

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/-4.7A, $R_{DS(ON)} = 50m\Omega @ V_{GS} = -4.5V$
- ◆ 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 ($T_C=25^\circ C$ Unless Otherwise Noted)

Parameter		Symbol	Maximum	Unit
Drain-Source Voltage		V_{DS}	-20	V
Gate- Source Voltage		V_{GS}	± 10	V
Continuous Drain Current	$T_C = 25^\circ C$	I_D	-4.7	A
	$T_C = 100^\circ C$		-3	
Pulsed Drain Current ¹		I_{DM}	-18.8	A
Power Dissipation	$T_C = 25^\circ C$	P_D	1.56	W
	Derate above 25 $^\circ C$		0.012	
Operating junction temperature range		T_J	- 55 to 150	$^\circ C$
Storage temperature range		T_{STG}	- 55 to 150	$^\circ C$

Thermal Resistance Ratings

Parameter	Symbol	Maximum	Unit
Junction-to-Ambient	$R_{\theta JA}$	80	$^\circ C/W$



Ordering Information

Device	Package	Remark
ECDN2311S	SOT-23	3000 pcs / Reel

Electrical Characteristics (T_J=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 = -250μA	-20	-	-	V
Gate Threshold Voltage	V _{GS(th)}	V _{GS} = V _{DS} , I _D = -250μA	-0.3	-0.6	-0.8	V
Gate Body Leakage	I _{GSS}	V _{DS} = 0V, V _{GS} = ±10 V	-	-	±100	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = -20V, V _{GS} = 0V T _J = 25°C	-	-	-1	μA
		V _{DS} = -16V, V _{GS} = 0V, T _J = 125°C	-	-	-10	
Forward Trans conductance	g _{fs}	V _{DS} = -10V, I _D = -3A	-	7	-	S
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} = -4.5V, I _D = -3A	-	40	50	mΩ
		V _{GS} = -2.5V, I _D = -2A	-	54	65	
		V _{GS} = -1.8V, I _D = -1.5A	-	67	85	
Dynamic Parameters						
Input Cap.	C _{iss}	V _{DS} = -10V, V _{GS} = 0V, F = 1MHz	-	850	1230	pF
Output Cap.	C _{oss}		-	70	100	
Reverse Transfer Cap.	C _{rss}		-	55	80	
Total Gate Charge ²³	Q _g	V _{DS} = -10V, V _{GS} = -4.5V, I _D = -3A	-	9.6	13	nC
Gate-Source Charge ²³	Q _{gs}		-	1.6	2	
Gate-Drain Charge ²³	Q _{gd}		-	2	4	
Turn-On Time ²³	t _{d(ON)}	V _{DD} = -10V, I _D = -1A, V _{GS} = -4.5V, R _G = 25Ω	-	6	11	nS
	t _r		-	21.6	41	
Turn-Off Time ²³	T _{d(OFF)}		-	51	97	
	T _f		-	13.8	26	
Source-Drain Diode Ratings And Characteristics						
Continuous Current	I _s	V _G = V _D = 0V, Force Current	-	-	-4.7	A
Pulsed Current	I _{SM}		-	-	-18.8	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 ≤ 300us , duty cycle ≤ 2%.
3. essentially independent of operating temperature

Typical Characteristics

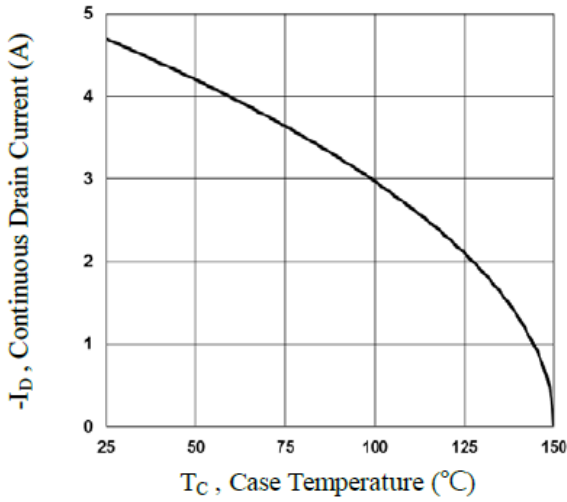


Fig.1 Continuous Drain Current vs. T_c

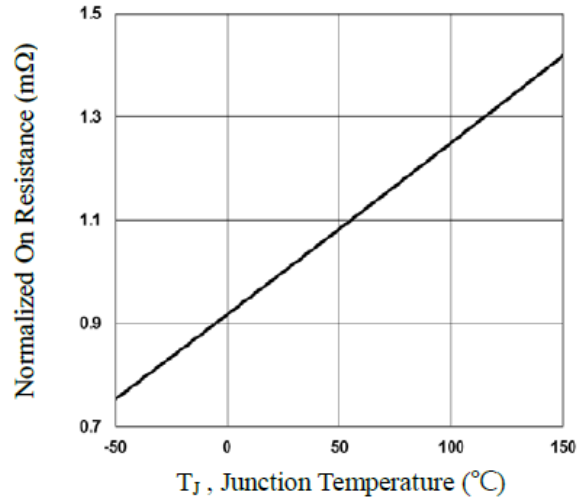


Fig.2 Normalized $R_{DS(on)}$ vs. T_j

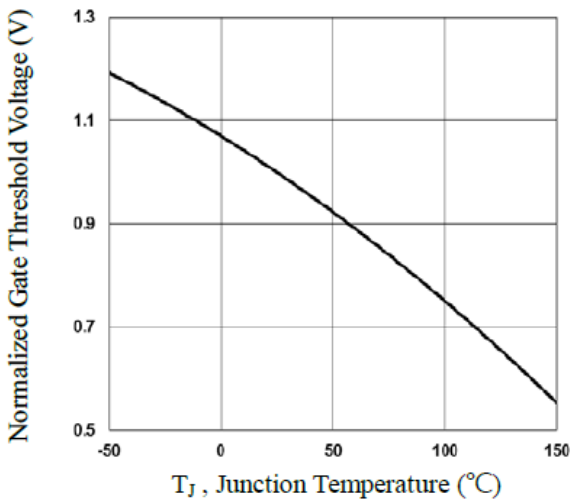


Fig.3 Normalized V_{th} vs. T_j

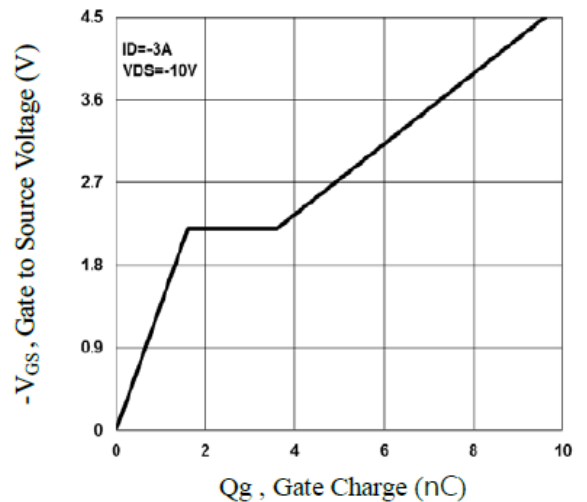


Fig.4 Gate Charge Waveform

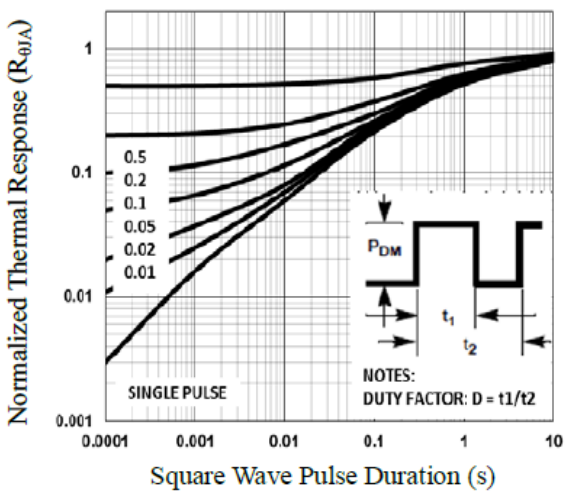


Fig.5 Normalized Transient Impedance

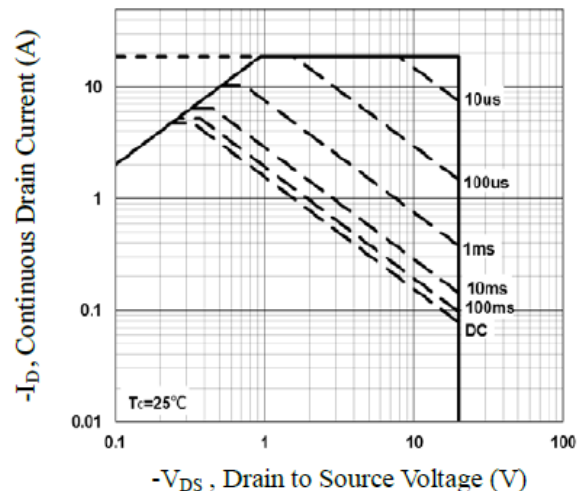


Fig.6 Maximum Safe Operation Area

Typical Characteristics

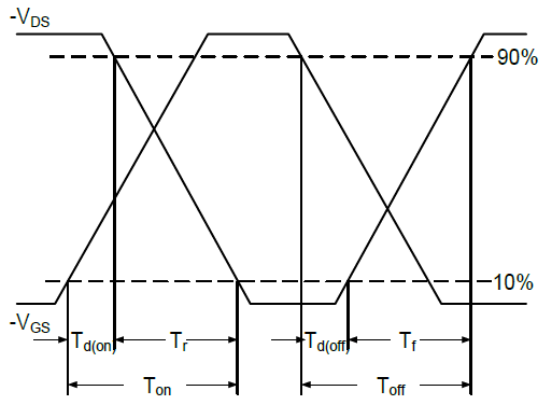


Fig.7 Switching Time Waveform

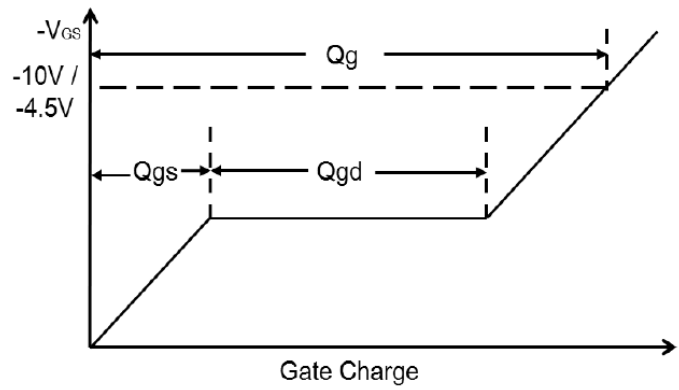


Fig.8 Gate Charge Waveform

Physical Dimensions

3-Pin surface Mount SOT-23-3

