

30V N-Channel MOSFETs**◆ DESCRIPTION**

The MTDS3906 is the N-Channel logic enhancement mode power field effect transistor are produced using high cell density, DMOS trench technology. This high density process is especially tailored to minimize on-state resistance.

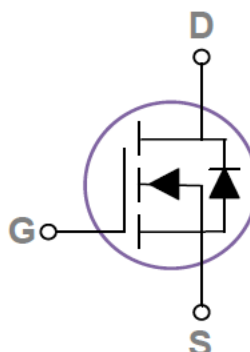
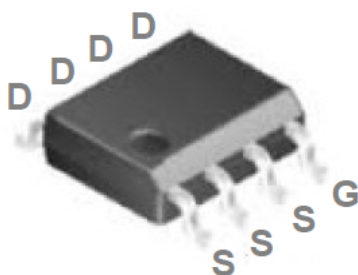
These devices are particularly suited for low voltage application such as cellular phone and notebook computer power management and other battery powered circuits, and low in-line power loss are needed in a very small outline surface mount package.

◆ FEATURES

- 30V/20A, $R_{DS(ON)} = 6m\Omega$ @ $V_{GS} = 10V$
- Improved dv/dt capability
- Fast switching
- 100% EAS Guaranteed
- Green Device Available
- SOP-8 package design

◆ APPLICATIONS

- POWER Management in Note
- Portable Equipment
- DC/DC Converter
- Load Switch
- LED Lighting

◆ PIN CONFIGURATION**SOP-8**

30V N-Channel MOSFETs
◆ ABSOLUTE MAXIMUM RATINGS

(T_A=25°C Unless Otherwise Noted)

Parameter		Symbol	Maximum	Unit
Drain-Source Voltage		V _{DS}	30	V
Gate-Source Voltage		V _{GS}	± 20	V
Continuous Drain Current	T _C = 25°C	I _D	20	A
	T _C = 100°C		12.6	
Pulsed Drain Current		I _{DM}	80	A
Power Dissipation	T _C = 25°C	P _D	5.4	W
	Derate above 25°C		0.043	W/°C
Operating junction temperature range		T _J	- 55 to 150	°C
Storage temperature range		T _{STG}	- 55 to 150	°C

◆ THERMAL RESISTANCE RATINGS

Parameter	Symbol	Maximum	Unit
Junction-to-Ambient	R _{θJA}	85	°C/W
Junction-to-Case	R _{θJC}	23	

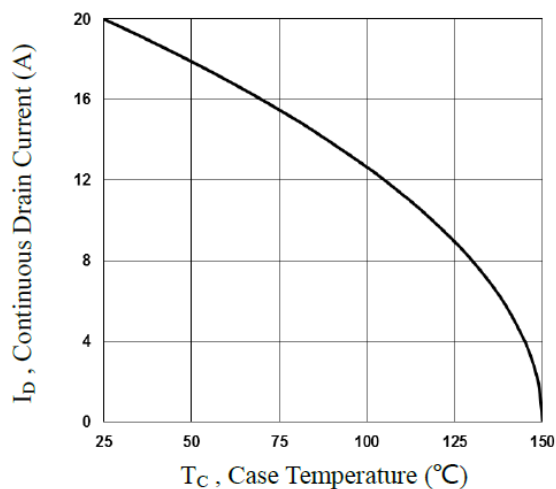
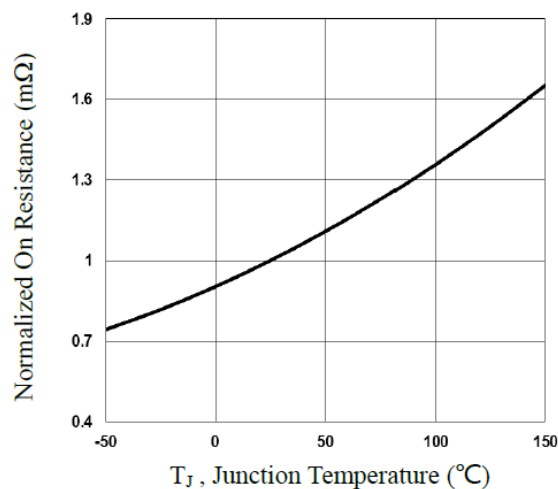
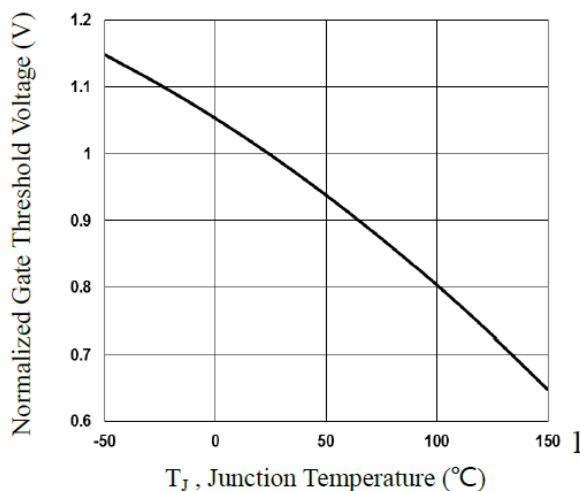
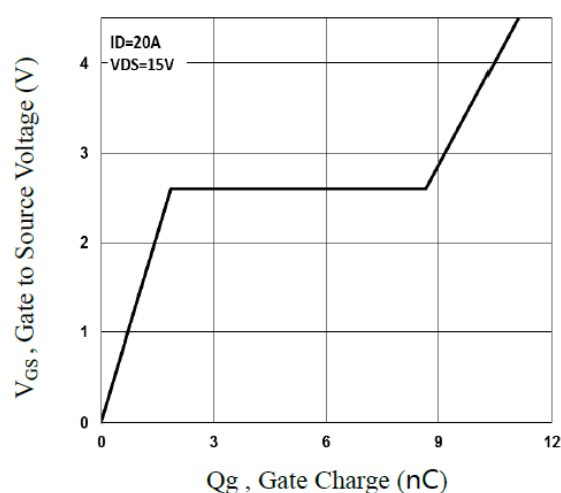
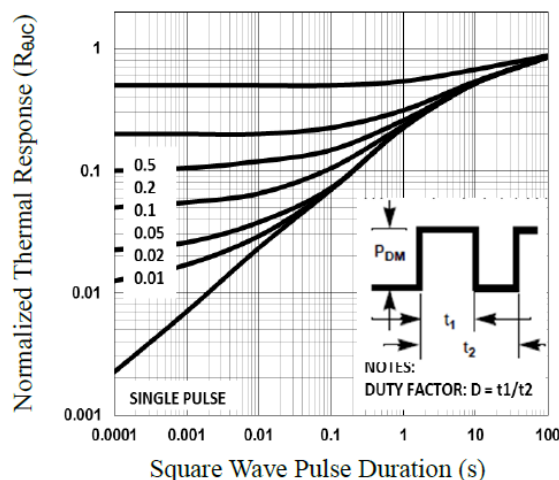
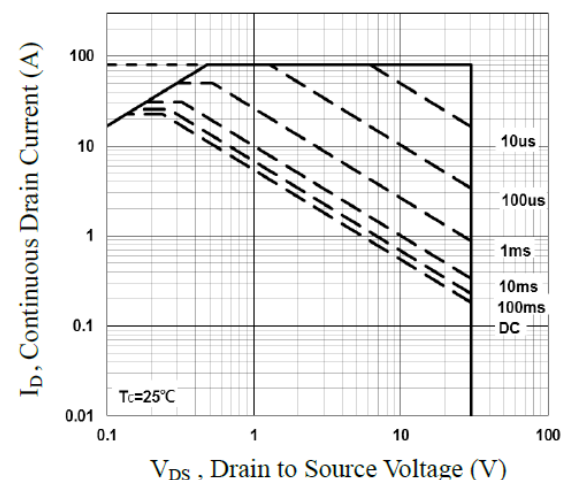
◆ ORDERING INFORMATION

Device	Package	REMARK
MTDS3906	SOP-8	

◆ ELECTRICAL CHARACTERISTICS

(TA=25°C Unless Otherwise Noted)

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static Parameters						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	30	-	-	V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS} = V_{DS}, I_D = 250\mu A$	1.2	1.6	2.5	V
Gate Leakage Current	I_{GSS}	$V_{DS} = 0V, V_{GS} = \pm 20V$	-	-	± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 30V, V_{GS} = 0V, T_J = 25^\circ C$	-	-	1	μA
		$V_{DS} = 24V, V_{GS} = 0V, T_J = 125^\circ C$	-	-	10	
Forward Trans conductance	g_{fs}	$V_{DS} = 10V, I_D = 10A$	-	18	-	S
Drain-Source On Resistance	$R_{DS(ON)}$	$V_{GS} = 4.5V, I_D = 5A$	-	6.5	9	m Ω
		$V_{GS} = 10V, I_D = 10A$	-	5	6	
Diode Forward Voltage	V_{SD}	$I_S = 1A$	-	-	1	V
Dynamic Parameters						
Input Cap.	C_{iss}	$V_{DS} = 25V, V_{GS} = 0V, F = 1MHz$	-	1160	1900	pF
Output Cap.	C_{oss}		-	200	400	
Reverse Transfer Cap.	C_{rss}		-	180	360	
Total Gate Charge	Q_g	$V_{DS} = 15V, V_{GS} = 4.5V, I_D = 20A$	-	11.1	22	nC
Gate-Source Charge	Q_{gs}		-	1.85	3.7	
Gate-Drain Charge	Q_{gd}		-	6.8	13	
Turn-On Time	$T_{D(ON)}$	$V_{DS} = 15V, V_{GS} = 10V, R_L = 3.3\Omega, I_D = 15A$	-	7.5	15	nS
	t_r		-	14.5	28	
Turn-Off Time	$T_{D(OFF)}$		-	35.2	60	
	t_f		-	9.6	19	
Gate Resistance	R_g	$V_{DS} = 0V, V_{GS} = 0V, F = 1MHz$	-	2.5	5	Ω

30V N-Channel MOSFETs
◆ TYPICAL CHARACTERISTICS

Fig.1 Continuous Drain Current vs. T_c

Fig.2 Normalized $R_{DS(on)}$ 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

◆ **TYPICAL CHARACTERISTICS**

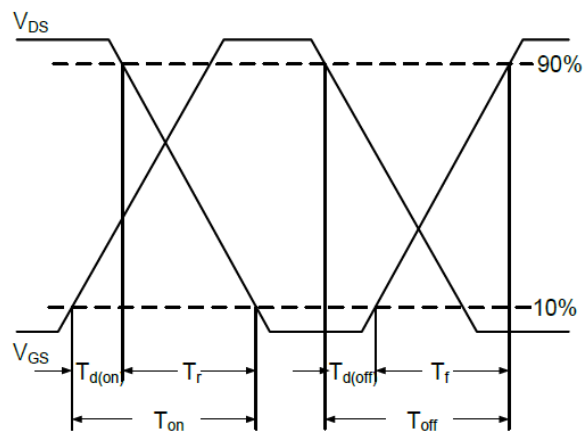


Fig.7 Switching Time Waveform

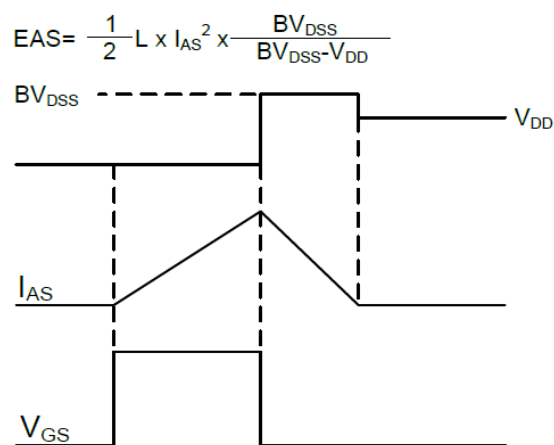


Fig.8 EAS Waveform

$$EAS = \frac{1}{2} L \times I_{AS}^2 \times \frac{BV_{DSS}}{BV_{DSS} - V_{DD}}$$

◆ PHYSICAL DIMENSIONS
8-Pin surface Mount SOP-8
