

## Single P-Channel MOSFET

### DESCRIPTION

STP4435 is the P-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior ,fast switching performance, and withstand high energy pulse in the avalanche and commutation mode. This device is suitable for use as a load switch or PWM applications.

### PART NUMBER INFORMATION

**STP 4435 M - TR G**  
 a      b      c      d      e

- a : Company name.
- b : Product Serial number.
- c : Package code                      M:SOP-8
- d : Handling code                      TR:Tape&Reel
- e : Green produce code              G:RoHS Compliant

### FEATURES

**$V_{DS} = -30V$ ,  $I_D = -10.6A$**

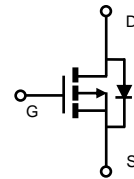
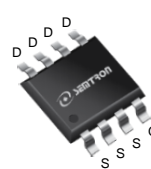
$R_{DS(ON)} = 14m\Omega(Typ.)@V_{GS} = -10V$

$R_{DS(ON)} = 18m\Omega(Typ.)@V_{GS} = -4.5V$

- ◆Fast switch
- ◆High power and current handling capability

### APPLICATIONS

- ◆Load Switch
- ◆LED Application
- ◆DC-DC Power Management



SOP-8

### ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ C$ Unless otherwise noted)

Symbol	Parameter	Rating	Units
$V_{DSS}$	Drain-Source Voltage	-30	V
$V_{GSS}$	Gate-Source Voltage	$\pm 20$	V
$I_D$	Continuous Drain Current	$T_A = 25^\circ C$	-10.6
		$T_A = 70^\circ C$	-8.5
$I_{DM}$	Pulsed Drain Current <sup>A</sup>	-42.4	A
$I_{AS}$	Avalanche Current <sup>A F</sup>	-30	A
$E_{AS}$	Single Pulse Avalanche energy $L=0.1mH$ <sup>A F</sup>	45	mJ
$P_D$	Power Dissipation <sup>B</sup>	$T_A = 25^\circ C$	3.1
		$T_A = 70^\circ C$	2
$T_J$	Operation Junction Temperature	-55/150	$^\circ C$
$T_{STG}$	Storage Temperature Range	-55/150	$^\circ C$

### THERMAL RESISTANCE

Symbol	Parameter	Typ	Max	Units
$R_{\theta JA}$	Thermal Resistance Junction to Ambient <sup>C</sup>	$t \leq 10s$	40	$^\circ C/W$
		Steady-State	75	
$R_{\theta JC}$	Thermal Resistance Junction to Case <sup>C</sup>		27	

## ELECTRICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ Unless otherwise noted)

Symbol	Parameter	Condition	Min	Typ	Max	Unit
<b>Static Parameters</b>						
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> = 0V, I <sub>D</sub> = -250 $\mu$ A	-30			V
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250 $\mu$ A	-1	-1.6	-2.5	V
I <sub>GSS</sub>	Gate Leakage Current	V <sub>DS</sub> = 0V, V <sub>GS</sub> = $\pm$ 20V			$\pm$ 100	nA
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> = -30V, V <sub>GS</sub> = 0V T <sub>J</sub> = 25 $^\circ$ C			-1	$\mu$ A
		V <sub>DS</sub> = -24V, V <sub>GS</sub> = 0V T <sub>J</sub> = 75 $^\circ$ C			-10	
R <sub>DS(ON)</sub>	Drain-source On-Resistance <sup>D</sup>	V <sub>GS</sub> = -10V, I <sub>D</sub> = -10.6A V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -8A		14 18	18 25	m $\Omega$
G <sub>fs</sub>	Forward Transconductance	V <sub>DS</sub> = -10V, I <sub>D</sub> = -10A		12.5		S
<b>Diode Characteristics</b>						
V <sub>SD</sub>	Diode Forward Voltage <sup>B</sup>	I <sub>S</sub> = -1A, V <sub>GS</sub> = 0V		-0.7	-1	V
I <sub>S</sub>	Continuous Source Current				-5.3	A
t <sub>rr</sub>	Body Diode Reverse Recovery Time	I <sub>S</sub> = -10A, dI/dt = 100A/ $\mu$ s		13.8		ns
Q <sub>rr</sub>	Body Diode Reverse Recovery Charge			12.3		nC
<b>Dynamic and Switching Parameters</b>						
Q <sub>g</sub>	Total Gate Charge (10V)	V <sub>DS</sub> = -15V, V <sub>GS</sub> = -10V I <sub>D</sub> = -10A		36	48.6	nC
Q <sub>g</sub>	Total Gate Charge (4.5V)			18	24.3	
Q <sub>gs</sub>	Gate-Source Charge			8.1	10.9	
Q <sub>gd</sub>	Gate-Drain Charge			10.3	13.9	
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> = -15V, V <sub>GS</sub> = 0V f = 1MHz		2590	3626	pF
C <sub>oss</sub>	Output Capacitance			283	396	
C <sub>rss</sub>	Reverse Transfer Capacitance			172	241	
R <sub>g</sub>	Gate Resistance	V <sub>GS</sub> = 0V, V <sub>DS</sub> = 0V, F = 1MHz		8.8	13	$\Omega$
t <sub>d(on)</sub>	Turn-On Time <sup>E</sup>	V <sub>DD</sub> = -15V, V <sub>GEN</sub> = -10V, R <sub>G</sub> = 3 $\Omega$ , I <sub>D</sub> = -1A		19.1		nS
t <sub>r</sub>				4.8		
t <sub>d(off)</sub>	Turn-Off Time <sup>E</sup>			58		
t <sub>f</sub>				11.5		

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

A. The value of R $\theta$ <sub>JA</sub> is measured with the device in a still air environment with maximum junction temperature T<sub>J(MAX)</sub> = 150 $^\circ$ C (initial temperature T<sub>A</sub> = 25 $^\circ$ C).

B. The T<sub>J(MAX)</sub> = 150 $^\circ$ C, using junction-to-ambient thermal resistance.

C. Surface-mounted on FR-4 board using 1 sq-in pad, 2 oz Cu, in a still air environment with T<sub>A</sub> = 25 $^\circ$ C.

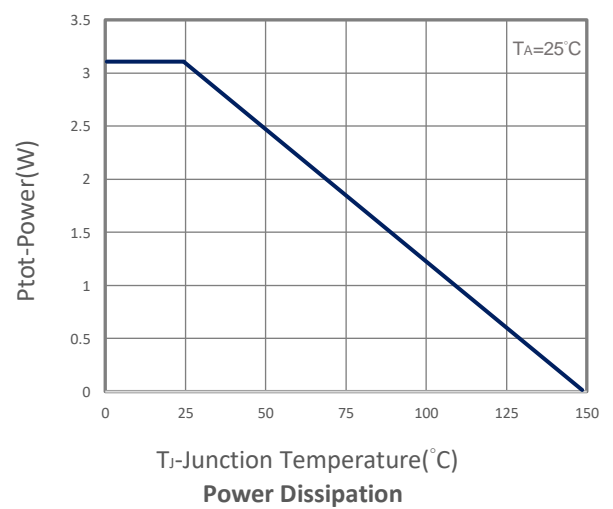
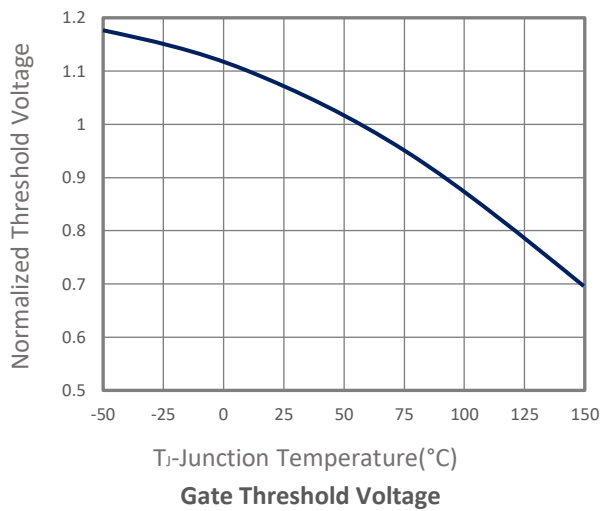
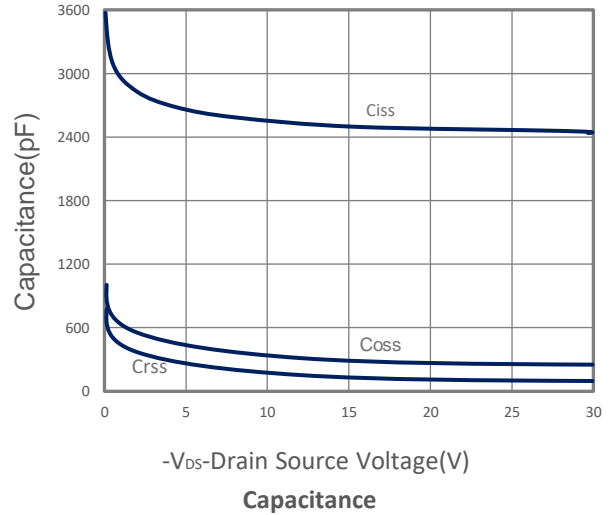
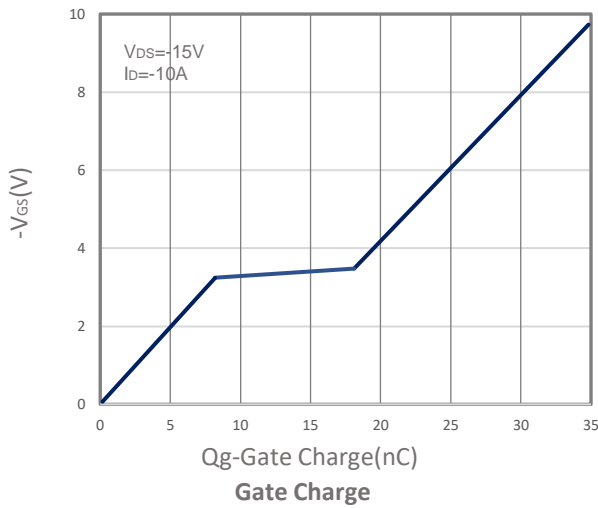
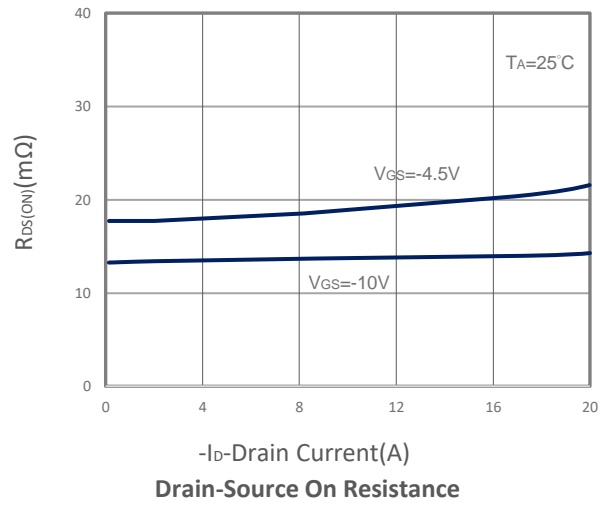
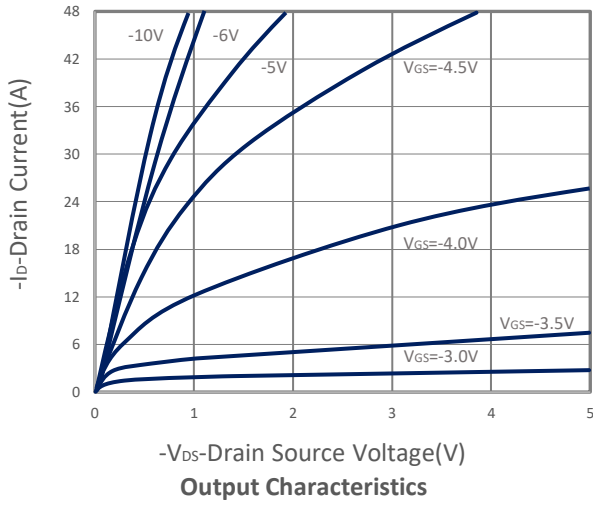
D. The data tested by pulsed, pulse width  $\leq$  300 $\mu$ s, duty cycle  $\leq$  2%.

E. Pulsed width limited by maximum junction temperature.

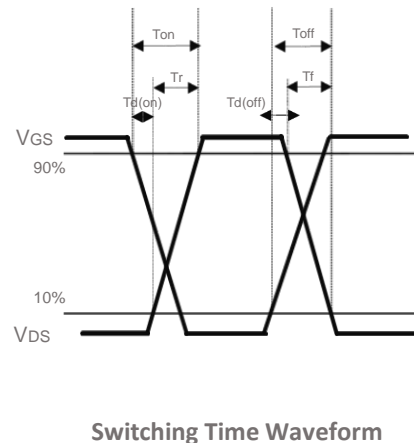
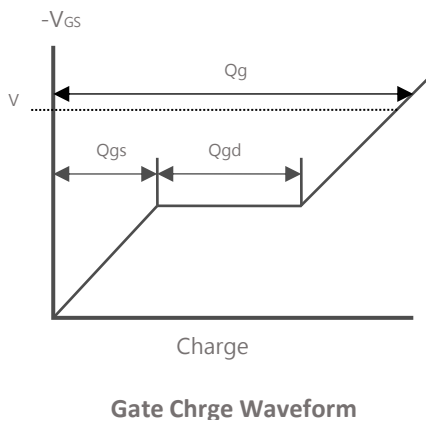
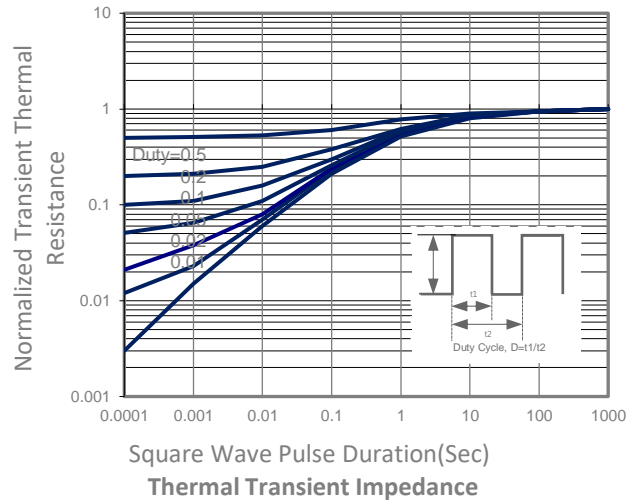
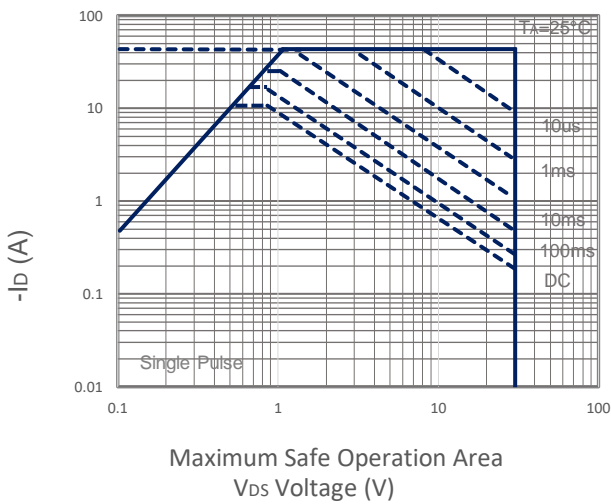
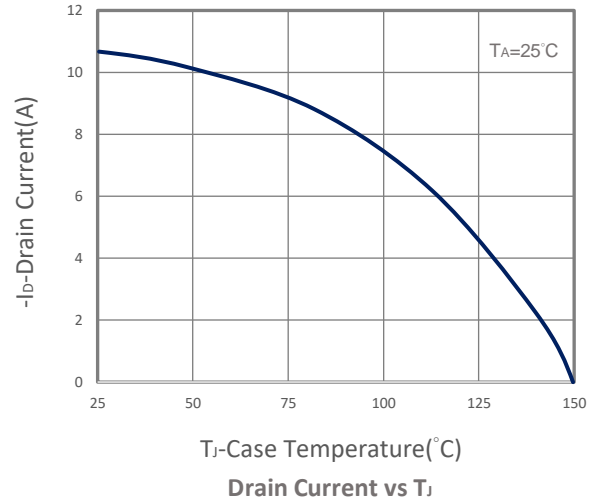
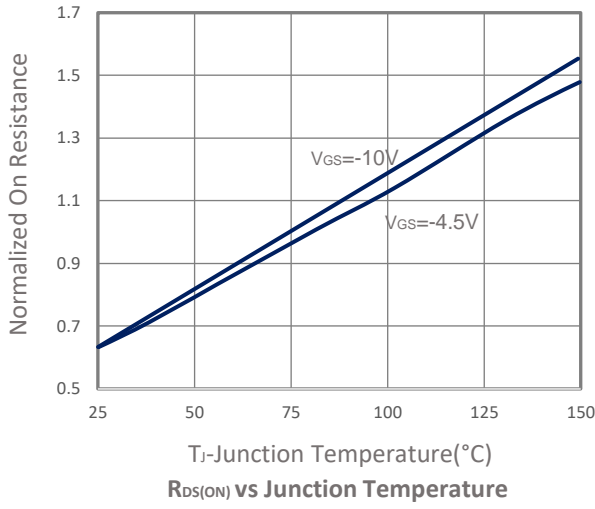
F. The E<sub>AS</sub> data shows Max.

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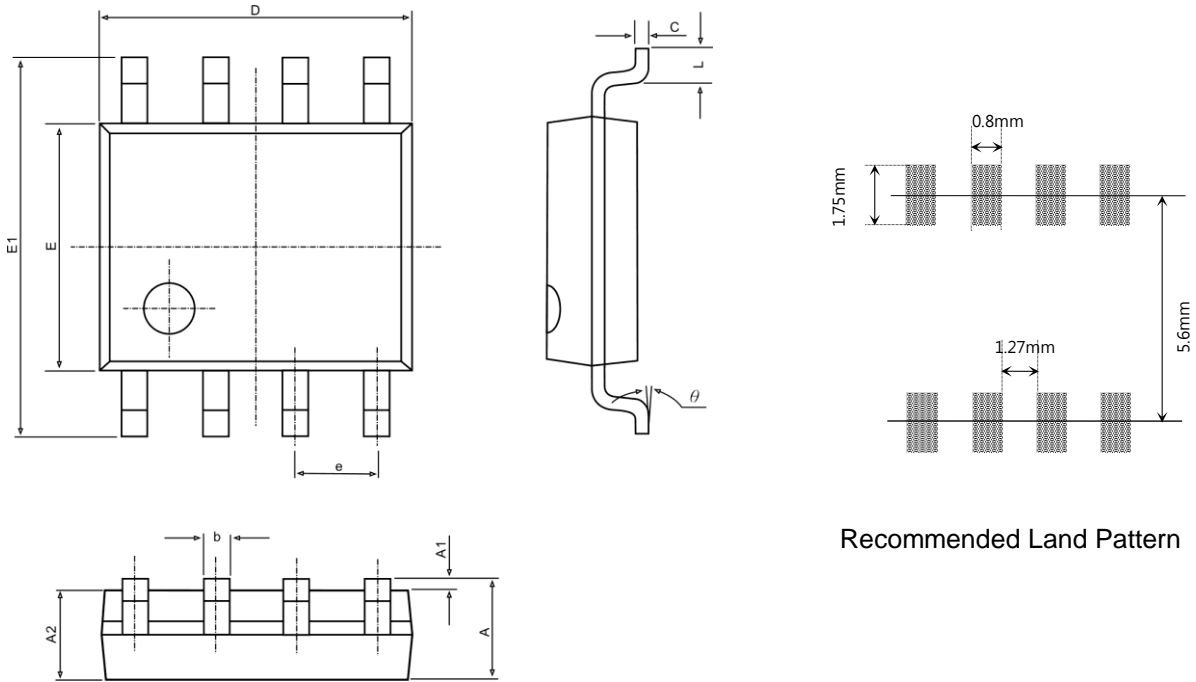
## TYPICAL CHARACTERISTICS



## TYPICAL CHARACTERISTICS



## ■ SOP-8 PACKAGE DIMENSIONS



Recommended Land Pattern

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	0.130	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	1.270BSC.		0.050BSC.	
L	0.400	1.270	0.016	0.005
θ	0°	8°	0°	8°