drain Charge	Q_{gd}			14.5		nC
Input Capacitance	C_{iss}	$V_{DS}=30V, V_{GS}=0V, f=1\text{MHz}$		1600		pF
Output Capacitance	C_{oss}			155		pF
Reverse Transfer Capacitance	C_{rss}			116		pF
Turn-On Time	$t_{D(on)}$	$V_{DS}=30V, R_L=3.6\Omega$		8.5		nS
	t_r			6		nS
Turn-Off Time	$t_{D(off)}$	$V_{GEN}=3V$		29		nS
	t_f			6		nS



6.1 Typical Characteristics

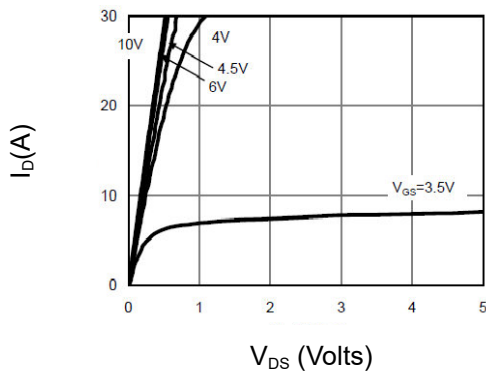


Figure 1: On-Region Characteristics

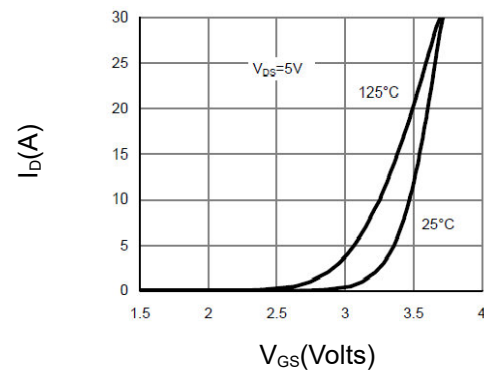


Figure 2: Transfer Characteristics

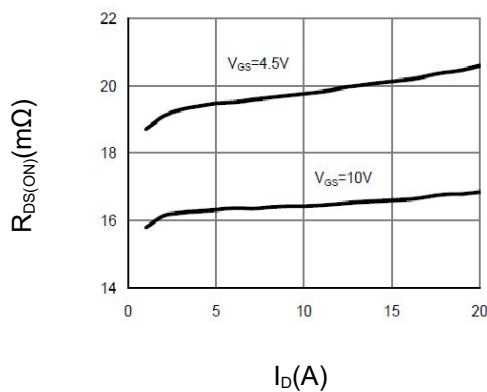


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

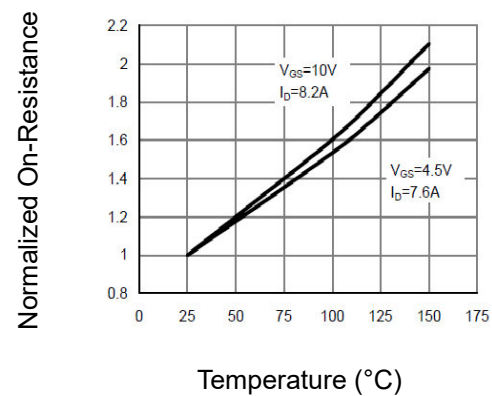


Figure 4: On-Resistance vs. Junction Temperature

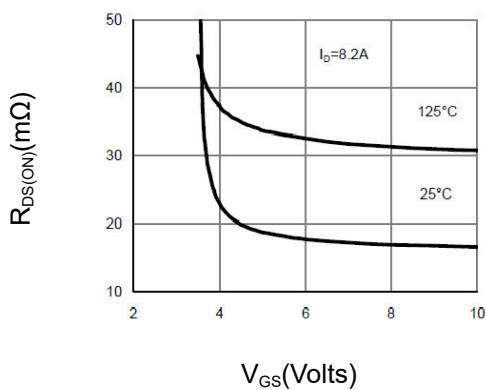


Figure 5: On-Resistance vs. Gate-Source Voltage

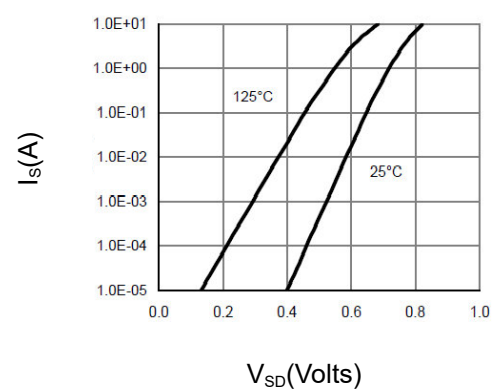


Figure 6: Body-Diode Characteristics



6.2 Typical Characteristics

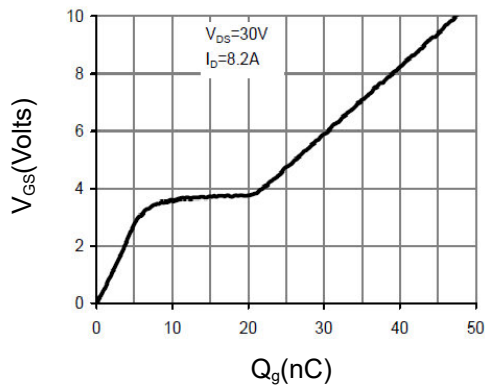


Figure 7: Gate-Charge Characteristics

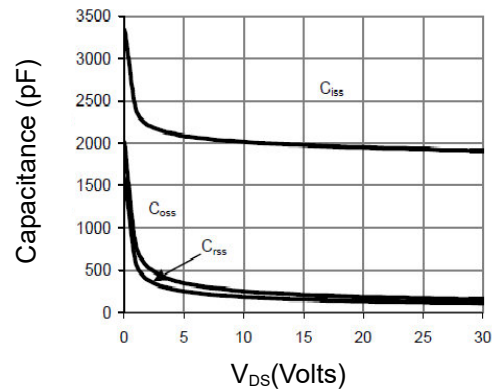


Figure 8: Capacitance Characteristics

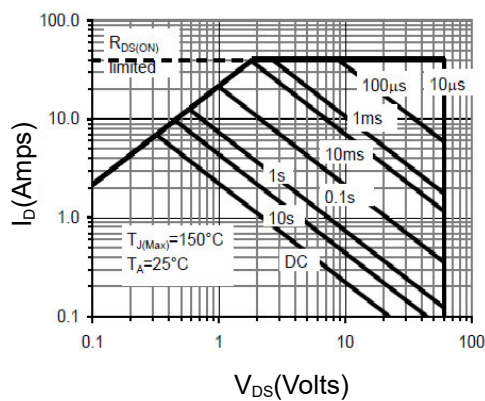


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

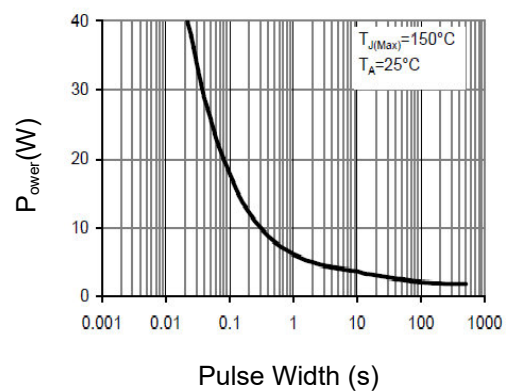


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

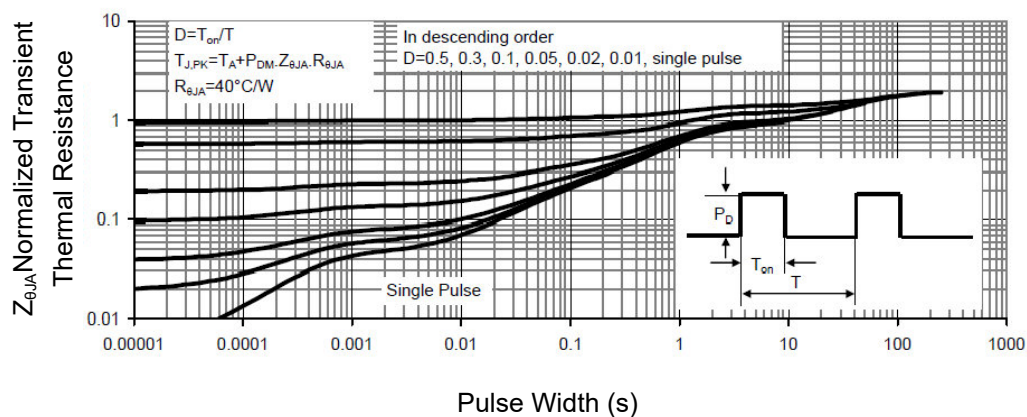
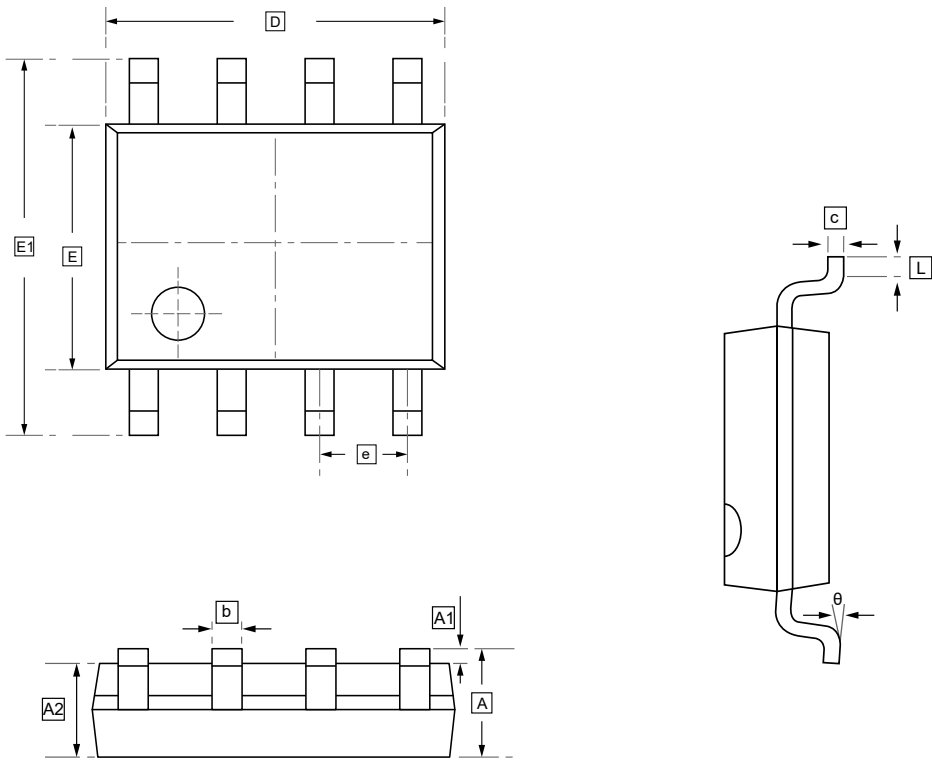


Figure 11: Normalized Maximum Transient Thermal Impedance



7.SOP-8 Package Outline Dimensions

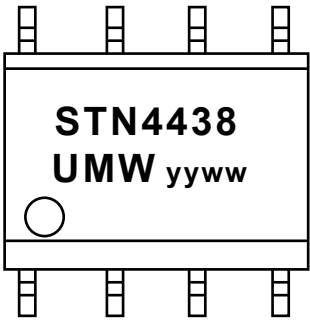


DIMENSIONS (mm are the original dimensions)

Symbol	A	A1	A2	b	c	D	E	E1	e	L	θ
Min	1.350	0.000	1.350	0.330	0.170	4.700	3.800	5.800	1.270	0.400	0°
Max	1.750	0.100	1.550	0.510	0.250	5.100	4.000	6.200	BSC	1.270	8°



8.Ordering information



yy: Year Code
ww: Week Code

Order Code	Package	Base QTY	Delivery Mode
UMW STN4438	SOP-8	3000	Tape and reel



9.Disclaimer

UMW reserves the right to make changes to all products, specifications. Customers should obtain the latest version of product documentation and verify the completeness and currency of the information before placing an order.

When applying our products, please do not exceed the maximum rated values, as this may affect the reliability of the entire system. Under certain conditions, any semiconductor product may experience faults or failures. Buyers are responsible for adhering to safety standards and implementing safety measures during system design, prototyping, and manufacturing when using our products to prevent potential failure risks that could lead to personal injury or property damage.

Unless explicitly stated in writing, UMW products are not intended for use in medical, life-saving, or life-sustaining applications, nor for any other applications where product failure could result in personal injury or death. If customers use or sell the product for such applications without explicit authorization, they assume all associated risks.

When reselling, applying, or exporting, please comply with export control laws and regulations of China, the United States, the United Kingdom, the European Union, and other relevant countries, regions, and international organizations.

This document and any actions by UMW do not grant any intellectual property rights, whether express or implied, by estoppel or otherwise. The product names and marks mentioned herein may be trademarks of their respective owners.