SemTron Microtech Corporation

STP4435M

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

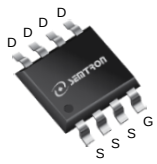
V_{DS} = -30V, I_D = -10.6A

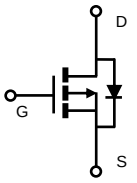
$R_{DS(ON)}$=14mΩ(Typ.)@V_{GS}=-10V
$R_{DS(ON)}$=18mΩ(Typ.)@V_{GS}=-4.5V

◆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°C Unless otherwise noted)

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

THERMAL RESISTANCE

Symbol	Parameter		Typ	Max	Units
$R_{\theta JA}$	Thermal Resistance Junction to Ambient [B]	t≦10s		40	°C/W
	Thermal Resistance Junction to Ambient [BC]	Steady-State		70	

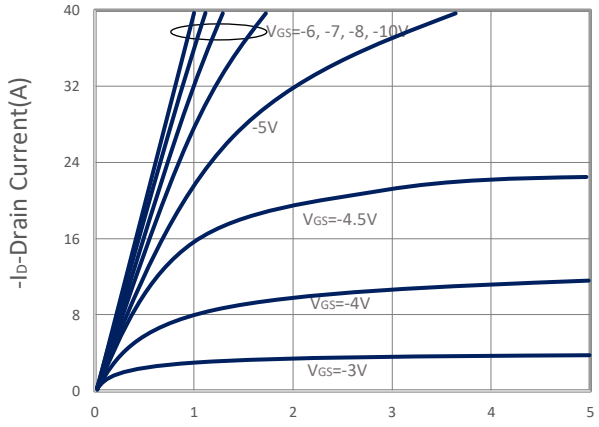
ELECTRICAL CHARACTERISTICS (T_A = 25°C Unless otherwise noted)

Symbol	Parameter	Condition	Min	Typ	Max	Unit
Static Parameters						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=-250μA	-30			V
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=-250μA	-1	-1.6	-2.5	V
I_{GSS}	Gate Leakage Current	V_{DS}=0V, V_{GS}=±20V			±100	nA
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=-30V, V_{GS}=0V, T_J=25°C			-1	μA
		V_{DS}=-24V, V_{GS}=0V, T_J=75°C			-10	
$R_{DS(ON)}$	Drain-source On-Resistance [D]	V_{GS}=-10V, I_D=-10.6A V_{GS}=-4.5V, I_D=-8A		14 18	18 25	mΩ
G_{fs}	Forward Transconductance	V_{DS}=-10V, I_D=-10A		12.5		S
Diode Characteristics						
V_{SD}	Diode Forward Voltage [D]	I_S=-1A, V_{GS}=0V		-0.7	-1	V
I_S	Continuous Source Current				-10.6	A
t_{rr}	Reverse Recovery Time	I_S=-10A, dI/dt=100A/μs		13.8		ns
Q_{rr}	Reverse Recovery Charge			12.3		nC
Dynamic and Switching Parameters						
Q_g	Total Gate Charge	V_{DS}=-15V, V_{GS}=-10V I_D=-10A		36	48.6	nC
Q_g	Total Gate Charge (4.5V)			18	24.3	
Q_{gs}	Gate-Source Charge			8.1	10.9	
Q_{gd}	Gate-Drain Charge			6.8	9.2	
C_{iss}	Input Capacitance	V_{DS}=-15V, V_{GS}=0V, f=1MHz		2150		pF
C_{oss}	Output Capacitance			298		
C_{rss}	Reverse Transfer Capacitance			135		
R_g	Gate Resistance	V_{GS}=0V, V_{DS}=0V, F=1MHz		8.8		Ω
$t_{d(on)}$	Turn-On Time [D]	V_{DD}=-15V, V_{GEN}=-10V, R_G=3.3Ω, I_D=-1A		7.7	15	nS
t_r				57.8	129	
$t_{d(off)}$	Turn-Off Time [D]			57.5	109	
t_f				21.3	40	

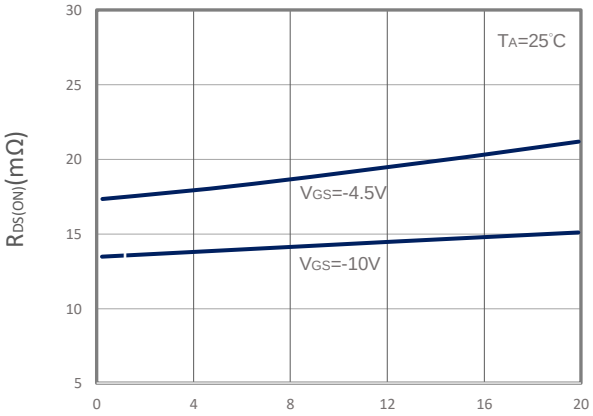
Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged.

A. Pulsed width limited by maximum junction temperature, $T_{J(MAX)}$=150°C.
B. The value of $R_{\theta JA}$ is measured with the device mounted on 1in2 FR-4 board in a still air environment with maximum junction temperature $T_{J(MAX)}$=150°C (initial temperature T_A=25°C).
C. $T_{J(MAX)}$=150°C,using junction-to-case thermal resistance ($R_{\theta JC}$) is more useful in additional heat sinking is used.
D. The data tested by pulsed , pulse width ≦ 300μS , duty cycle ≦ 2%.
E. The E_{AS} data shows Max, tested and pulse width limited by $T_{J(MAX)}$=150°C (initial temperature T_J=25°C).

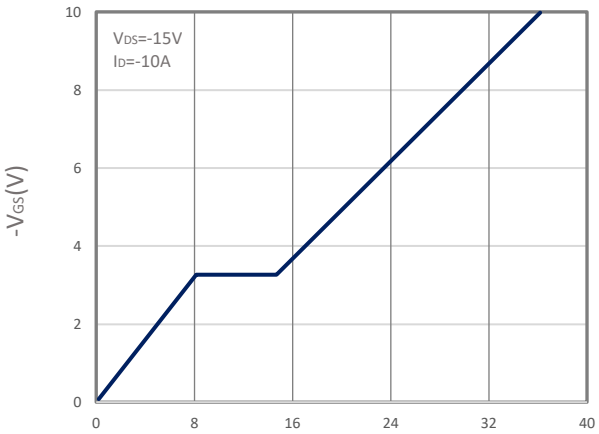
■TYPICAL CHARACTERISTICS



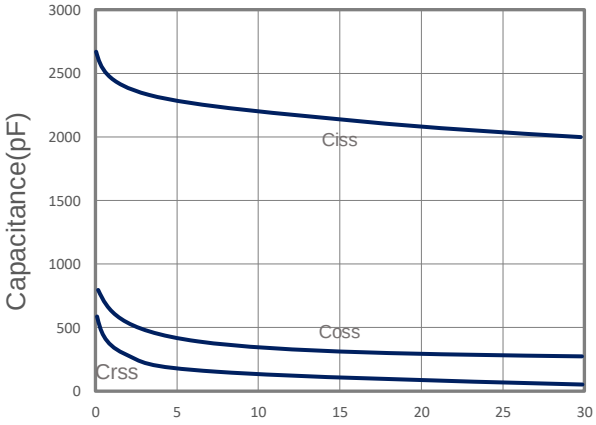
Output Characteristics



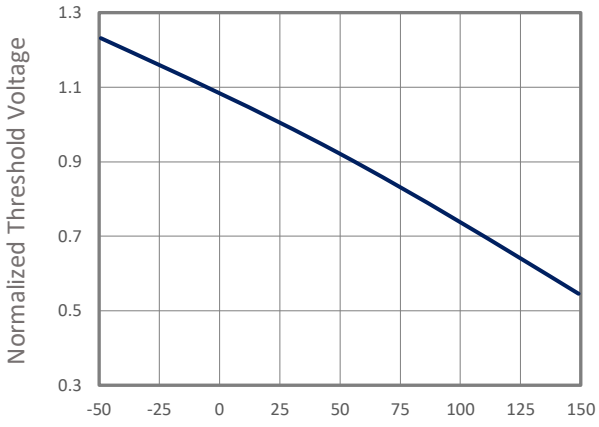
Drain-Source On Resistance



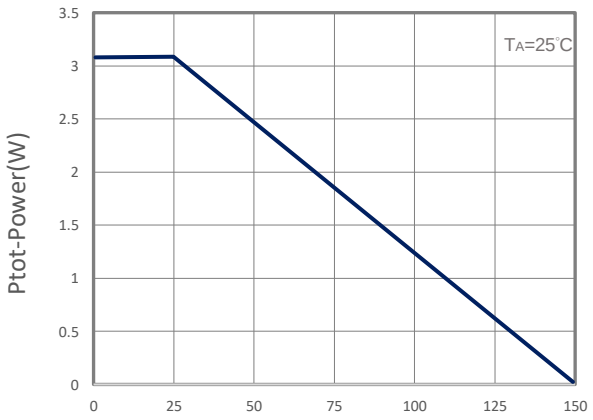
Gate Charge



Capacitance

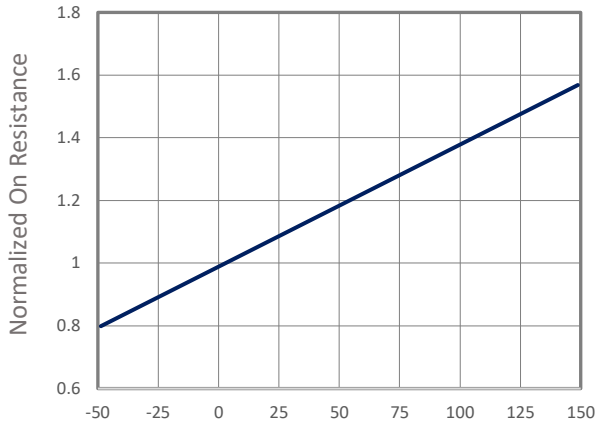


Gate Threshold Voltage

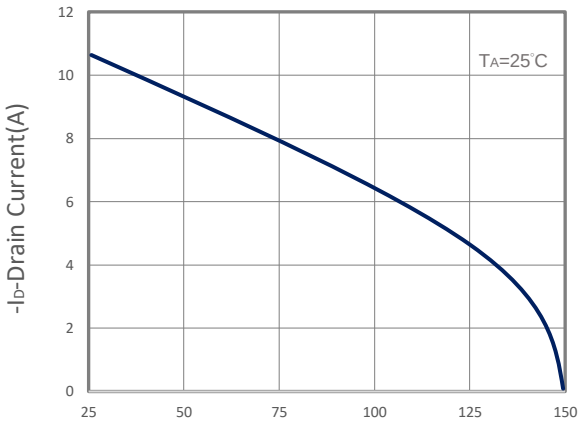


Power Dissipation

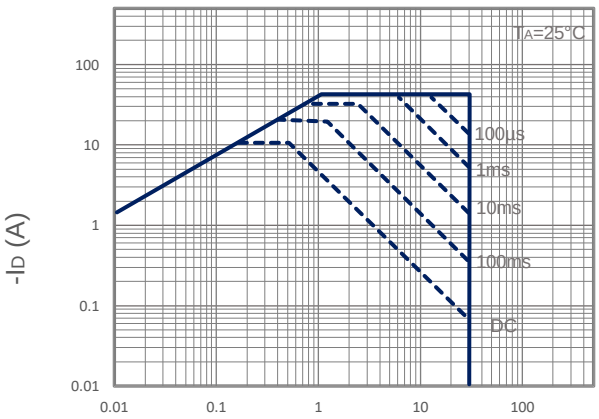
TYPICAL CHARACTERISTICS



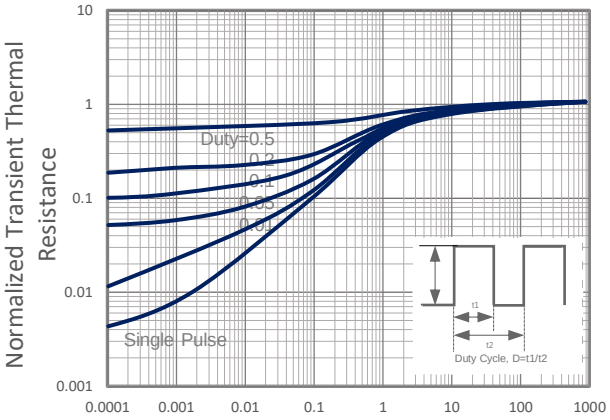
$R_{DS(ON)}$ vs Junction Temperature

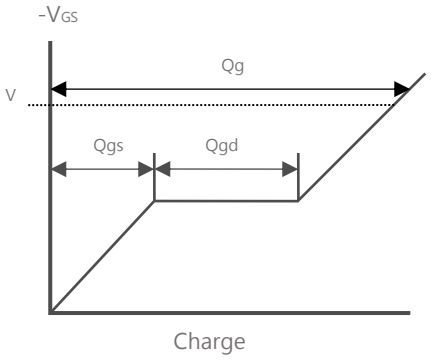


Drain Current vs T_J

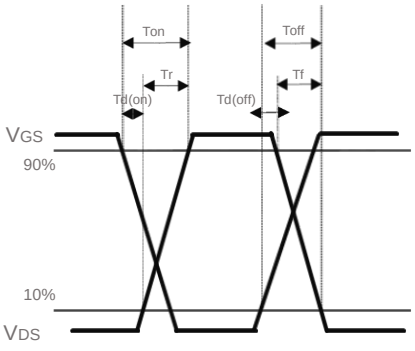


Maximum Safe Operation Area



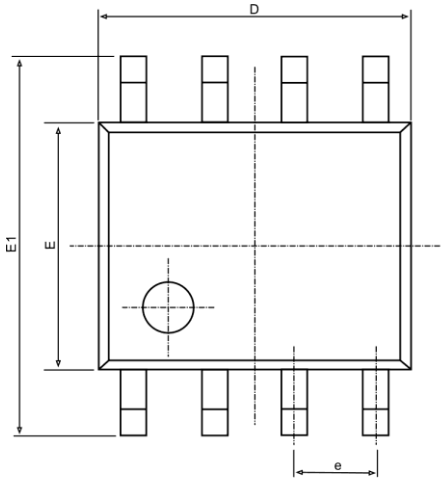


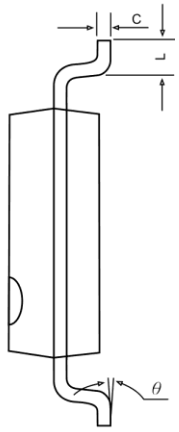
Gate Chrge Waveform

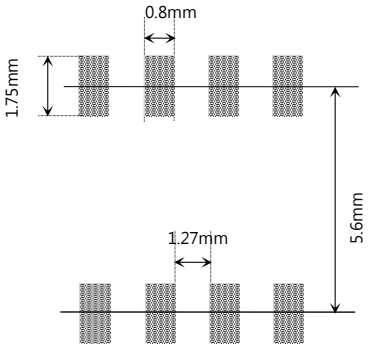


Switching Time Waveform

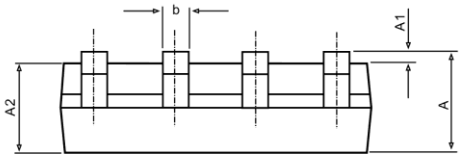
■SOP-8 PACKAGE DIMENSIONS







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°