PDEB25A6Q

20V Dual N-Channel MOSFETs
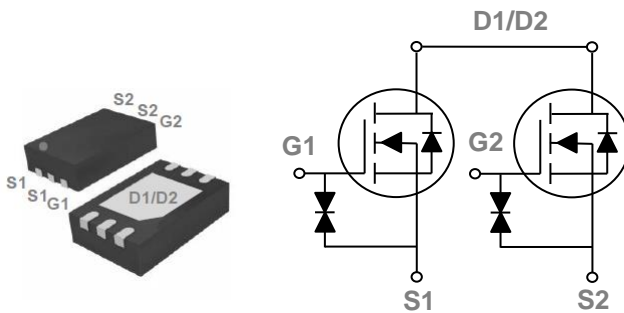
General Description

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.

BVDSS	RDSON	ID
20V	6.7mΩ	32A

Features

- *20V,32A, RDS(ON) =6.7mΩ @VGS = 4.5V*
- *Improved dv/dt capability*
- *Fast switching*
- *G-S ESD Protection Diode Embedded*
- *Green Device Available*

DFN2x3 Dual Pin Configuration

Applications

- *Handheld Instruments*
- *POL Applications*
- *Battery Protection Applications*

Absolute Maximum Ratings Tc=25℃ unless otherwise noted

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	20	V
V_{GS}	Gate-Source Voltage	±12	V
I_D	Drain Current – Continuous (T_C=25℃)	32	A
	Drain Current – Continuous (T_C=100℃)	20.2	A
	Drain Current – Continuous (T_A=25℃)	13	A
	Drain Current – Continuous (T_A=70℃)	10.4	A
I_{DM}	Drain Current – Pulsed[1] (T_C=25℃)	128	A
P_D	Power Dissipation (T_C=25℃)	20	W
	Power Dissipation – Derate above T_C=25℃	0.16	W/℃
	Power Dissipation (T_A=25℃)	2	W
	Power Dissipation – Derate above T_A=25℃	0.016	W/℃
T_{STG}	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
$R_{θJA}$	Thermal Resistance Junction to ambient	---	62	℃/W
$R_{θJC}$	Thermal Resistance Junction to case	---	6.1	℃/W

Electrical Characteristics (T$_J$=25 ℃, 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
I$_{DSS}$	Drain-Source Leakage Current	V$_{DS}$=20V , V$_{GS}$=0V , T$_J$=25℃	---	---	1	uA
		V$_{DS}$=16V , V$_{GS}$=0V , T$_J$=85℃	---	---	10	uA
I$_{GSS}$	Gate-Source Leakage Current	V$_{GS}$=±12V , V$_{DS}$=0V	---	---	±20	uA

On Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
R$_{DS(ON)}$	Static Drain-Source On-Resistance[3]	V$_{GS}$=4.5V , I$_D$=5.5A	4.5	5.6	6.7	mΩ
		V$_{GS}$=4.0V , I$_D$=5.5A	4.8	5.8	7.2	mΩ
		V$_{GS}$=3.7V , I$_D$=5.5A	5	6	7.6	mΩ
		V$_{GS}$=3.1V , I$_D$=5.5A	5.5	6.5	8.2	mΩ
		V$_{GS}$=2.5V , I$_D$=5.5A	6	7.4	9.6	mΩ
V$_{GS(th)}$	Gate Threshold Voltage	V$_{GS}$=V$_{DS}$, I$_D$ =250uA	0.5	0.75	1.5	V
gfs	Forward Transconductance	V$_{DS}$=5V , I$_D$=5A	---	15	---	S

Dynamic and switching Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Q$_g$	Total Gate Charge[2,3]	V$_{DS}$=16V , V$_{GS}$=4.5V , I$_D$=5A	---	19.9	30	nC
Q$_{gs}$	Gate-Source Charge[2,3]		---	2.3	3.8	
Q$_{gd}$	Gate-Drain Charge[2,3]		---	8.2	12.3	
T$_{d(on)}$	Turn-On Delay Time[2,3]	V$_{DD}$=15V , V$_{GS}$=10V , R$_G$=6Ω I$_D$=5A	---	31	60	ns
T$_r$	Rise Time[2,3]		---	69	140	
T$_{d(off)}$	Turn-Off Delay Time[2,3]		---	66	132	
T$_f$	Fall Time[2,3]		---	58	119	
C$_{iss}$	Input Capacitance	V$_{DS}$=15V , V$_{GS}$=0V , F=1MHz	---	780	1180	pF
C$_{oss}$	Output Capacitance		---	237	356	
C$_{rss}$	Reverse Transfer Capacitance		---	90	136	

Drain-Source Diode Characteristics and Maximum Ratings

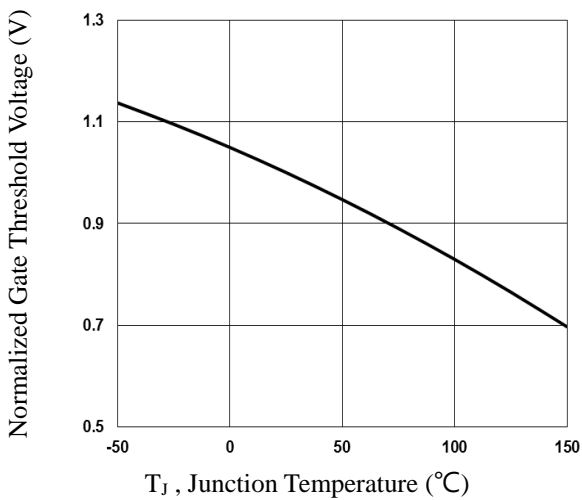| Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I$_S$	Continuous Source Current	V$_G$=V$_D$=0V , Force Current	---	---	32	A
I$_{SM}$	Pulsed Source Current		---	---	64	A
V$_{SD}$	Diode Forward Voltage[2]	V$_{GS}$=0V , I$_S$=1A , T$_J$=25℃	---	---	1	V
T$_{rr}$	Reverse Recovery Time	V$_R$=20V,IS=5A	---	670	---	ns
Q$_{rr}$	Reverse Recovery Charge	di/dt=100A/μs TJ=25℃	---	9.8	---	uC

Note :
1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%.
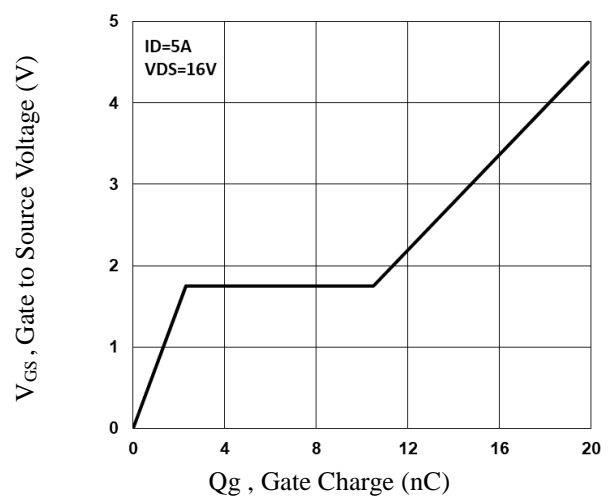3. Essentially independent of operating temperature.
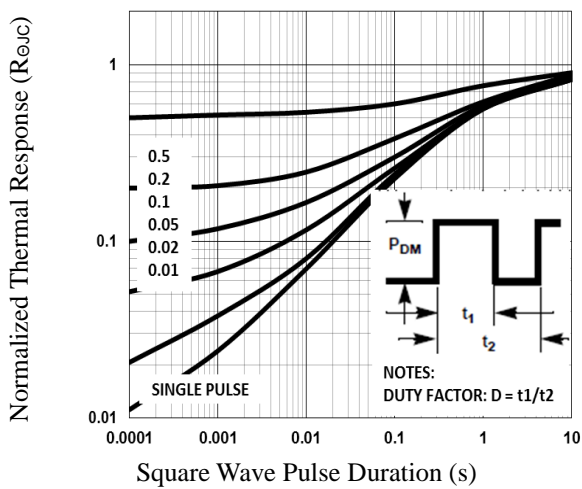
Fig.1   Continuous Drain Current vs. T$_C$

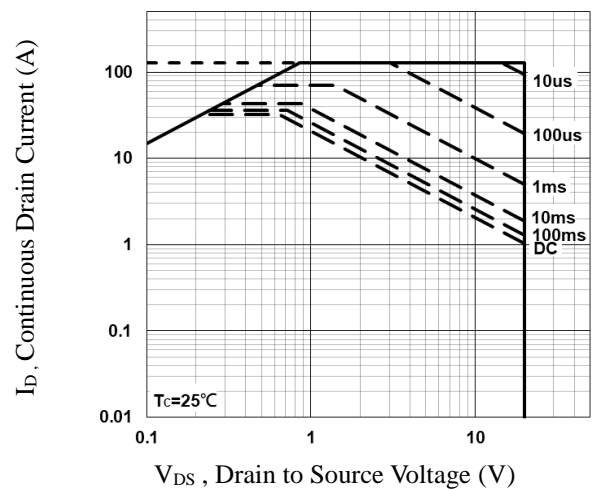**Fig.2   Normalized RDSON vs. T$_J$**

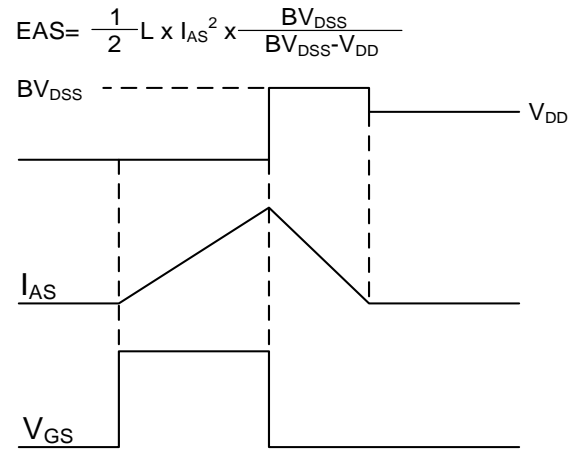**Fig.3   Normalized V$_{th}$ vs. T$_J$**

Fig.4   Gate Charge Waveform

Fig.5   Normalized Transient Response

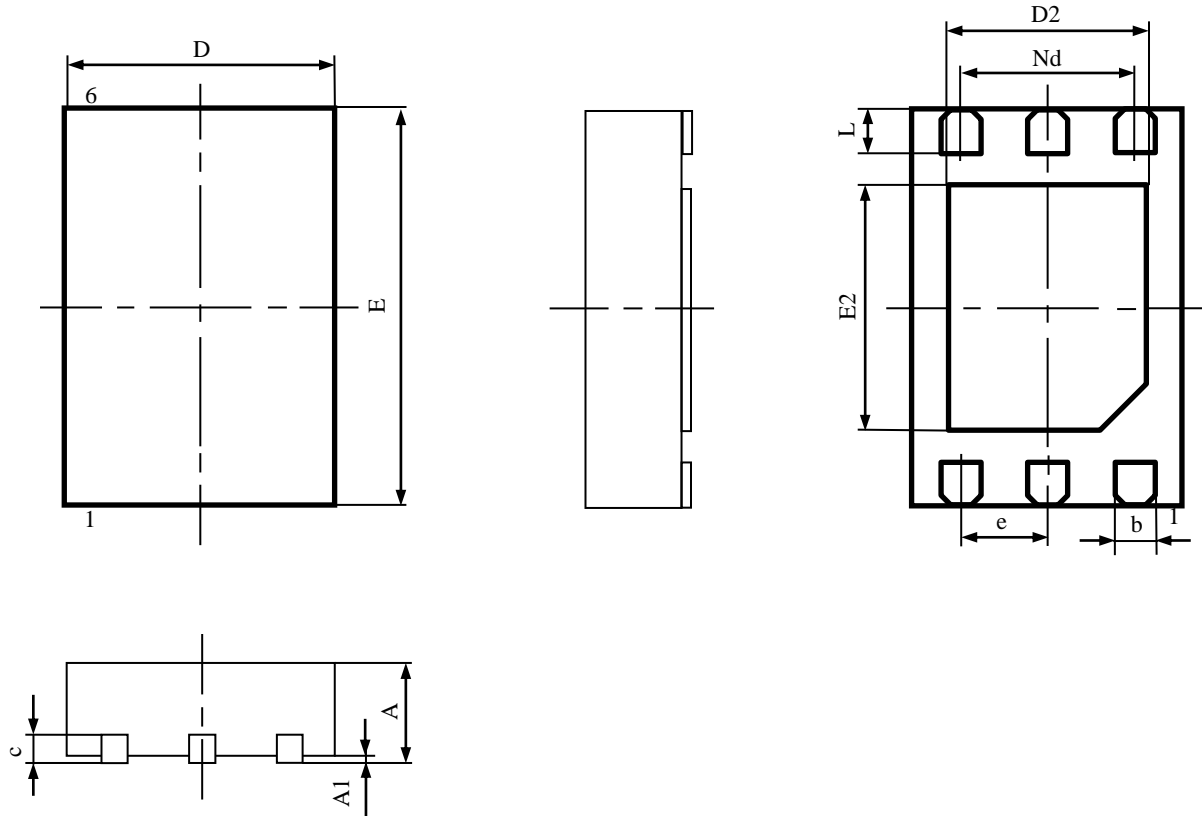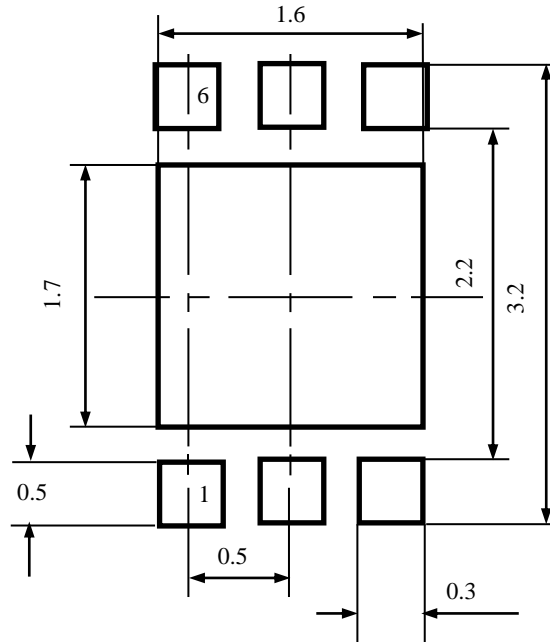**Fig.6   Maximum Safe Operation Area**

Fig.7   Switching Time Waveform

$$EAS = \frac{1}{2}L \times I_{AS}^2 \times \frac{BV_{DSS}}{BV_{DSS} - V_{DD}}$$

Fig.8   EAS Waveform

DFN2X3 PACKAGE INFORMATION

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MAX	**MIN**	**MAX**	**MIN**
A	0.800	0.700	0.031	0.028
A1	0.050	0.02typ.	0.002	0.001typ.
b	0.350	0.200	0.014	0.008
c	0.250	0.180	0.010	0.007
D	2.100	1.900	0.083	0.075
D2	1.600	1.400	0.063	0.055
e	0.5BSC		0.02BSC	
Nd	1.0BSC		0.04BSC	
E	3.100	2.900	0.122	0.114
E2	1.750	1.650	0.069	0.065
L	0.400	0.300	0.016	0.012

DFN2X3 RECOMMENDED LAND PATTERN

unit : mm