

Aug 2008

HFG1N80

800V N-Channel MOSFET

FEATURES

- ❑ Originative New Design
- ❑ Superior Avalanche Rugged Technology
- ❑ Robust Gate Oxide Technology
- ❑ Very Low Intrinsic Capacitances
- ❑ Excellent Switching Characteristics
- ❑ Unrivalled Gate Charge : 7.5 nC (Typ.)
- ❑ Extended Safe Operating Area
- ❑ Lower $R_{DS(ON)}$: 13 Ω (Typ.) @ $V_{GS}=10V$

$$BV_{DSS} = 800 V$$

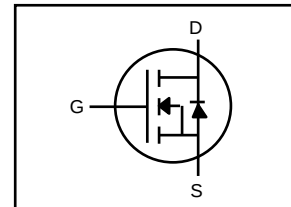
$$R_{DS(on) \text{ typ}} = 13 \Omega$$

$$I_D = 1.0 A$$

TO-92L



1.Gate 2. Drain 3. Source



Absolute Maximum Ratings $T_C=25^\circ\text{C}$ unless otherwise specified

Symbol	Parameter	Value	Units
V_{DSS}	Drain-Source Voltage	800	V
I_D	Drain Current – Continuous ($T_C = 25^\circ\text{C}$)	1.0	A
	Drain Current – Continuous ($T_C = 100^\circ\text{C}$)	0.63	A
I_{DM}	Drain Current – Pulsed (Note 1)	4.0	A
V_{GS}	Gate-Source Voltage	± 30	V
E_{AS}	Single Pulsed Avalanche Energy (Note 2)	90	mJ
I_{AR}	Avalanche Current (Note 1)	1.0	A
E_{AR}	Repetitive Avalanche Energy (Note 1)	4.5	mJ
dv/dt	Peak Diode Recovery dv/dt (Note 3)	4.0	V/ns
P_D	Power Dissipation ($T_A = 25^\circ\text{C}$) *	2.5	W
	Power Dissipation ($T_C = 25^\circ\text{C}$)	45	W
	– Derate above 25°C	0.36	W/ $^\circ\text{C}$
T_J, T_{STG}	Operating and Storage Temperature Range	-55 to +150	$^\circ\text{C}$
T_L	Maximum lead temperature for soldering purposes, 1/8" from case for 5 seconds	300	$^\circ\text{C}$

Thermal Resistance Characteristics

Symbol	Parameter	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case	--	2.78	$^\circ\text{C}/\text{W}$
$R_{\theta JA}$	Junction-to-Ambient*	--	50	
$R_{\theta JA}$	Junction-to-Ambient	--	110	

* When mounted on the minimum pad size recommended (PCB Mount)

Electrical Characteristics $T_C=25\text{ }^{\circ}\text{C}$ unless otherwise specified

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
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On Characteristics

V_{GS}	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$	2.5	--	4.5	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS} = 10\text{ V}, I_D = 0.5\text{ A}$	--	13	16	Ω

Off Characteristics

BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$	800	--	--	V
$\Delta BV_{DSS} / \Delta T_J$	Breakdown Voltage Temperature Coefficient	$I_D = 250\text{ }\mu\text{A}$, Referenced to 25°C	--	1.0	--	$\text{V}/^{\circ}\text{C}$
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 800\text{ V}, V_{GS} = 0\text{ V}$	--	--	1	μA
		$V_{DS} = 640\text{ V}, T_C = 125^{\circ}\text{C}$	--	--	10	μA
I_{GSSF}	Gate-Body Leakage Current, Forward	$V_{GS} = 30\text{ V}, V_{DS} = 0\text{ V}$	--	--	100	nA
I_{GSSR}	Gate-Body Leakage Current, Reverse	$V_{GS} = -30\text{ V}, V_{DS} = 0\text{ V}$	--	--	-100	nA

Dynamic Characteristics

C_{iss}	Input Capacitance	$V_{DS} = 25\text{ V}, V_{GS} = 0\text{ V},$ $f = 1.0\text{ MHz}$	--	150	195	pF
C_{oss}	Output Capacitance		--	20	26	pF
C_{rss}	Reverse Transfer Capacitance		--	5.5	7.2	pF

Switching Characteristics

$t_{d(on)}$	Turn-On Time	$V_{DS} = 400\text{ V}, I_D = 1.0\text{ A},$ $R_G = 25\text{ }\Omega$ (Note 4,5)	--	12	30	ns
t_r	Turn-On Rise Time		--	40	90	ns
$t_{d(off)}$	Turn-Off Delay Time		--	25	60	ns
t_f	Turn-Off Fall Time		--	45	100	ns
Q_g	Total Gate Charge	$V_{DS} = 640\text{ V}, I_D = 1.0\text{ A},$ $V_{GS} = 10\text{ V}$ (Note 4,5)	--	7.5	10.0	nC
Q_{gs}	Gate-Source Charge		--	1.2	--	nC
Q_{gd}	Gate-Drain Charge		--	4.5	--	nC

Source-Drain Diode Maximum Ratings and Characteristics

I _S	Continuous Source-Drain Diode Forward Current		--	--	1.0	A
I _{SM}	Pulsed Source-Drain Diode Forward Current		--	--	4.0	
V _{SD}	Source-Drain Diode Forward Voltage	I _S = 1.0 A, V _{GS} = 0 V	--	--	1.4	V
trr	Reverse Recovery Time	I _S = 1.0 A, V _{GS} = 0 V di _F /dt = 100 A/μs (Note 4)	--	310	--	ns
Qrr	Reverse Recovery Charge		--	0.8	--	μC

Notes ;

1. Repetitive Rating : Pulse width limited by maximum junction temperature
2. $L=170\text{mH}$, $I_{AS}=1.0\text{A}$, $V_{DD}=50\text{V}$, $R_G=25\Omega$, Starting $T_J=25^{\circ}\text{C}$
3. $I_{SD}\leq 1.0\text{A}$, $di/dt\leq 200\text{A}/\mu\text{s}$, $V_{DD}\leq BV_{DSS}$, Starting $T_J=25^{\circ}\text{C}$
4. Pulse Test : Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2\%$
5. Essentially Independent of Operating Temperature