

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

- ◆ -20V/-2.5A, $R_{DS(ON)} = 160m\Omega @ V_{GS} = -4.5V$
- ◆ Improved dv/dt capability
- ◆ Suit for -1.8V Gate Drive Applications
- ◆ Fast switching
- ◆ SOT-23 package design

Applications

- ◆ Notebook
- ◆ Battery Protection
- ◆ Load Switch
- ◆ Hand-held Instruments

Pin Configuration



Absolute Maximum Ratings (T_C=25°C Unless Otherwise Noted)

Parameter		Symbol	Maximum	Unit
Drain-Source Voltage		V _{DS}	-20	V
Gate- Source Voltage		V _{GS}	± 10	V
Continuous Drain Current	T _C = 25 °C	I _D	-2.5	A
	T _C = 100 °C		-1.6	
Pulsed Drain Current ¹		I _{DM}	-10	A
Power Dissipation	T _C = 25 °C	P _D	1.56	W
	Derate above 25 °C		0.012	
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}	80	°C/W



Ordering Information

Device	Package	Remark
ECDN2317S	SOT-23	3000 pcs / Reel

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

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static Parameters						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = -250\mu A$	-20	-	-	V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS} = V_{DS}, I_D = -250\mu A$	-0.3	-0.6	-1	V
Gate Body Leakage	I_{GSS}	$V_{DS} = 0V, V_{GS} = \pm 10V$	-	-	± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = -20V, V_{GS} = 0V, T_J = 25^\circ\text{C}$	-	-	-1	μA
		$V_{DS} = -16V, V_{GS} = 0V, T_J = 125^\circ\text{C}$	-	-	-10	
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS} = -4.5V, I_D = -2.5A$	-	120	160	m Ω
		$V_{GS} = -2.5V, I_D = -2A$	-	170	230	
		$V_{GS} = -1.8V, I_D = -1A$	-	240	320	
Dynamic Parameters						
Input Cap.	C_{iss}	$V_{DS} = -15V, V_{GS} = 0V,$ $F = 1\text{MHz}$	-	150	300	μF
Output Cap.	C_{oss}		-	32	64	
Reverse Transfer Cap.	C_{rss}		-	23	46	
Total Gate Charge ²³	Q_g	$V_{DS} = -10V, V_{GS} = -4.5V,$ $I_D = -1A$	-	2.5	5	nC
Gate-Source Charge ²³	Q_{gs}		-	0.36	0.72	
Gate-Drain Charge ²³	Q_{gd}		-	0.5	1	
Turn-On Time ²³	$t_{d(ON)}$	$V_{DD} = -10V, I_D = -1A,$ $V_{GS} = -4.5V, R_G = 25\Omega$	-	2	4	nS
	t_r		-	7.8	15	
Turn-Off Time ²³	$T_{d(OFF)}$		-	16.6	32	
	T_f		-	4.5	9	
Source-Drain Diode Ratings And Characteristics						
Continuous Current	I_S	$V_G = V_D = 0V, \text{Force Current}$	-	-	-2.5	A
Pulsed Current	I_{SM}		-	-	-5	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

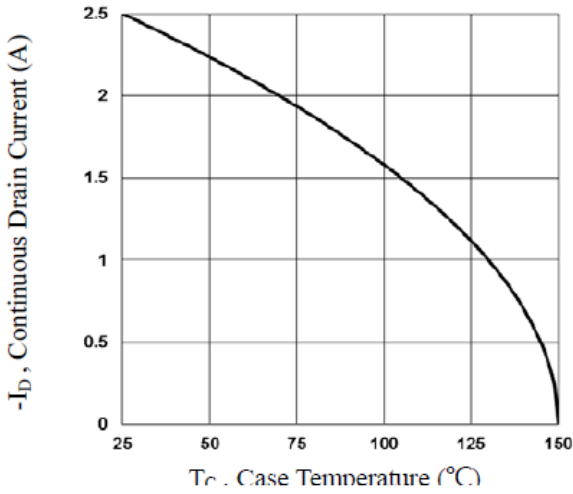


Fig.1 Continuous Drain Current vs. T_c

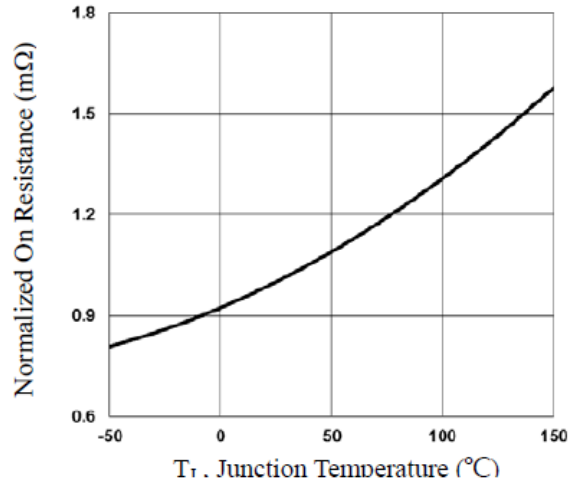


Fig.2 Normalized $R_{DS(on)}$ vs. T_j

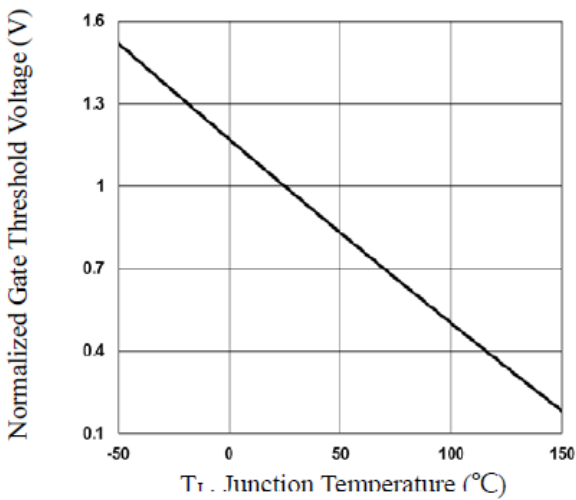


Fig.3 Normalized V_{th} vs. T_j

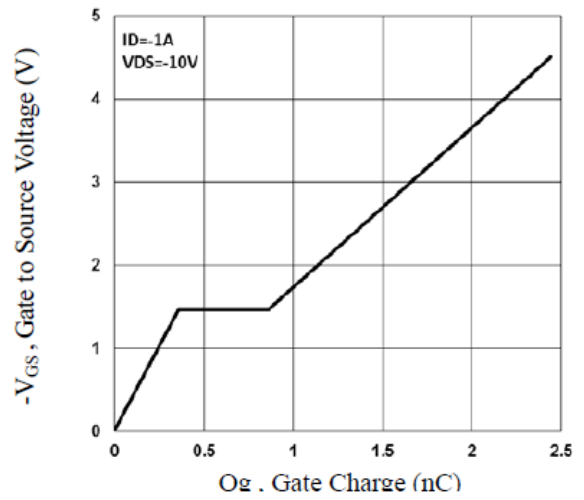


Fig.4 Gate Charge Waveform

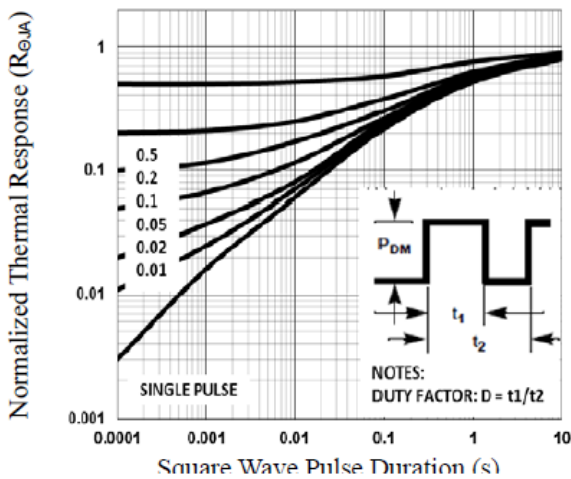


Fig.5 Normalized Transient Impedance

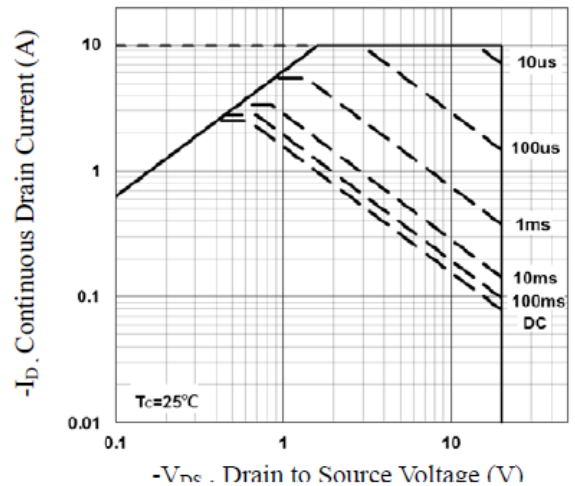


Fig.6 Maximum Safe Operation Area

Typical Characteristics

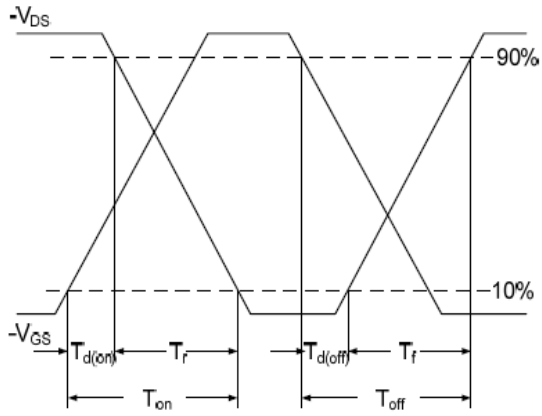


Fig.7 Switching Time Waveform

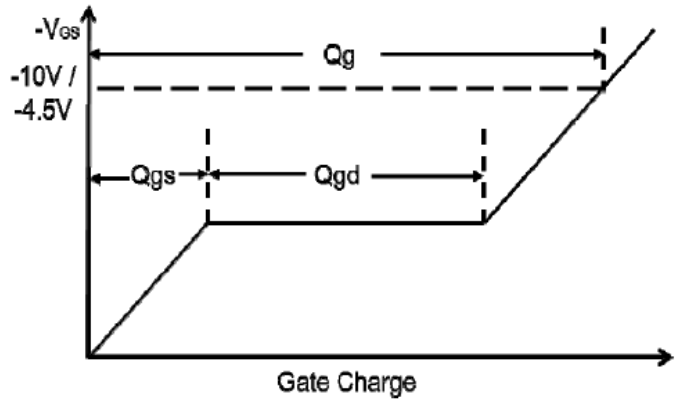
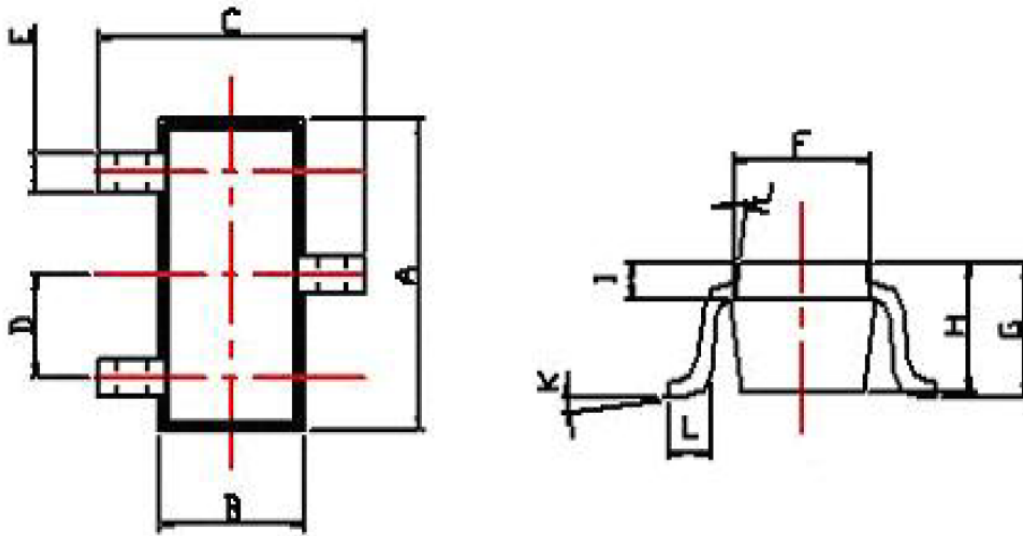


Fig.8 Gate Charge Waveform

Physical Dimensions

3-Pin surface Mount SOT-23-3



REF.	Millimeter		REF.	Millimeter	
	Min.	Max.		Min.	Max.
A	2.70	3.10	G	0.9	1.4
B	1.20	1.66	H	0.8	1.30
C	2.37	2.90	I	0.25	0.7
D	0.85	1.15	J	7 ± 2°	
E	0.350 + 0.15/-0.05		K	0 ~ 10°	
F	1.07	1.53	L	0.2 (MIN)	