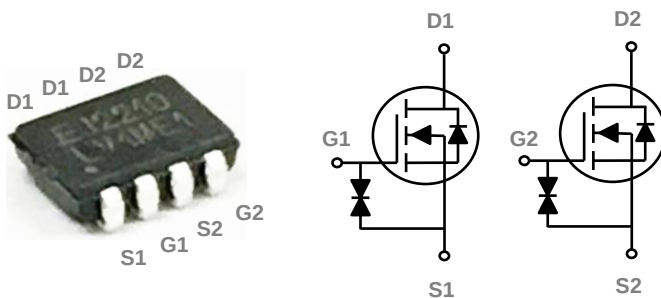


General Description

These N-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.

2928-J Dual Pin Configuration



BVDSS	RDS(ON)	ID
20V	15mΩ	7.6A

Features

- 20V, 7.5A, RDS(ON)=15mΩ@VGS=4.5V
- Improved dv/dt capability
- Fast switching
- Green Device Available
- Suit for 1.8V Gate Drive Applications
- G-S ESD protection diode embedded

Applications

- Notebook
- Load Switch
- LED applications

Absolute Maximum Ratings $T_c=25^{\circ}\text{C}$ unless otherwise noted

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	20	V
V_{GS}	Gate-Source Voltage	± 10	V
I_D	Drain Current – Continuous ($T_A=25^{\circ}\text{C}$)	7.6	A
	Drain Current – Continuous ($T_A=70^{\circ}\text{C}$)	6.08	A
I_{DM}	Drain Current – Pulsed ¹	30.4	A
P_D	Power Dissipation ($T_A=25^{\circ}\text{C}$)	1.39	W
	Power Dissipation – Derate above 25°C	0.01	W/ $^{\circ}\text{C}$
T_{STG}	Storage Temperature Range	-55 to 150	$^{\circ}\text{C}$
T_J	Operating Junction Temperature Range	-55 to 150	$^{\circ}\text{C}$

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction to ambient	---	90	$^{\circ}\text{C/W}$

Electrical Characteristics (T_J=25 °C, unless otherwise noted)
Off Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250uA	20	---	---	V
ΔBV _{DSS} /ΔT _J	BV _{DSS} Temperature Coefficient	Reference to 25°C, I _D =1mA	---	0.02	---	V/°C
I _{DSS}	Drain-Source Leakage Current	V _{DS} =20V, V _{GS} =0V, T _J =25°C	---	---	1	uA
		V _{DS} =16V, V _{GS} =0V, T _J =125°C	---	---	10	uA
I _{GSS}	Gate-Source Leakage Current	V _{GS} =±10V, V _{DS} =0V	---	---	±10	uA

On Characteristics

R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =4.5V, I _D =6A	---	12.3	15	mΩ
		V _{GS} =2.5V, I _D =5A	---	13.8	18	
		V _{GS} =1.8V, I _D =4A	---	16.2	22	
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =250uA	0.3	0.6	1	V
ΔV _{GS(th)}	V _{GS(th)} Temperature Coefficient		---	2	---	mV/°C
g _{fs}	Forward Transconductance	V _{DS} =10V, I _S =3A	---	15	---	S

Dynamic and switching Characteristics

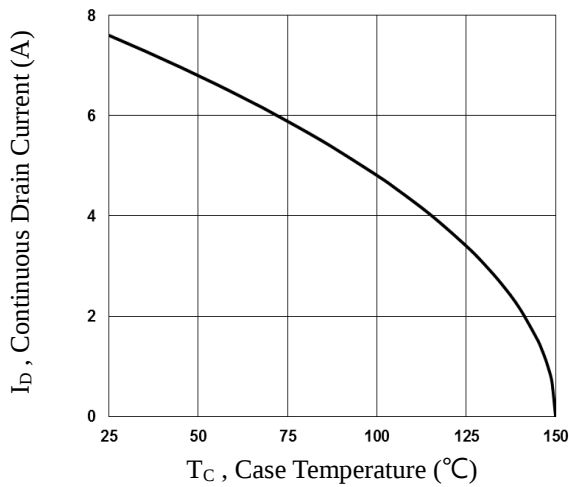
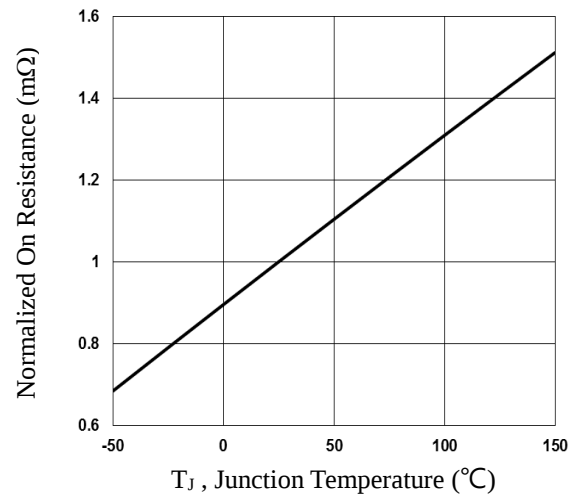
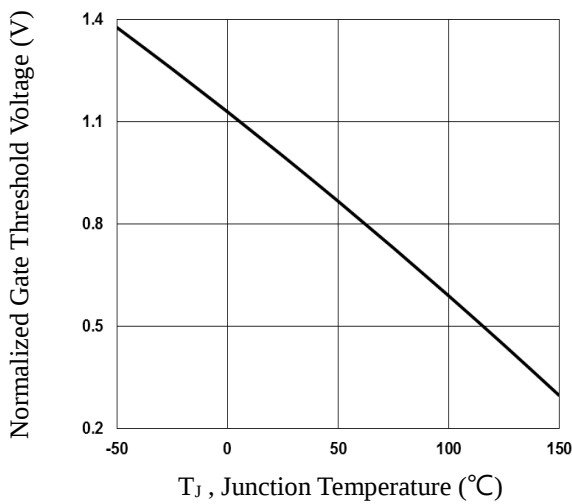
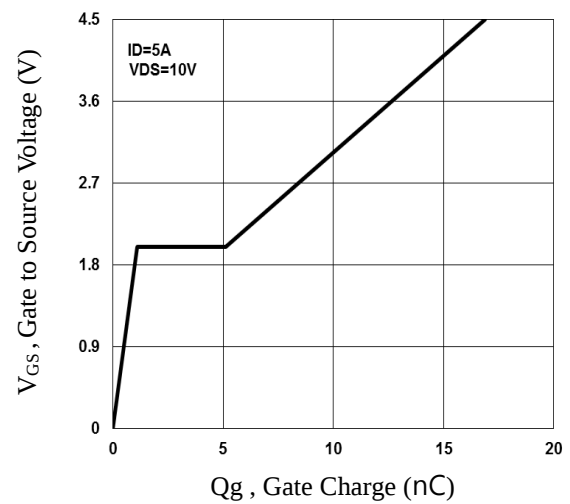
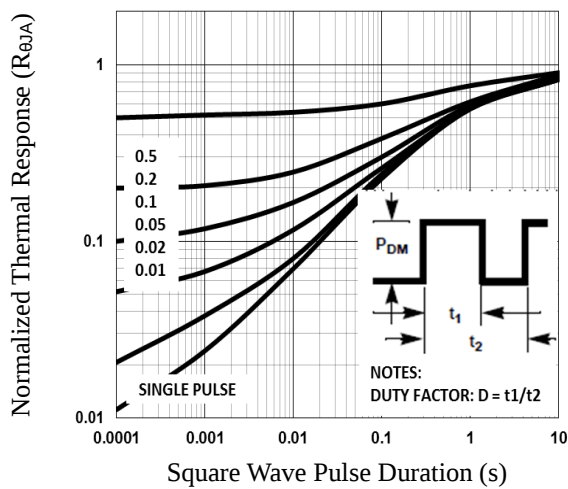
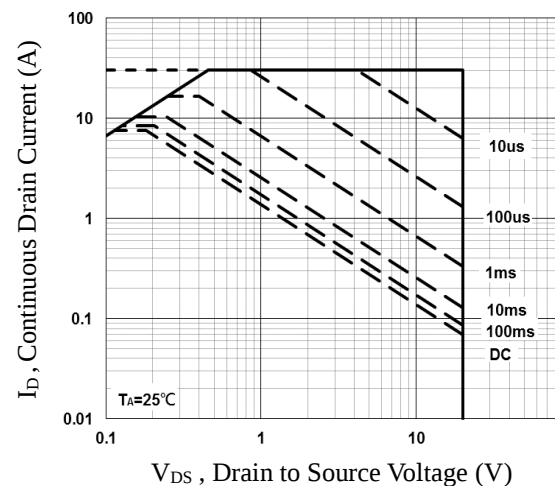
Q _g	Total Gate Charge ^{2, 3}	V _{DS} =10V, V _{GS} =4.5V, I _D =5A	---	16.9	26	nC
Q _{gs}	Gate-Source Charge ^{2, 3}		---	1.1	3	
Q _{gd}	Gate-Drain Charge ^{2, 3}		---	4	7	
T _{d(on)}	Turn-On Delay Time ^{2, 3}	V _{DD} =10V, V _{GS} =4.5V, R _G =25Ω I _D =1A	---	6.8	13	nS
T _r	Rise Time ^{2, 3}		---	20	38	
T _{d(off)}	Turn-Off Delay Time ^{2, 3}		---	41.8	79	
T _f	Fall Time ^{2, 3}		---	13.2	25	
C _{iss}	Input Capacitance	V _{DS} =10V, V _{GS} =0V, F=1MHz	---	1020	1480	pF
C _{oss}	Output Capacitance		---	160	240	
C _{rss}	Reverse Transfer Capacitance		---	110	160	

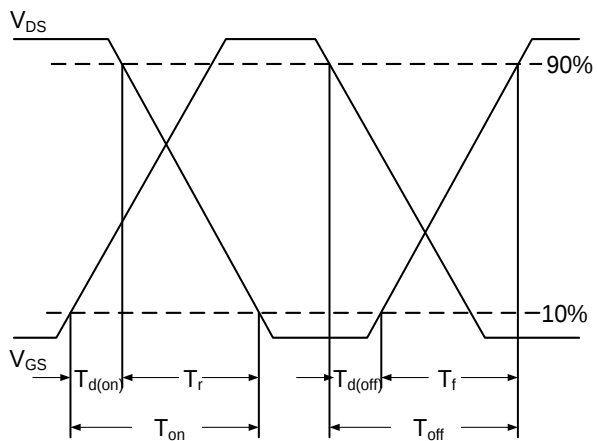
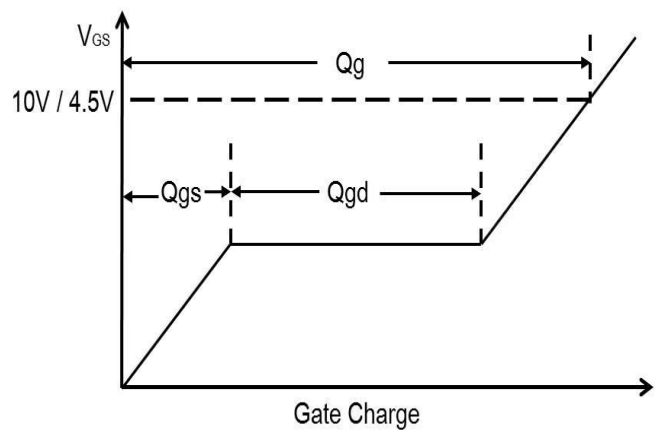
Drain-Source Diode Characteristics and Maximum Ratings

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I _S	Continuous Source Current	V _G =V _D =0V, Force Current	---	---	7.6	A
I _{SM}	Pulsed Source Current		---	---	15.2	A
V _{SD}	Diode Forward Voltage	V _{GS} =0V, I _S =1A, T _J =25°C	---	---	1	V

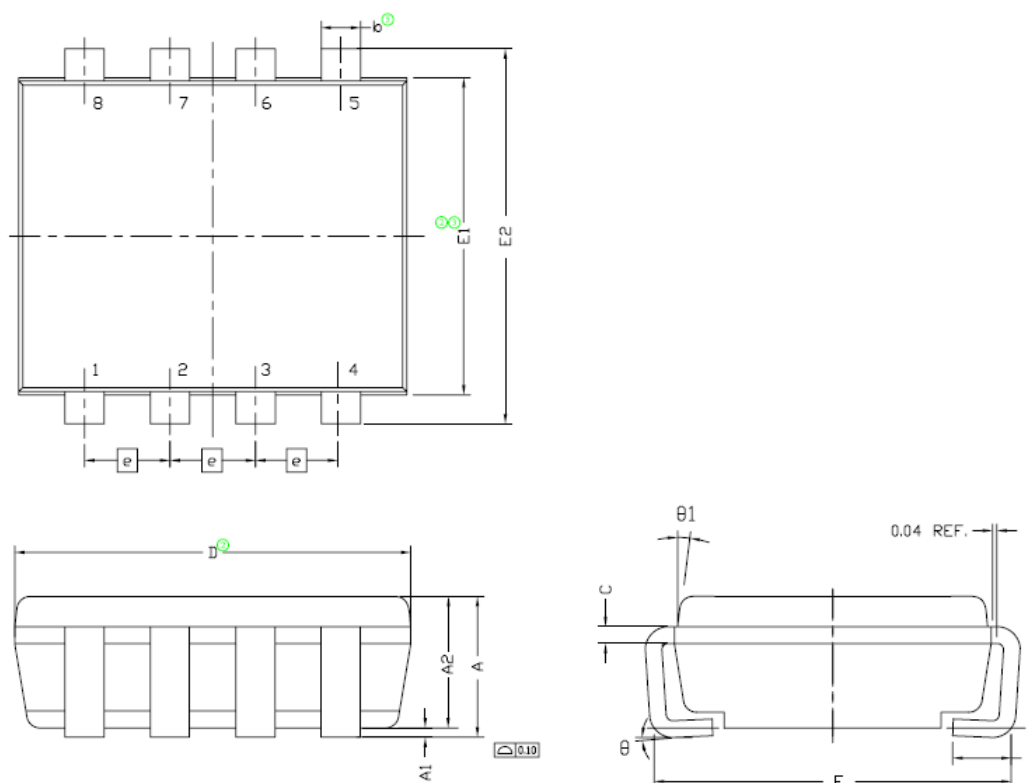
Note :

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 $R_{DS(on)}$ 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


Fig.7 Switching Time Waveform

Fig.8 Gate Charge Waveform

2928-8L PACKAGE INFORMATION



Symbol	Dimensions In Millimeters		
	Min	Typ	Max
E	2.50	-	3.00
E1	2.30	2.40	2.50
E2	2.65	2.85	3.05
L	0.30	0.45	0.60
A	0.94	-	1.10
A1	0.01	-	0.10
A2	0.93	-	1.00
D	2.95	3.05	3.10
e	0.65BSC		
b	0.25	0.32	0.40
c	0.10	0.15	0.20
Θ	0°	4°	8°
Θ1	7° NOM		