



20V P-Channel MOSFETs

General Description

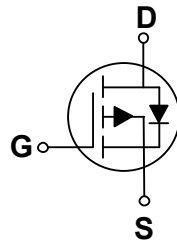
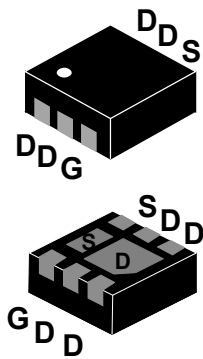
These P-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These devices are well suited for high efficiency fast switching applications.

BV_{DSS}	$R_{DS(ON)}$	I_D
-20 V	17 m Ω	-11.5 A

Features

- $R_{DS(ON)} \leq 17m\Omega @ V_{GS} = -4.5V$
- Fast Switching
- Green Device Available
- Improved dv/dt Capability

DFN2x2-6L Pin Configuration



Applications

- Battery Protection
- Power Management
- Load Switch

Absolute Maximum Ratings $T_A=25^\circ\text{C}$ 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 ($T_A=25^\circ\text{C}$)	-11.5	A
I_{DM}	Drain Current - Pulsed (NOTE 1)	-46	A
EAS	Single Pulse Avalanche Energy (NOTE 2)	20	mJ
P_D	Power Dissipation ($T_A=25^\circ\text{C}$)	3.1	W
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ\text{C}$
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ\text{C}$

Thermal Characteristics

Symbol	Parameter	Rating	Unit
$R_{\theta JA}$	Thermal Resistance Junction to Ambient	40.3	$^\circ\text{C/W}$



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

Off Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0\text{V}$, $I_D=-250\mu\text{A}$	-20	---	---	V
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=-20\text{V}$, $V_{GS}=0\text{V}$	---	---	-1	μA
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 12\text{V}$, $V_{DS}=0\text{V}$	---	---	± 100	nA

On Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=-4.5\text{V}$, $I_D=-8\text{A}$	---	---	17	m Ω
		$V_{GS}=-2.5\text{V}$, $I_D=-6\text{A}$	---	---	22	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}$, $I_D=-250\mu\text{A}$	-0.3	---	-1.0	V

Dynamic and switching Characteristics (NOTE 4)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Q_g	Total Gate Charge	$V_{DS}=-10\text{V}$, $V_{GS}=-4.5\text{V}$, $I_D=-8\text{A}$	---	12	---	nC
Q_{gs}	Gate-Source Charge		---	1.8	---	
Q_{gd}	Gate-Drain Charge		---	3.2	---	
$T_{d(on)}$	Turn-On Delay Time	$V_{DD}=-10\text{V}$, $V_{GS}=-4.5\text{V}$, $R_G=3\Omega$, $I_D=-8\text{A}$	---	17	---	nS
T_r	Rise Time		---	25.5	---	
$T_{d(off)}$	Turn-Off Delay Time		---	32	---	
T_f	Fall Time		---	15	---	
C_{iss}	Input Capacitance	$V_{DS}=-10\text{V}$, $V_{GS}=0\text{V}$, $F=1\text{MHz}$	---	1555	---	pF
C_{oss}	Output Capacitance		---	224	---	
C_{rss}	Reverse Transfer Capacitance		---	195	---	
R_g	Gate Resistance		$V_{DS}=-10\text{V}$, $V_{GS}=0\text{V}$, $F=1\text{MHz}$	---	10	

Drain-Source Diode Characteristics and Ratings

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current	$V_G=V_D=0\text{V}$, Force Current	---	---	-11.5	A
V_{SD}	Diode Forward Voltage	$V_{GS}=0\text{V}$, $I_S=-8\text{A}$	---	---	-1.2	V

NOTES :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. The EAS data shows Max. rating. The test condition is $V_{DD}=-20\text{V}$, $V_{GS}=-10\text{V}$, $L=0.1\text{mH}$, $I_{AS}=-20\text{A}$.
3. The data tested by pulsed , pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$.
4. This value is guaranteed by design hence it is not included in the production test.



Characteristics Curves

FIG. 1-Transfer Characteristics

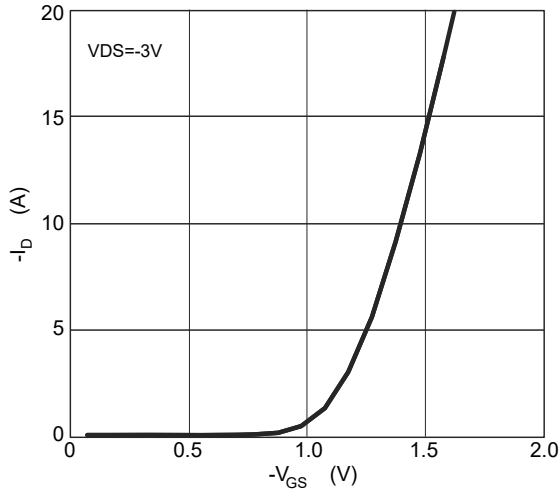


FIG. 2- I_S vs V_{SD}

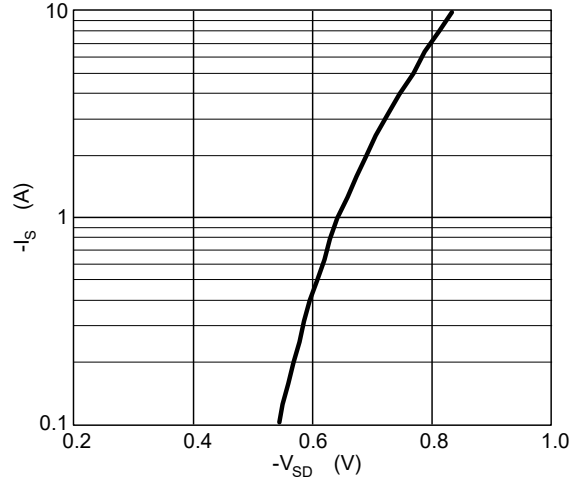


FIG. 3- $R_{DS(ON)}$ vs I_D

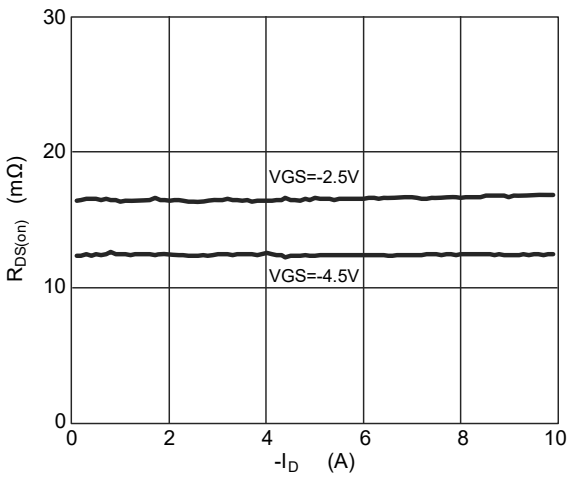


FIG. 4-Normalized $R_{DS(ON)}$ vs T_J

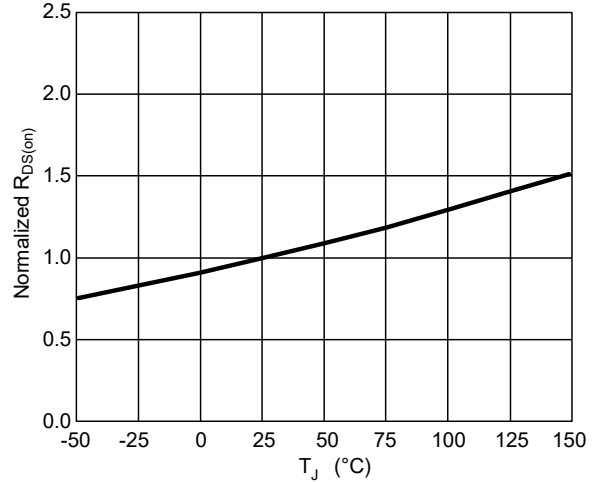


FIG. 5-Gate Charge Characteristics

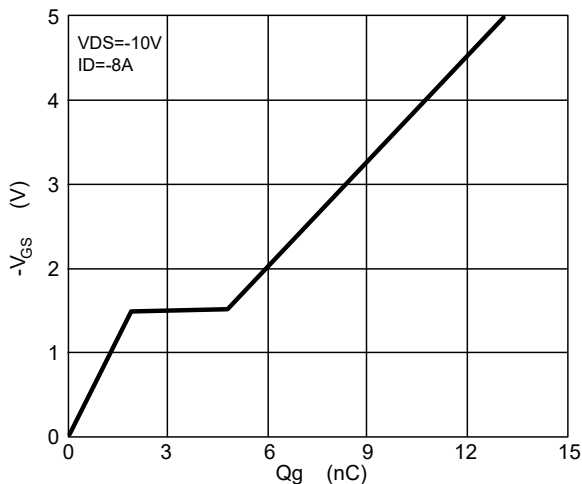
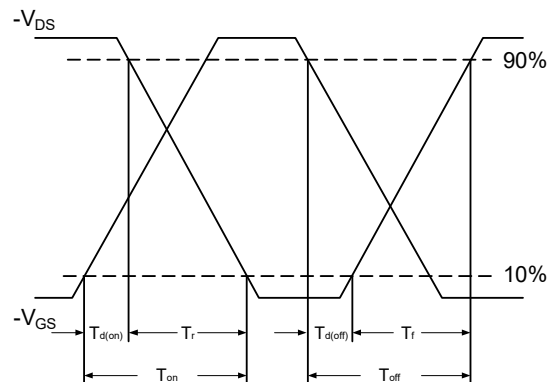


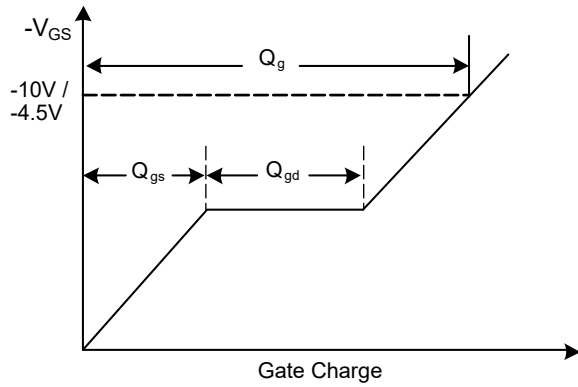
FIG. 6-Switching Time Waveform



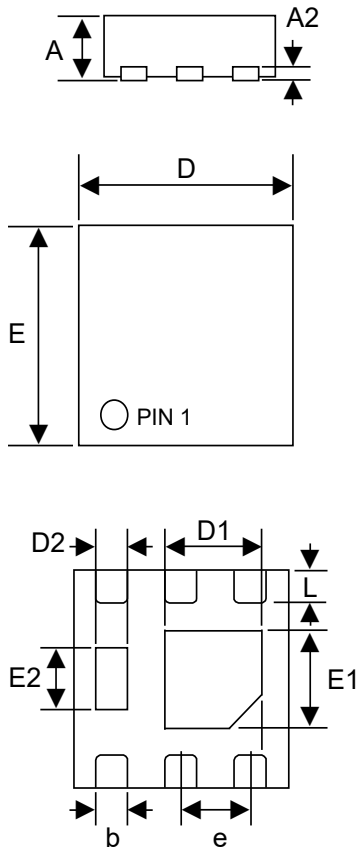


Characteristics Curves

FIG. 7-Gate Charge Waveform



Package Outline Dimensions



Symbol	Dimensions in mm		Dimensions in inches	
	Min.	Max.	Min.	Max.
A	0.50	0.80	0.019	0.032
A2	0.203 REF		0.008 REF	
b	0.15	0.35	0.005	0.014
D	1.90	2.10	0.074	0.083
D1	0.80	1.20	0.031	0.048
D2	0.15	0.40	0.005	0.016
E	1.90	2.10	0.074	0.083
E1	0.80	1.30	0.031	0.052
E2	0.46	0.90	0.018	0.036
e	0.65 BSC		0.026 BSC	
L	0.20	0.35	0.007	0.014

DFN2x2-6L



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