HOEN Dongguan Hoen Semiconductor Co.,LTD

HFF10N65

650V N-Channel MOSFETs

Features

- 650V,10A, $R_{DS(ON)}$ =0.8Ω@V_{GS} = 10V
- Improved dv/dt capability
- Fast switching
- 100% EAS Guaranteed
- Green Device Available

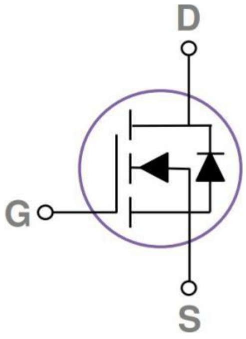
Applications

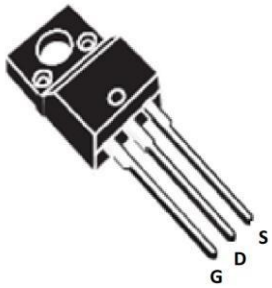
- Networking
- Load Switch
- LED applications
- Quick Charger

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.

Product Summary





BV_{DSS}	R_{DSON}	I_D
650V	0.8ohm	10A

Absolute Maximum Ratings T_C=25℃ unless otherwise noted

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	650	V
Gate-Source Voltage	V_{GS}	±30	V
Continuous Drain Current	I_D@Tc=25℃	10	A
	I_D@Tc=100℃	6.3	A
Pulsed Drain Current	I_{DM}	40	A
Single Pulse Avalanche Energy	EAS	500	mJ
Single Pulse Avalanche Current	IAS	10	A
Power Dissipation-	Derate above 25℃	0.31	W/℃
Power Dissipation	T_C=25℃	125	W
Operating Junction Temperature	T_J	-55 to 150	℃
Storage Temperature	T_{STG}	-55 to 150	℃

Thermal Resistance

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal resistance, junction - case	R_{thJC}	---	---	0.8	℃/W
Thermal Resistance Junction to ambient	R_{thJA}	---	---	65	℃/W
Soldering temperature, wave soldering for 10s	Tsold	---	---	265	℃

■ Electronic Characteristics TJ =25℃ unless otherwise noted

Off Characteristics

Parameter	Condition	Symbol	Min.	Typ.	Max.	Unit
Drain-Source Breakdown Voltage	V_{GS} =0V, I_D =250uA	BV_{DSS}	650	700	---	V
Drain-Source Leakage Current	V_{DS}=650V, V_{GS} =0V	I_{DSS}	---	---	1	uA
	V_{DS}=520V, V_{GS} =0V		---	---	10	
Gate- Source Leakage Current	V_{GS}=±30V, V_{DS} =0V	I_{GSS}	---	---	±100	nA

On Characteristics

Parameter	Condition	Symbol	Min.	Typ.	Max.	Unit
Static Drain-source On Resistance	V_{GS}=10V, I_D=5A	$R_{DS(ON)}$	---	0.75	0.8	Ω
Gate Threshold Voltage	V_{GS} =V_{DS}, I_D=250uA	$V_{GS(TH)}$	2.0	3.0	4.0	V
Forward Transconductance	V_{DS} =40V, I_D=10A	g_{FS}	---	2.5	---	S

Dynamic and switching Characteristics

Parameter	Condition	Symbol	Min.	Typ.	Max.	Unit
Total Gate Charge	V_{DS}=520V V_{GS}=10V I_D=10A	Qg	---	21	---	nC
Gate-Source Charge		Qgs	---	7.5	---	
Gate-Drain Charge		Qgd	---	6	---	
Turn-On Delay Time	V_{DD}=300V V_{GS}=10V R_G=25Ω I_D=10A	$T_{d(on)}$	---	38	---	ns
Rise Time		T_r	---	70	---	
Turn-Off Delay Time		$T_{d(off)}$	---	53	---	
Fall Time		T_f	---	35	---	
Input capacitance	V_{DS}=25V V_{GS}=0V F=1MHz	Ciss	---	1120	---	pF
Output capacitance		Coss	---	130	---	
Reverse transfer capacitance		Crss	---	4.9	---	
Gate resistance	V_{DS}=0V,V_{GS}=0V,F=1MHz	Rg	---	1.2	2.4	Ω

Drain-Source Diode Characteristics and Maximum Ratings

Parameter	Condition	Symbol	Min.	Typ.	Max.	Unit
Diode Forward Voltage	V_{GS}=0V,I_S=10A	V_{SD}	---	0.72	1.4	V
Reverse Recovery Time	IF=10A, dI/dt=40A/μs, V_{DS}=100V	trr	---	491	---	nS
Reverse Recovery Charge		Qrr	---	2296	---	nC

Note:

1. Repetitive Rating: Pulsed width limited by maximum junction temperature.
2. V_{DD}=650V, V_{GS}=10V, L=1mH,IAS=10A.,R_G=25 ,Starting TJ=25℃.
3. The data tested by pulsed, pulse width ≦ 300us, duty cycle ≦ 2%.
4. Essentially independent of operating temperature.

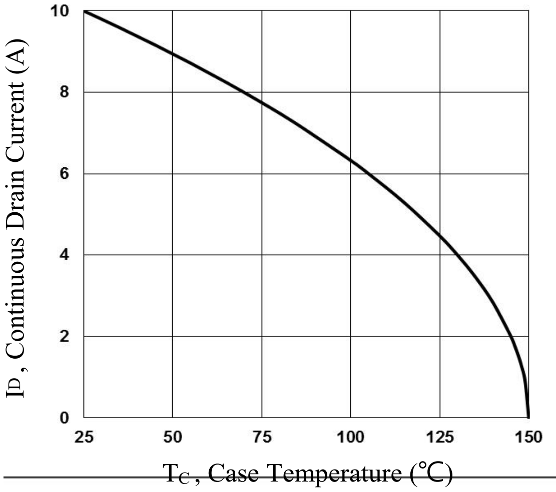


Fig.1 Continuous Drain Current vs. TC

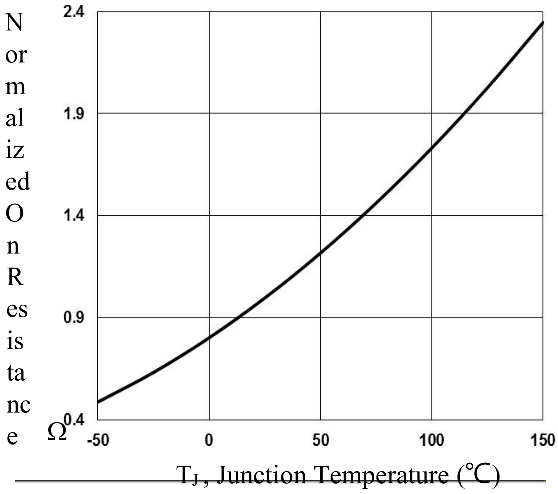


Fig.2 Normalized RDSON vs. TJ

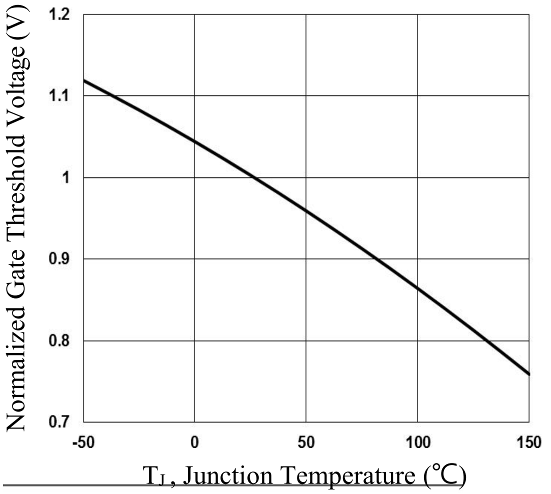


Fig.3 Normalized V_{th} vs. T_J

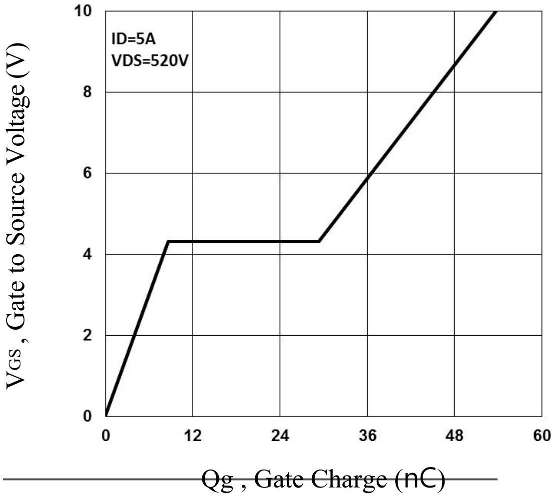


Fig.4 Gate Charge Waveform

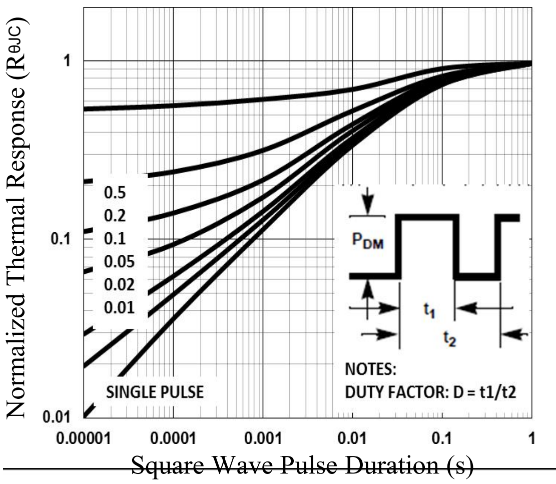


Fig.5 Normalized Transient Impedance

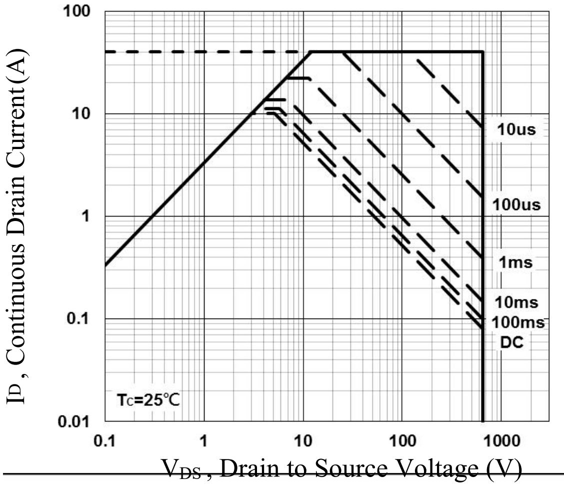


Fig.6 Maximum Safe Operation Area

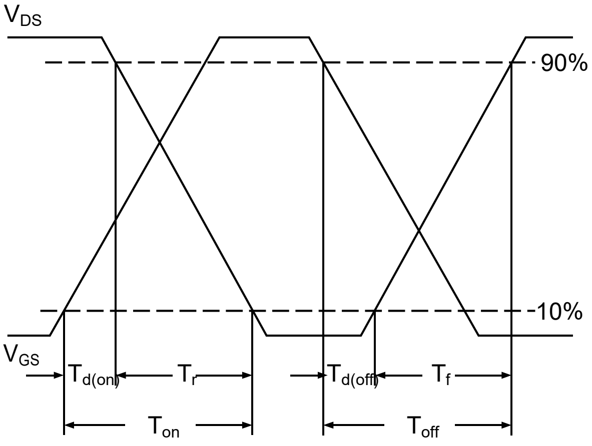


Fig.7 Switching Time Waveform

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

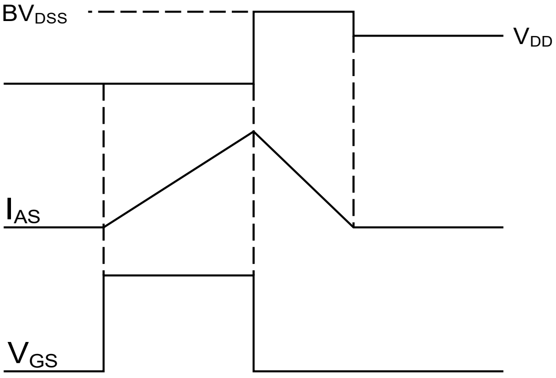


Fig.8 EAS Waveform

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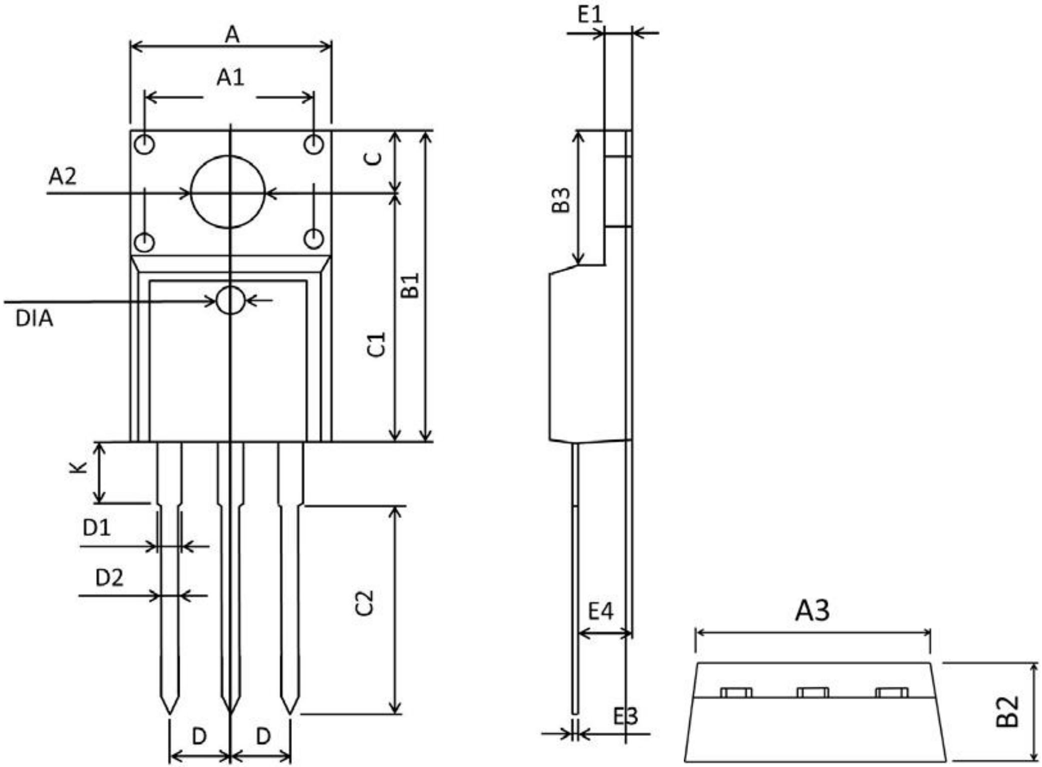

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	9.860	10.460	0.389	0.411
A1	6.900	7.100	0.272	0.279
A2	3.100	3.500	0.123	0.137
B1	9.500	9.900	0.375	0.389
B2	4.500	4.900	0.178	0.192
B3	6.480	6.880	0.256	0.271
C	3.100	3.500	0.123	0.137
C1	12.270	12.870	0.484	0.506
C2	12.580	13.380	0.496	0.526
D	2.490	2.590	0.099	0.101
D1	1.070	1.470	0.043	0.057
D2	0.700	0.900	0.028	0.035
K	2.900	3.300	0.115	0.129
E1	2.340	2.740	0.093	0.107
E3	0.400	0.600	0.016	0.023
E4	2.560	2.960	0.101	0.116
DIA	1.45	1.55	0.058	0.061