Description

These N+P dual 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.

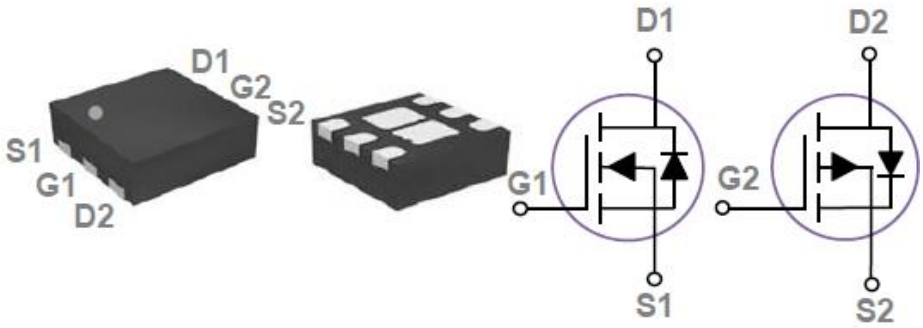
Features

◆20V/3.8A, RDS(ON) = 40mΩ @ VGS = 4.5V
◆-20V/-2.5A, RDS(ON) =100mΩ @ VGS = 4.5V
◆Fast switching speed
◆Suit for 1.8V Gate Drive Applications
◆DFN 2x2-6 package design

Applications

◆Notebook
◆Newworking
◆Load Switch
◆Hand-held Instruments

Pin Configuration



Absolute Maximum Ratings (T_C=25℃ Unless Otherwise Noted)

Parameter		Symbol	N-Channel	P-Channel	Unit
Drain-Source Voltage		V_{DS}	20	-20	V
Gate-Source Voltage		V_{GS}	±10	±10	V
Continuous Drain Current	T_C=25°C	I_D	3.8	-2.5	A
	T_C=100°C		2.3	-1.5	
Pulsed Drain Current [1]		I_{DM}	15.2	-10	A
Power Dissipation	T_C=25°C	P_D	1.25	1.25	W
	Derate above 25°C		0.01	0.01	W/°C
Operating Junction and Storage Temperature Range		T_J,T_{STG}	-55 to 150		°C

Thermal Resistance Ratings

Thermal Resistance	Symbol	Typ.	Maximum	Unit
Maximum Junction-to-Ambient	$R_{\theta JA}$	-	100	°C/W
Maximum Junction-to-Case	$R_{\theta JC}$	-	15	°C/W

Ordering Information

Device	Package	Remark
ECDB2116S	DFN2x2-6	

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

Electrical Characteristics (T_J=25℃ unless otherwise noted)

Parameter	Symbol	Test Conditions	Limits				Unit
			Ch	Min	Typ	Max	
Static							
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V , I_D=250uA	N	20	-	-	V
		V_{GS}=0V , I_D=-250uA	P	-20	-	-	
Gate-Threshold Voltage	$V_{GS(th)}$	V_{GS} = V_{DS}, I_D = 250 uA	N	0.3	0.6	1	V
		V_{GS} = V_{DS}, I_D = -250 uA	P	-0.3	-0.6	-1	
Gate-Body Leakage	I_{GSS}	V_{GS} = ±10 V, V_{DS} = 0 V	N	-	-	±100	nA
		V_{GS} = ±10 V, V_{DS} = 0 V	P	-	-	±100	
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}= 20 V, V_{GS}= 0V,Tj=25 °C	N	-	-	1	uA
		V_{DS} =-20 V, V_{GS}=0V, Tj=25 °C	P	-	-	-1	
		V_{DS}= 16 V, V_{GS}= 0V,Tj=125 °C	N	-	-	10	
		V_{DS} =-16V,V_{GS}=0V, Tj=125 °C	P	-	-	-10	
Drain-Source On-Resistance	$R_{DS(on)}$	V_{GS}= 4.5 V, I_D= 3 A	N	-	30	40	mΩ
		V_{GS}= 2.5 V, I_D= 2 A		-	42	55	
		V_{GS}= 1.8 V, I_D= 1.5 A		-	55	70	
		V_{GS}= -4.5 V, I_D= -3A	P	-	82	100	
		V_{GS}= -2.5 V, I_D= -2A		-	125	140	
		V_{GS}= -1.8 V, I_D= -1A		-	197	230	
Forward Tranconductance	g_{fs}	V_{DS}= 10 V, I_D= 2 A	N	-	4.4	-	S
		V_{DS}= -10V, I_D= -1 A	P	-	2.2	-	
Diode Forward Voltage	V_{SD}	I_S= 1A, V_{GS}= 0V, Tj=25 °C	N	-	-	1	V
		I_S= -1A, V_{GS}= 0V, Tj=25 °C	P	-	-	-1	
Dynamic							
Total Gate Charge [23]	Q_g	N-Channel V_{DS}=10V, V_{GS}=4.5V, I_D=3A P-Channel V_{DS}=-10V, V_{GS}=-4.5V, I_D=-2A	N	-	5.8	10	nC
			P	-	4.8	10	
Gate-Source Charge [23]	Q_{gs}		N	-	0.6	1.5	
			P	-	0.5	1	
Gate-Drain Charge [23]	Q_{gd}		N	-	1.5	3	
			P	-	1.9	4	
Input Capacitance	C_{iss}	N-Channel V_{DS}=15V, V_{GS}=0V, f=1MHz P-Channel V_{DS}=-15V, V_{GS}=0V, f=1MHz	N	-	315	600	pF
			P	-	350	510	
Output Capacitance	C_{oss}		N	-	50	80	
			P	-	65	95-	
Reverse Transfer Capacitance	C_{rss}		N	-	40	60	
			P	-	50	75-	
Turn-On Delay Time [23]	$t_{d(on)}$	N-Channel V_{DD}=10V, V_{GS}=4.5V, I_D=1A , R_{GEN}=25Ω, P-Channel V_{DD}=-10V, V_{GS}=-4.5V, I_D=-1A ,R_{GEN}=25Ω	N	-	2.9	6	nS
			P	-	3.5	7	
Rise Time [23]	t_r		N	-	8.4	16	
			P	-	12.6	24	
Turn-Off Delay Time [23]	$t_{d(off)}$		N	-	19.2	38	
			P	-	32.6	62	
Fall-Time [23]	t_f		N	-	5.6	12	
			P	-	8.4	16	

Typical Characterictics(N-Channel)

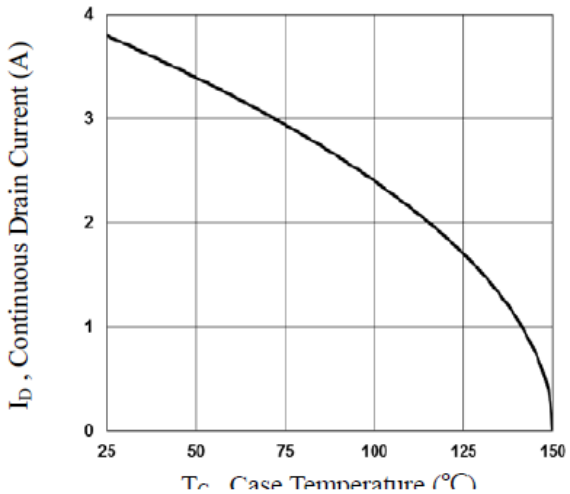


Fig.1 Continuous Drain Current vs. T_C

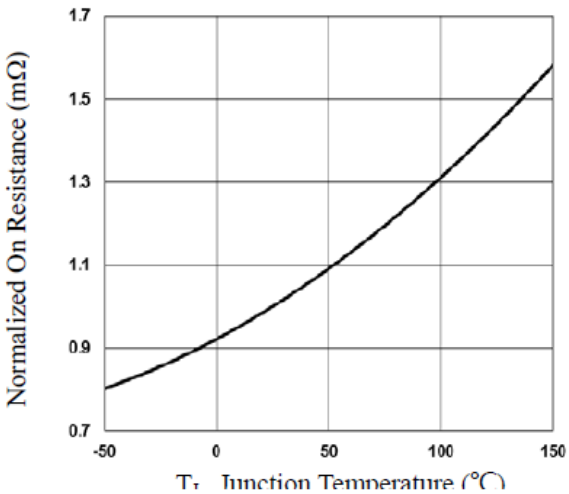


Fig.2 Normalized RDSON vs. T_J

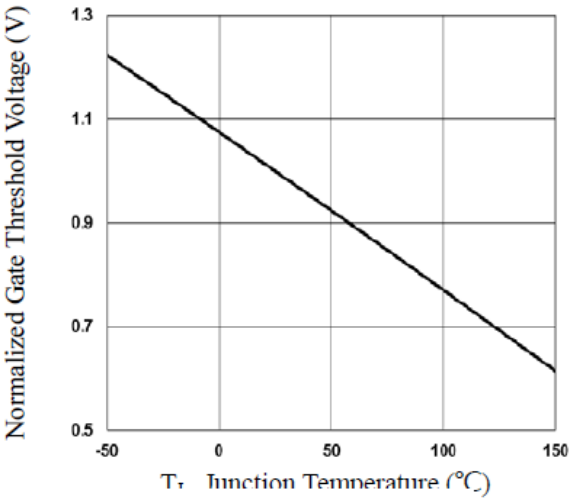


Fig.3 Normalized V_{th} vs. T_J

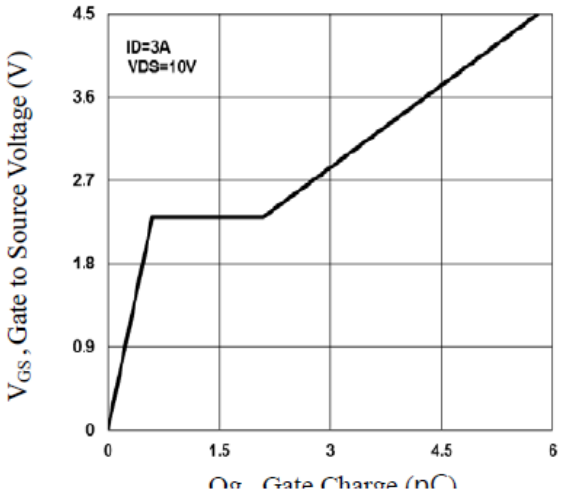


Fig.4 Gate Charge Waveform

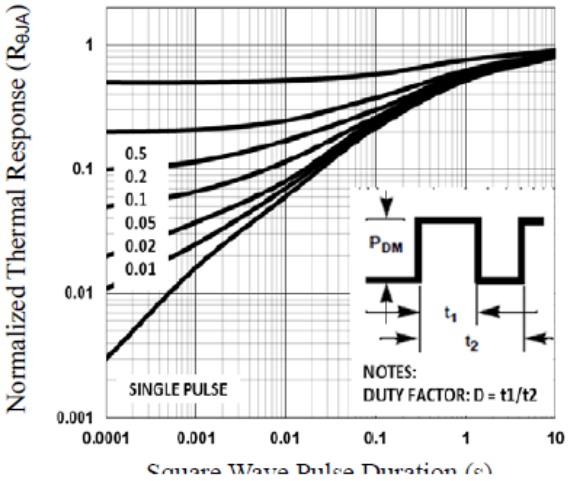


Fig.5 Normalized Transient Impedance

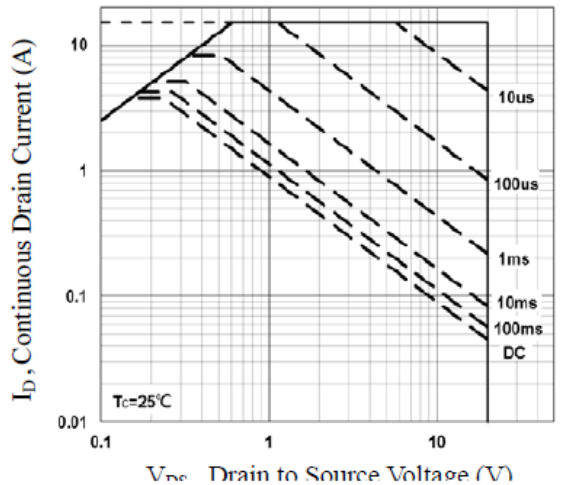


Fig.6 Maximum Safe Operation Area

Typical Characterictics (P-Channel)

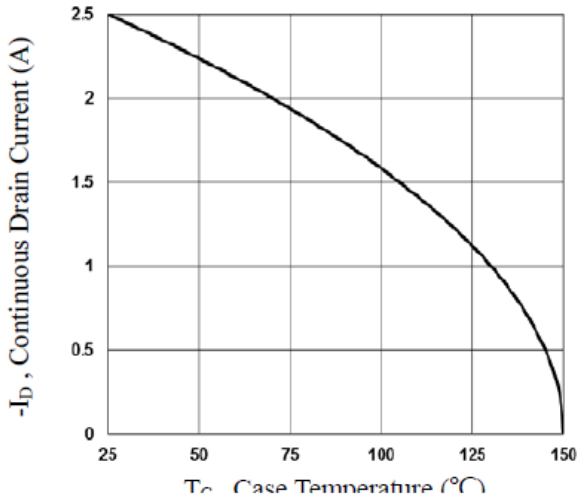


Fig.7 Continuous Drain Current vs. T_c

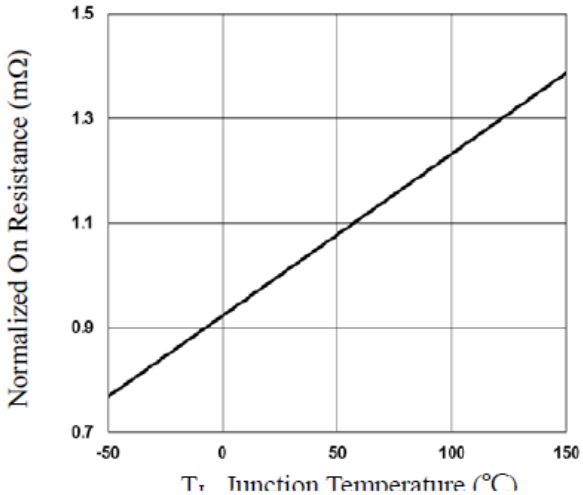


Fig.8 Normalized RDSON vs. T_J

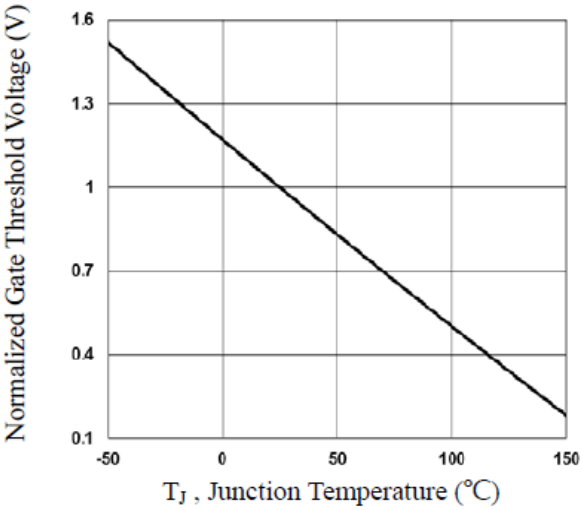


Fig.9 Normalized V_{th} vs. T_J

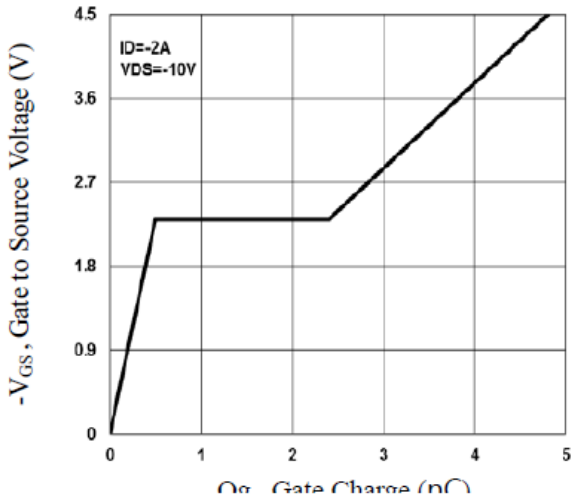


Fig.10 Gate Charge Waveform

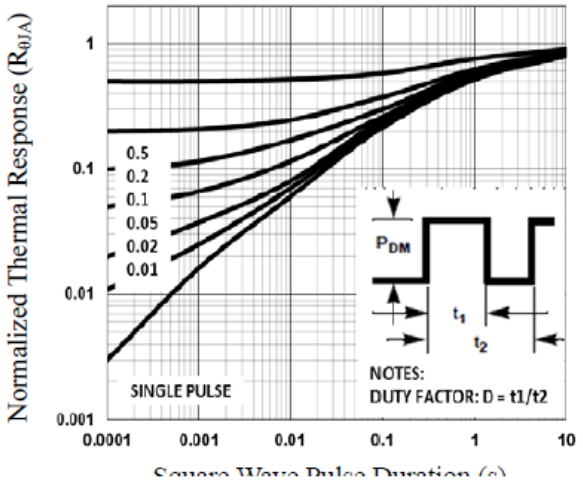


Fig.11 Normalized Transient Impedance

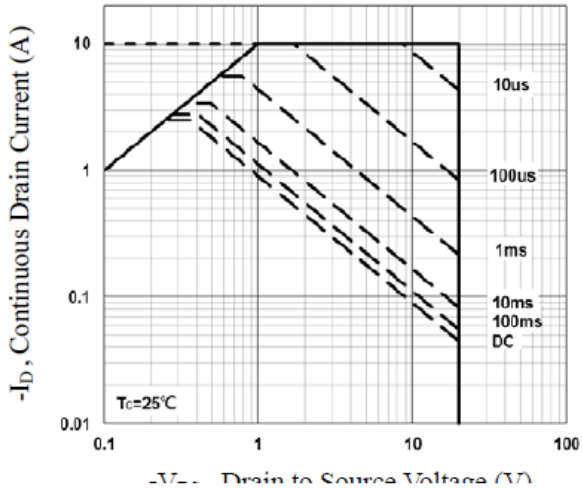
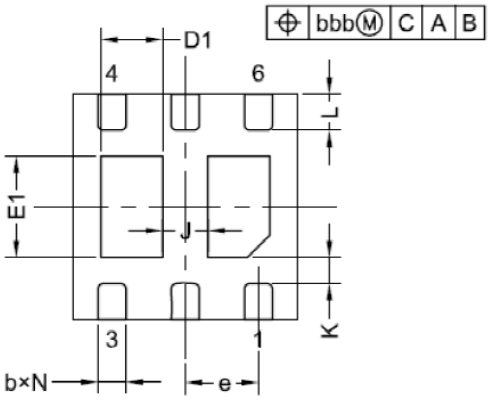


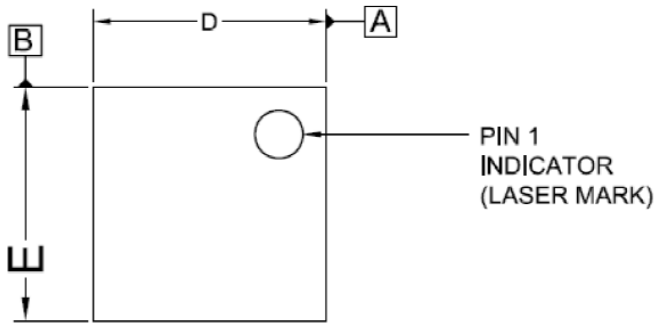
Fig.12 Maximum Safe Operation Area

Physical Dimensions

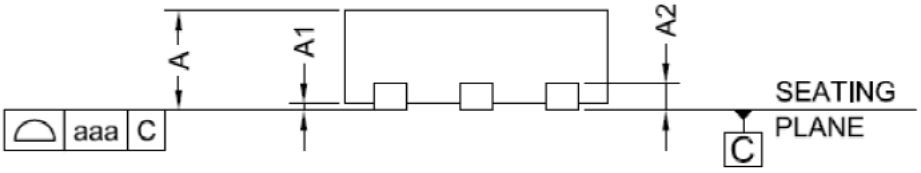
6-Pin Plastic DFN2x2-6



BOTTOM VIEW



TOP VIEW



SIDE VIEW

COMMON DIMENSIONS

(UNITS OF MEASURE=MILLIMETER)

SYMBOL	MIN	TYP	MAX
A	0.70	0.75	0.80
A1	0.00	0.02	0.05
A2		0.203	
b	0.20	0.25	0.30
D	1.95	2.00	2.05
D1	0.50	0.55	0.60
E	1.95	2.00	2.05
E1	0.85	0.90	0.95
e		0.65BSC	
L	0.27	0.32	0.37
J		0.40BSC	
K		0.20MIN	
N		6	
aaa		0.08	
bbb		0.10	