

### Description

These 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 switching performance, and withstand high energy pulse in the avalanche and commutation mode.

These devices are well suited for high efficiency fast switching applications..

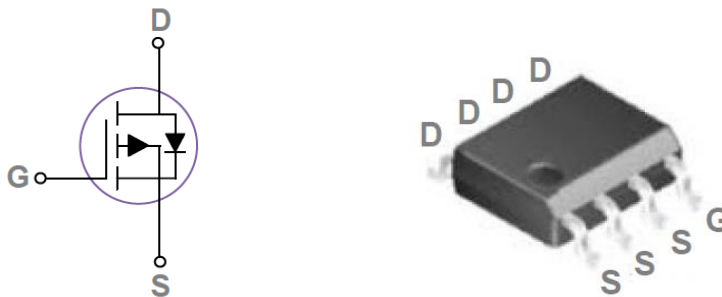
### Features

- ◆ -30V/-10A,  $R_{DS(ON)} = 18m\Omega @ V_{GS} = -10V$
- ◆ Fast switching
- ◆ Suit for -4.5V Gate Drive Applications
- ◆ SOP-8 package design

### Applications

- ◆ MB / VGA / Vcore
- ◆ POL Applications
- ◆ LED Application
- ◆ Load Switch

### Pin Configuration



### Absolute Maximum Ratings ( $T_C=25^\circ C$ Unless Otherwise Noted)

Parameter		Symbol	Maximum	Unit
Drain-Source Voltage		$V_{DS}$	-30	V
Gate- Source Voltage		$V_{GS}$	$\pm 20$	V
Continuous Drain Current	$T_C = 25^\circ C$	$I_D$	-10	A
	$T_C = 100^\circ C$		-6.3	
Pulsed Drain Current <sup>1</sup>		$I_{DM}$	-40	A
Power Dissipation	$T_C = 25^\circ C$	$P_D$	2.5	W
	Derate above 25 $^\circ C$		0.02	
Operating junction temperature range		$T_J$	- 55 to 150	$^\circ C$
Storage temperature range		$T_{STG}$	- 55 to 150	$^\circ C$

### Thermal Resistance Ratings

Thermal Resistance	Symbol	Maximum	Unit
Junction-to-Ambient	$R_{\theta JA}$	50	$^\circ C/W$



**Ordering Information**

Device	Package	Shipping
ECDS3905	SOP-8	3,000 PCS / Tape & Reel

**Electrical Characteristics** ( $T_J=25^{\circ}\text{C}$  unless otherwise noted)

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
<b>Static Parameters</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = -250\mu A$	-30	-	-	V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS} = V_{DS}, I_D = -250\mu A$	-1.0	-1.6	-2.5	V
Gate Body Leakage	$I_{GSS}$	$V_{DS} = 0V, V_{GS} = \pm 20V$	-	-	$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = -30V, V_{GS} = 0V, T_J = 25^{\circ}\text{C}$	-	-	-1	$\mu A$
		$V_{DS} = -24V, V_{GS} = 0V, T_J = 125^{\circ}\text{C}$	-	-	-10	
Forward Trans conductance	$g_{fs}$	$V_{DS} = -10V, I_D = -8A$	-	10.5	-	S
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS} = -10V, I_D = -8A$	-	12.4	15.5	$m\Omega$
		$V_{GS} = -4.5V, I_D = -6A$	-	19.2	25	
<b>Dynamic Parameters</b>						
Input Cap.	$C_{iss}$	$V_{DS} = -15V, V_{GS} = 0V, F = 1\text{MHz}$	-	1730	2510	$pF$
Output Cap.	$C_{oss}$		-	180	260	
Reverse Transfer Cap.	$C_{rss}$		-	125	180	
Total Gate Charge <sup>23</sup>	$Q_g$	$V_{DS} = -15V, V_{GS} = -4.5V, I_D = -8A$	-	14.6	21	$nC$
Gate-Source Charge <sup>23</sup>	$Q_{gs}$		-	4.1	6	
Gate-Drain Charge <sup>23</sup>	$Q_{gd}$		-	6.3	9	
Turn-On Time <sup>23</sup>	$t_{d(ON)}$	$V_{DS} = -15V, I_D \approx -1A, V_{GS} = -10V, R_G = 6\Omega$	-	9	17	$nS$
	$t_r$		-	21.8	41	
Turn-Off Time <sup>23</sup>	$T_{d(OFF)}$		-	59.8	114	
	$T_f$		-	14.4	27	
<b>Source-Drain Diode Ratings And Characteristics</b>						
Continuous Current	$I_S$	$V_G = V_D = 0V, \text{Force Current}$	-	-	-10	A
Pulsed Current <sup>C</sup>	$I_{SM}$		-	-	-40	A
Diode Forward Voltage	$V_{SD}$	$I_S = -1A, V_{GS} = 0V$	-	-	-1	V

Note

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed , pulse width  $\leq 300\mu s$  , duty cycle  $\leq 2\%$ .
3. Essentially independent of operating temperature.

Typical Characteristics

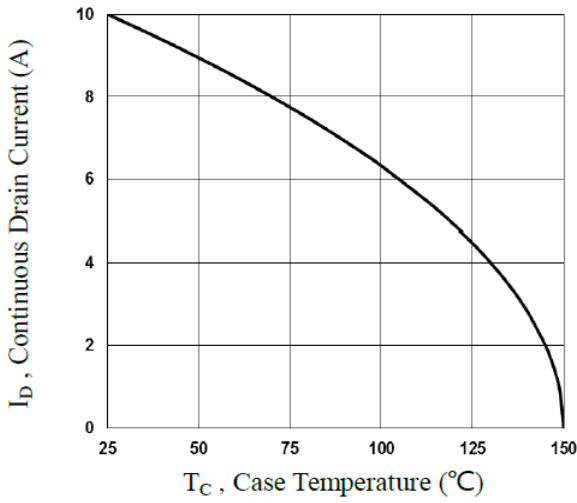


Fig.1 Continuous Drain Current vs. T<sub>c</sub>

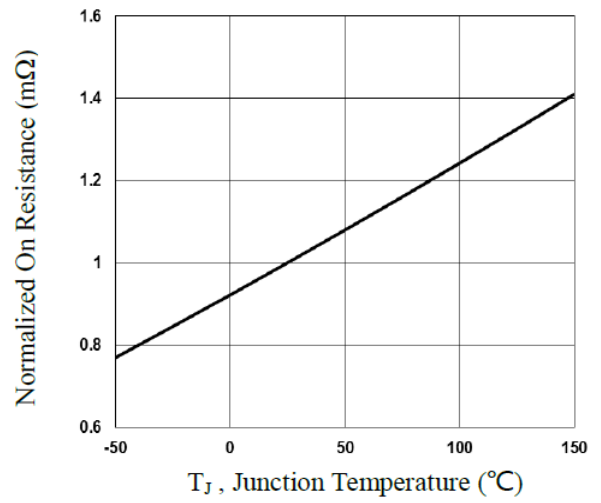


Fig.2 Normalized R<sub>DSon</sub> vs. T<sub>j</sub>

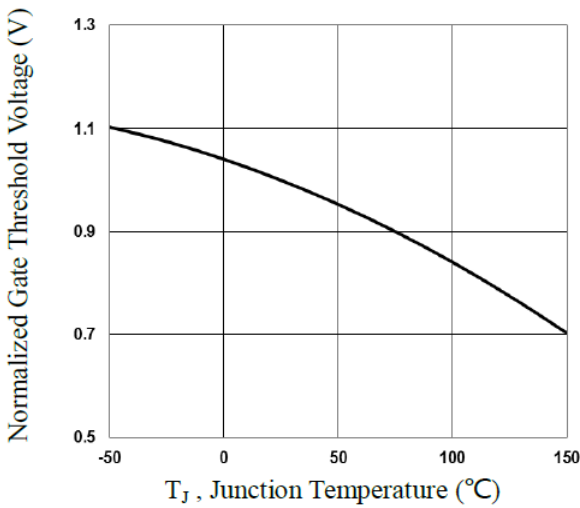


Fig.3 Normalized V<sub>th</sub> vs. T<sub>j</sub>

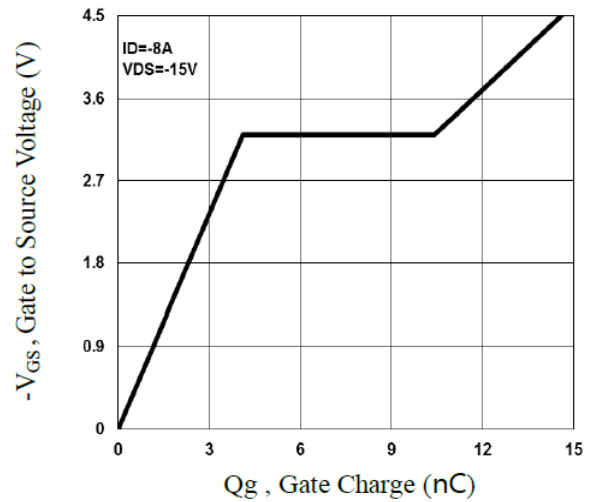


Fig.4 Gate Charge Waveform

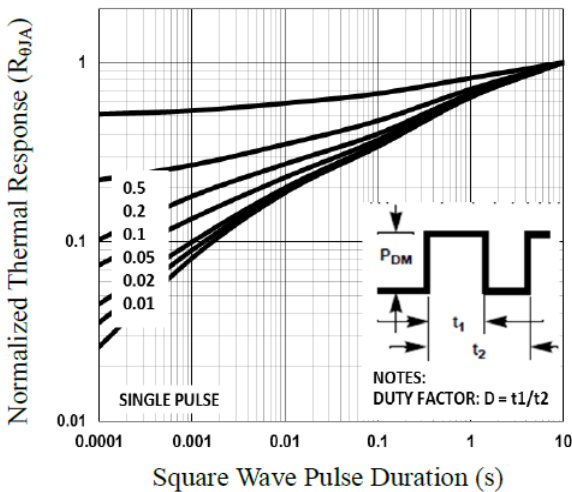


Fig.5 Normalized Transient Impedance

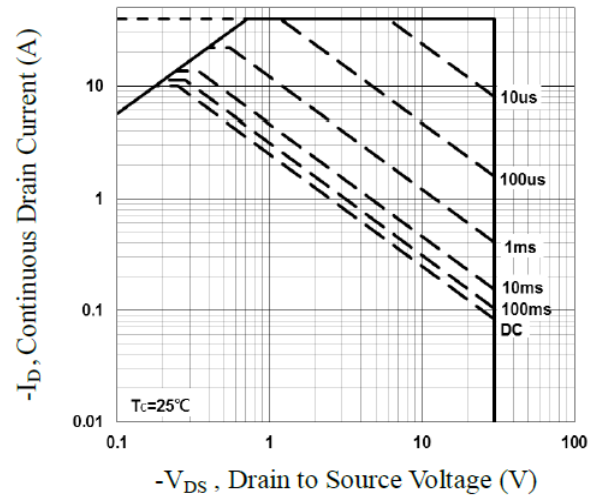
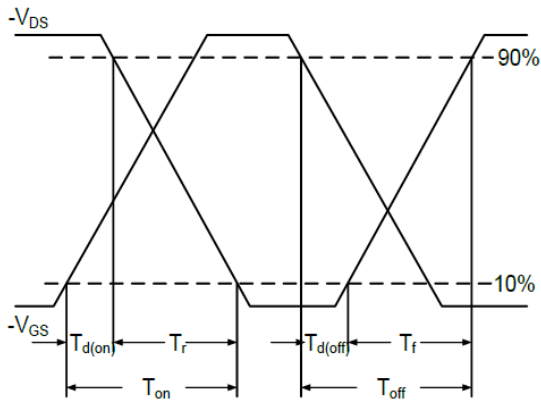
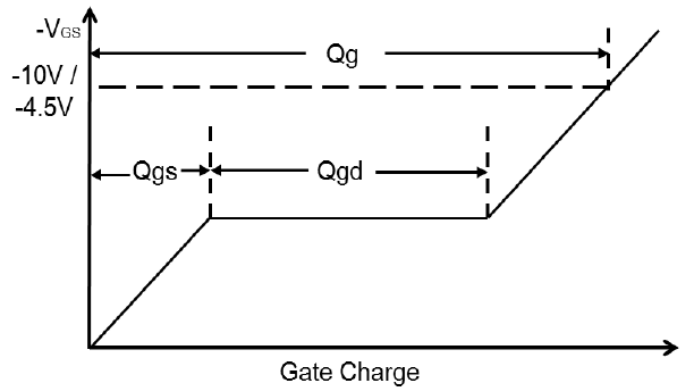


Fig.6 Maximum Safe Operation Area

### Typical Characteristics



**Fig.7 Switching Time Waveform**



**Fig.8 Gate Charge Waveform**

### Physical Dimensions

8 Pin Surface Mount SOP-8

