S30P32DNF

30V 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}	$R_{DS(ON)}$Max.	I_D
-30V	32mΩ	-6.5A

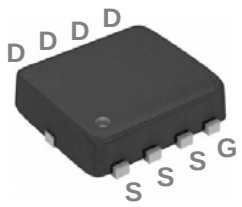
Features

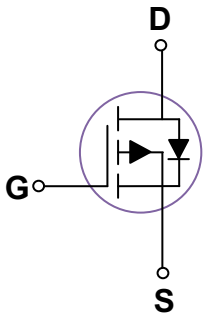
- *-30V,-6.5A, $R_{DS(ON)}$Max. =32mΩ@V_{GS} = -10V*
- *Fast switching*
- *Green Device Available*
- *Suit for -4.5V Gate Drive Applications*

Applications

- *Notebook*
- *Load Switch*
- *Battery Protection*
- *Hand-held Instruments*

DFN2020-8 Pin Configuration





Absolute Maximum Ratings **Tc=25℃ unless otherwise noted**

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-30	V
V_{GS}	Gate-Source Voltage	±12	V
I_D	Drain Current – Continuous (T_C=25˚C)	-6.5	A
	Drain Current – Continuous (T_C=100˚C)	-4.3	A
I_{DM}	Drain Current – Pulsed[1]	-42	A
E_{AS}	Single Pulse Avalanche Energy[2]	78.4	mJ
I_{AS}	Single Pulse Avalanche Current[2]	56	A
P_D	Power Dissipation (T_C=25˚C)	1.56	W
	Power Dissipation – Derate above 25˚C	0.012	W/˚C
T_{STG}	Storage Temperature Range	-55 to 150	˚C
T_J	Operating Junction Temperature Range	-55 to 150	˚C

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction to ambient		80	˚C/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	-30			V
$\triangle BV_{DSS}/\triangle T_J$	BV_{DSS} Temperature Coefficient	Reference to 25℃ , I_D=-1mA		-0.03		V/℃
I_{DSS}	Drain-Source Leakage Current	V_{DS}=-30V , V_{GS}=0V , T_J=25℃			-1	uA
		V_{DS}=-24V , V_{GS}=0V , T_J=125℃			-10	uA
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V , V_{DS}=0V			±100	nA

On Characteristics

$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=-10V , I_D=-4A		29	32	mΩ
		V_{GS}=-4.5V , I_D=-2A		38	46	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =-250uA	-0.5	-1.0	-1.5	V
$\triangle V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient			4		mV/℃
gfs	Forward Transconductance	V_{DS}=-10V , I_D=-3A		9		S

Dynamic and switching Characteristics

Q_g	Total Gate Charge[2,3]	V_{DS}=-15V , V_{GS}=-4.5V , I_D=-5A		8		nC
Q_{gs}	Gate-Source Charge[2,3]			3.3		
Q_{gd}	Gate-Drain Charge[2,3]			2.3		
$T_{d(on)}$	Turn-On Delay Time[2,3]	V_{DD}=-15V , V_{GS}=-10V , R_G=6Ω , I_D=-1A		4.6		ns
T_r	Rise Time[2,3]			14		
$T_{d(off)}$	Turn-Off Delay Time[2,3]			34		
T_f	Fall Time[2,3]			18		
C_{iss}	Input Capacitance	V_{DS}=-15V , V_{GS}=0V , F=1MHz		757		pF
C_{oss}	Output Capacitance			122		
C_{rss}	Reverse Transfer Capacitance			88		

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			-6.5	A
I_{SM}	Pulsed Source Current				-32	A
V_{SD}	Diode Forward Voltage	V_{GS}=0V , I_S=-1A , T_J=25℃			-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.

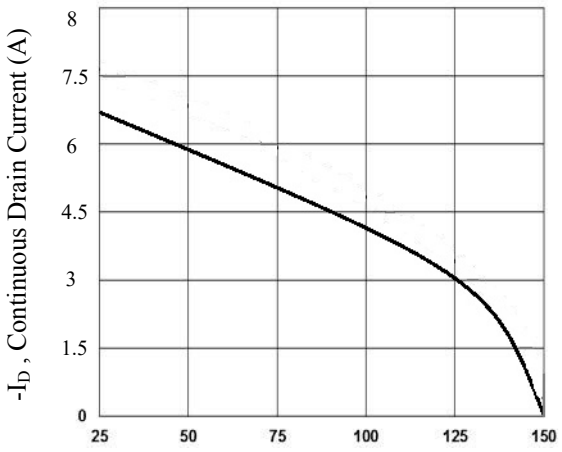


Fig.1 Continuous Drain Current vs. T_C

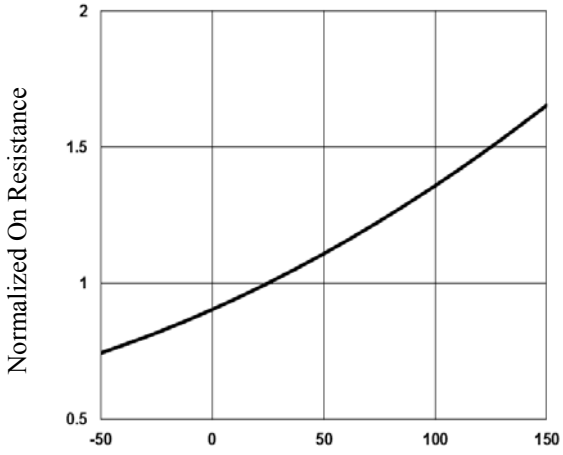


Fig.2 Normalized RDSON vs. T_J

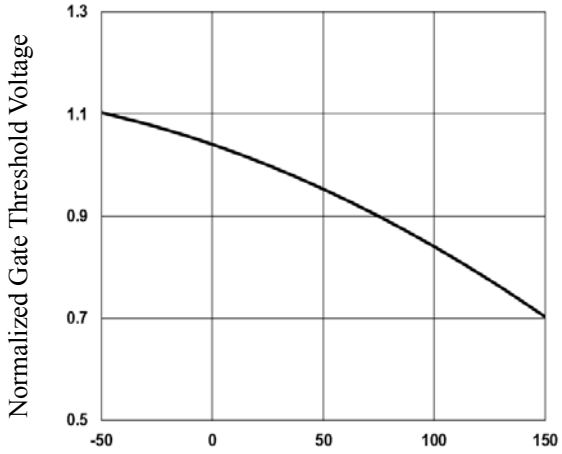


Fig.3 Normalized V_{th} vs. T_J

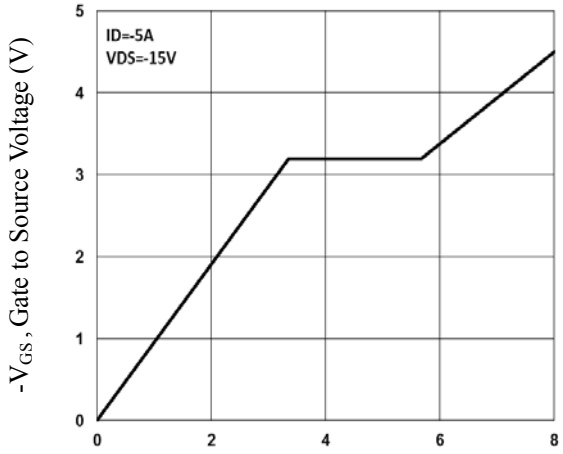


Fig.4 Gate Charge Waveform

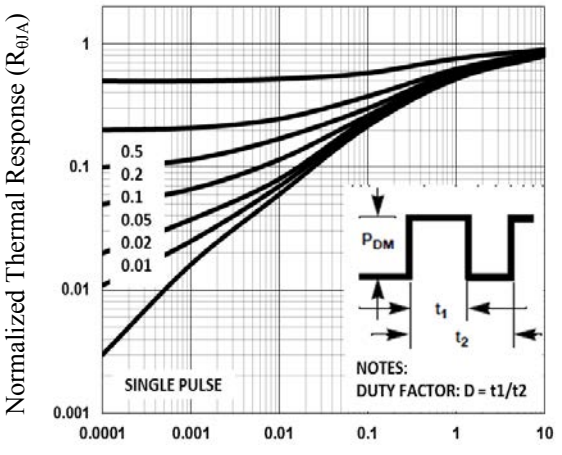


Fig.5 Normalized Transient Impedance

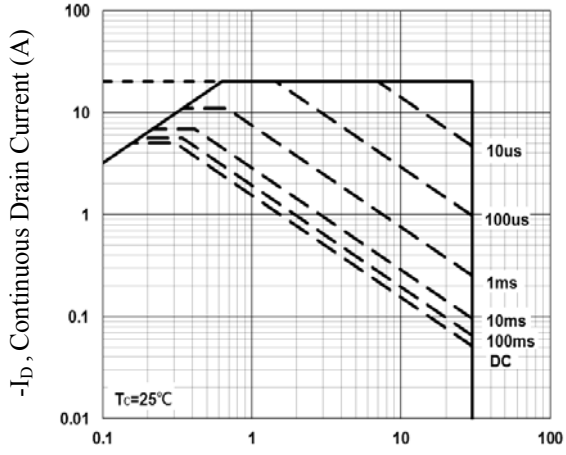


Fig.6 Maximum Safe Operation Area

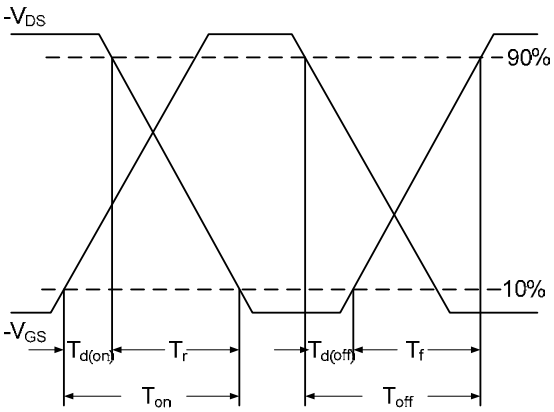


Fig.7 Switching Time Waveform

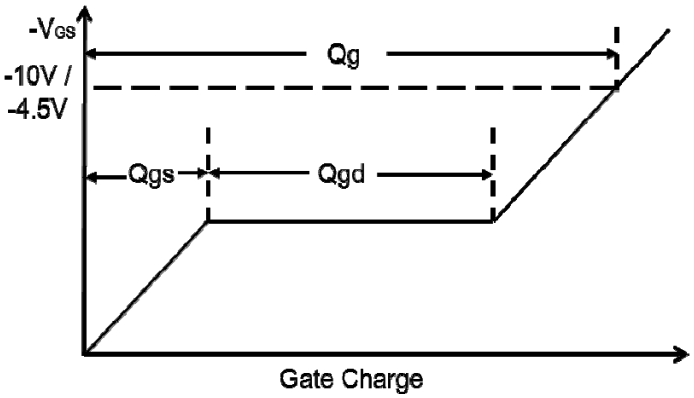


Fig.8 Gate Charge Waveform

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