TW4406A

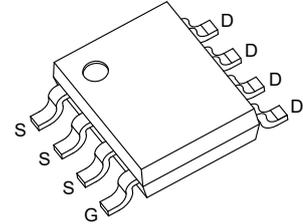## SOP-8 Plastic-Encapsulate MOSFETS

Features

- 30V, 15A, RDS(ON)=10mΩ@VGS = 10V
- Improved dv/dt capability
- Fast switching
- Green Device Available

Applications
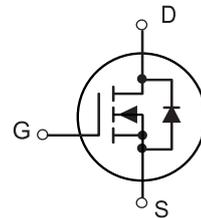
- Notebook
- Load Switch
- LED applications
- Hand-Held Device

SOP-8

RoHS COMPLIANT

Equivalent Circuit

Absolute Maximum Ratings Tc=25℃ unless otherwise noted

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	30	V
V_{GS}	Gate-Source Voltage	±20	V
I_D	Drain Current – Continuous (T_C=25℃)	15	A
	Drain Current – Continuous (T_C=100℃)	9.5	A
I_{DM}	Drain Current – Pulsed[1]	60	A
P_D	Power Dissipation (T_C=25℃)	4	W
	Power Dissipation – Derate above 25℃	0.032	W/℃
T_{STG}	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
$R_{θJA}$	Thermal Resistance Junction to ambient	---	85	℃/W
$R_{θJC}$	Thermal Resistance Junction to Case	---	31	℃/W

Electrical Characteristics (T$_J$=25 ℃, unless otherwise noted)

Off Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV$_{DSS}$	Drain-Source Breakdown Voltage	V$_{GS}$=0V , I$_D$=250uA	30	---	---	V
△BV$_{DSS}$/△T$_J$	BV$_{DSS}$ Temperature Coefficient	Reference to 25℃ , I$_D$=1mA	---	0.04	---	V/℃
I$_{DSS}$	Drain-Source Leakage Current	V$_{DS}$=30V , V$_{GS}$=0V , T$_J$=25℃	---	---	1	uA
		V$_{DS}$=24V , V$_{GS}$=0V , T$_J$=125℃	---	---	10	uA
I$_{GSS}$	Gate-Source Leakage Current	V$_{GS}$=±20V , V$_{DS}$=0V	---	---	±100	nA

On Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
R$_{DS(ON)}$	Static Drain-Source On-Resistance	V$_{GS}$=10V , I$_D$=6A	---	7.5	10	mΩ
		V$_{GS}$=4.5V , I$_D$=3A	---	10.5	14	mΩ
V$_{GS(th)}$	Gate Threshold Voltage	V$_{GS}$=V$_{DS}$, I$_D$ =250uA	1.2	1.6	2.5	V
△V$_{GS(th)}$	V$_{GS(th)}$ Temperature Coefficient		---	-4	---	mV/℃
gfs	Forward Transconductance	V$_{DS}$=10V , I$_D$=10A	---	18	---	S

Dynamic and switching Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Q$_g$	Total Gate Charge[2,3]	V$_{DS}$=15V , V$_{GS}$=4.5V , I$_D$=10A	---	7.5	15	nC
Q$_{gs}$	Gate-Source Charge[2,3]		---	1.3	3	
Q$_{gd}$	Gate-Drain Charge[2,3]		---	4.5	9	
T$_{d(on)}$	Turn-On Delay Time[2,3]	V$_{DD}$=15V , V$_{GS}$=10V , R$_G$=3.3Ω I$_D$=15A	---	4.8	9	ns
T$_r$	Rise Time[2,3]		---	12.5	25	
T$_{d(off)}$	Turn-Off Delay Time[2,3]		---	27.6	50	
T$_f$	Fall Time[2,3]		---	8.2	16	
C$_{iss}$	Input Capacitance	V$_{DS}$=25V , V$_{GS}$=0V , F=1MHz	---	750	1350	pF
C$_{oss}$	Output Capacitance		---	150	300	
C$_{rss}$	Reverse Transfer Capacitance		---	110	200	
R$_g$	Gate resistance	V$_{GS}$=0V, V$_{DS}$=0V, F=1MHz	---	2.7	4.5	Ω

Drain-Source Diode Characteristics and Maximum Ratings

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I$_S$	Continuous Source Current	V$_G$=V$_D$=0V , Force Current	---	---	15	A
I$_{SM}$	Pulsed Source Current		---	---	30	A
V$_{SD}$	Diode Forward Voltage	V$_{GS}$=0V , I$_S$=1A , T$_J$=25℃	---	---	1	V

Note :
1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%.
3. Essentially independent of operating temperature.

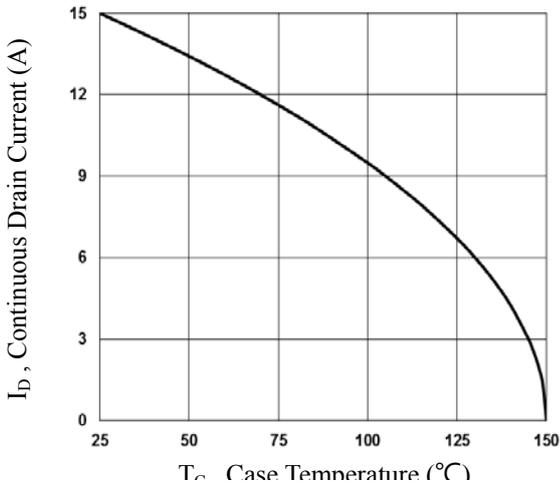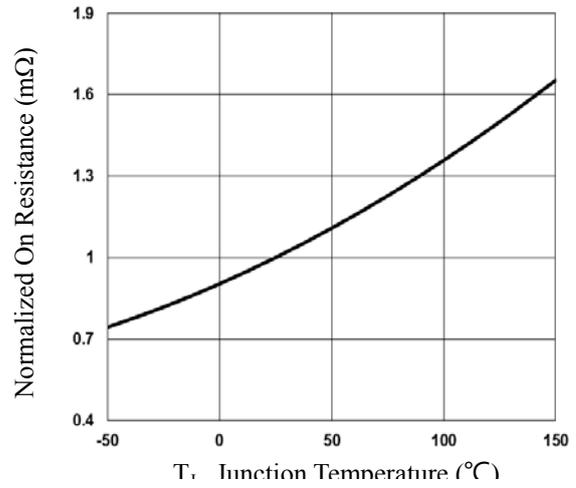**Fig.1   Continuous Drain Current vs. T$_C$**
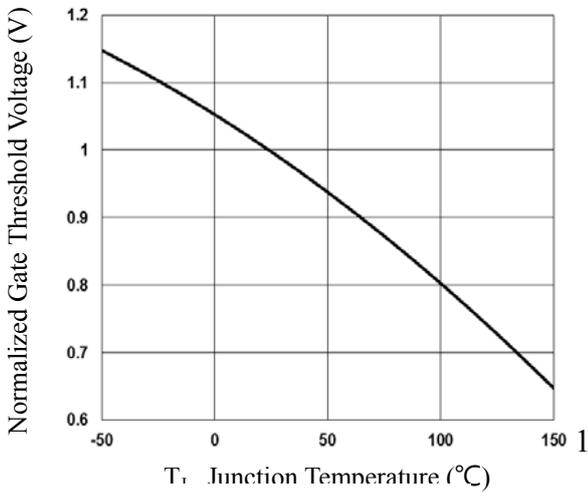
Fig.2   Normalized RDSON vs. T$_J$

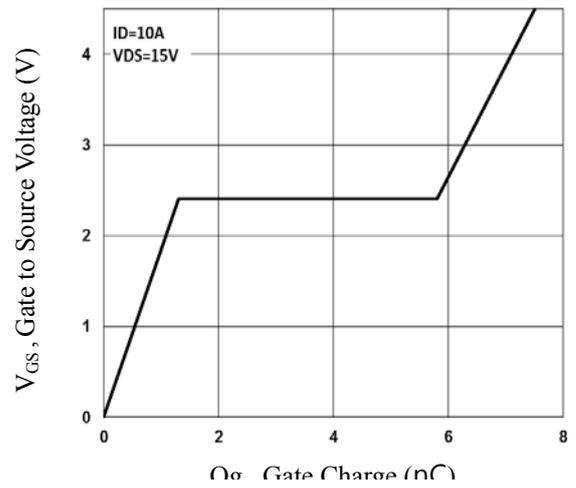**Fig.3   Normalized V$_{th}$ vs. T$_J$**

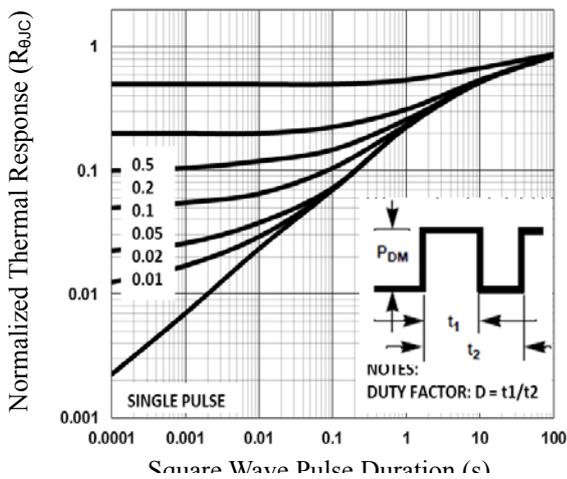**Fig.4   Gate Charge Waveform**

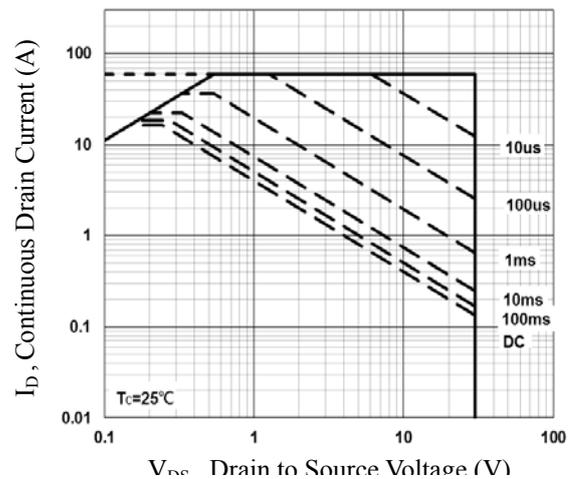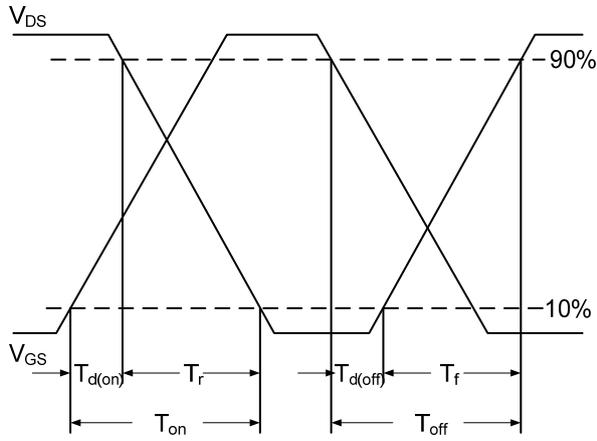**Fig.5   Normalized Transient Impedance**

Fig.6   Maximum Safe Operation Area

Fig.7　Switching Time Waveform

$$EAS= \frac{1}{2}L \times I_{AS}^2 \times \frac{BV_{DSS}}{BV_{DSS}-V_{DD}}$$
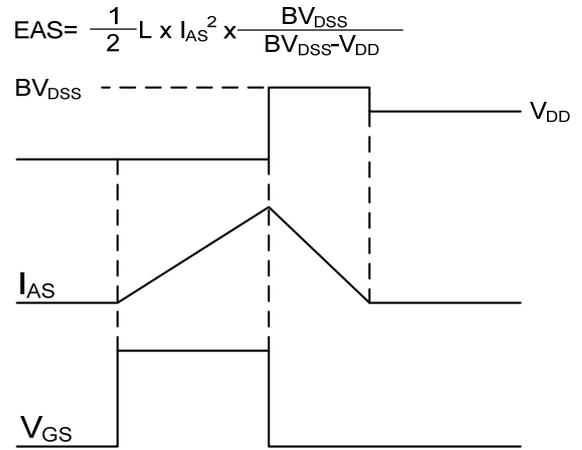
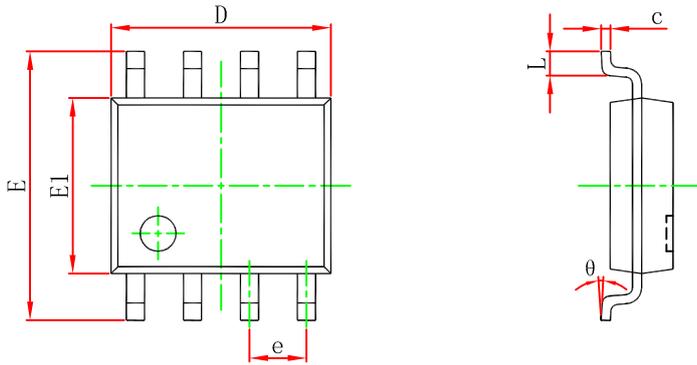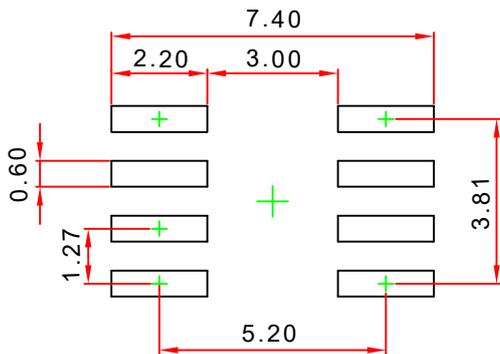**Fig.8　EAS Waveform**

SOP8 Package Outline Dimensions
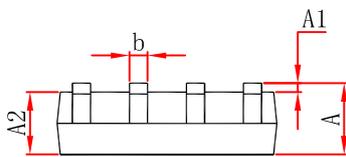
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	**Max**	**Min**	**Max**
A	1.450	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.007	0.010
D	4.700	5.100	0.185	0.201
e	1.270（BSC）		0.050（BSC）	
E	5.800	6.200	0.228	0.244
E1	3.800	4.000	0.150	0.157
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°

SOP8 Suggested Pad Layout

Note:
1. **Controlling dimension:in/millimeters.**
2. **General tolerance: ±0.05mm.**
3. **The pad layout is for reference purposes only.**