

# FH30120GS

## N-Channel Trench Power MOSFET

### Description

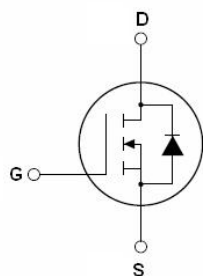
The FH30120GS uses advanced Shielded Gate trench technology and design to provide excellent  $R_{DS(ON)}$  with low gate charge. It can be used in a wide variety of applications.

### Application

- Motor drivers
- Power switching application
- DC/DC Converters In Computing
- Isolated DC/DC Converters In Telecom and Industrial

### Features

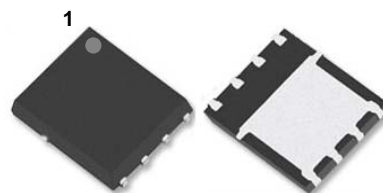
- $V_{DS} = 30V$  ;  $I_D = 120A$   
 $R_{DS(ON)}(Typ.) = 1.0 m\Omega @ V_{GS} = 10 V$   
 $R_{DS(ON)}(Typ.) = 1.6 m\Omega @ V_{GS} = 4.5V$
- High density cell design for ultra low  $R_{dson}$
- Fully characterized avalanche voltage and current
- Good stability and uniformity with high  $E_{AS}$
- Excellent package for good heat dissipation



Schematic diagram



Marking and pin Assignment



PDFN5x6-8L top and bottom view

### Absolute Maximum Ratings ( $T_C=25^\circ C$ unless otherwise specified)

Symbol	Parameter	Max.	Units
$V_{DSS}$	Drain-Source Voltage	30	V
$V_{GSS}$	Gate-Source Voltage	$\pm 20$	V
$I_D^*$	Continuous Drain Current	$T_C = 25^\circ C$	120
		$T_C = 100^\circ C$	68
$I_{DM}^{*****}$	Pulsed Drain Current	314	A
$E_{AS}^{****}$	Single Pulsed Avalanche Energy	128	mJ
$P_D^*$	Power Dissipation	$T_C = 25^\circ C$	34
$R_{\theta JC}^*$	Thermal Resistance, Junction to Case	3.2	$^\circ C/W$
$T_J, T_{STG}$	Operating and Storage Temperature Range	-55 to +150	$^\circ C$

#### Notes :

- \* Surface Mounted on 1 in<sup>2</sup> pad area,  $t \leq 10$  sec
- \*\* Pulse width  $\leq 300 \mu s$ , duty cycle  $\leq 2\%$
- \*\*\* limited by bonding wire
- \*\*\*\*  $V_D=20V, V_G=10V, R_G=25\Omega, L=0.5mH$

**Electrical Characteristics** (T<sub>c</sub>=25°C unless otherwise specified)

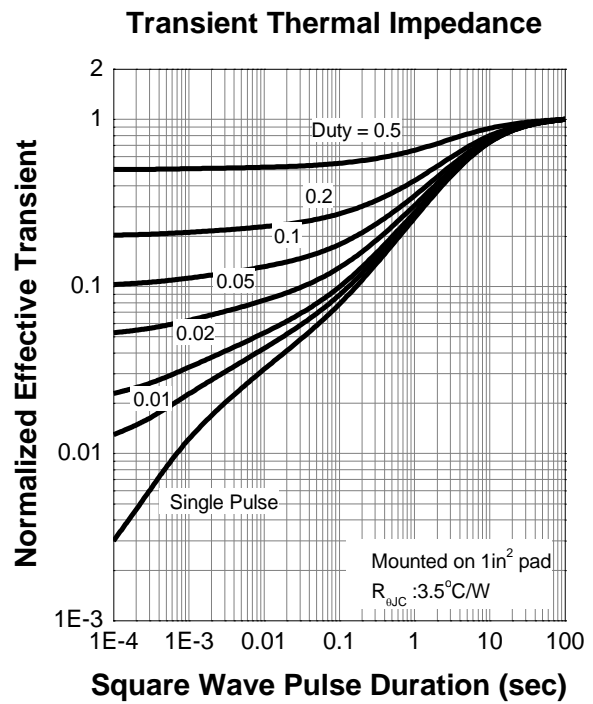
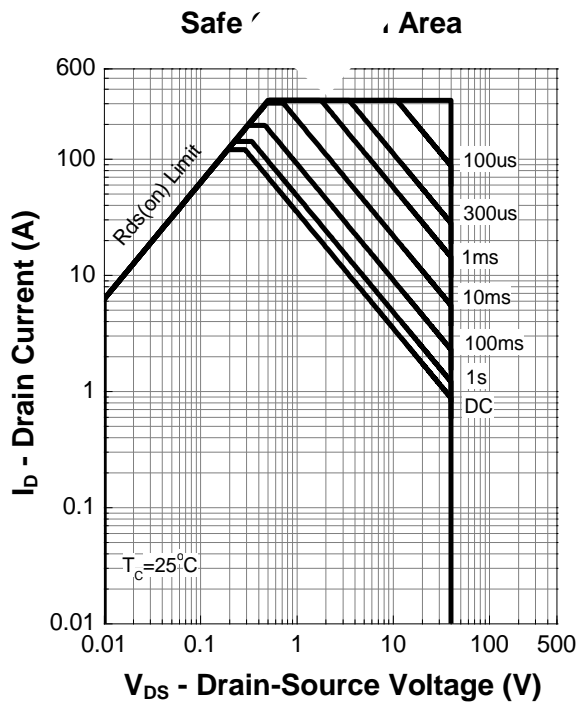
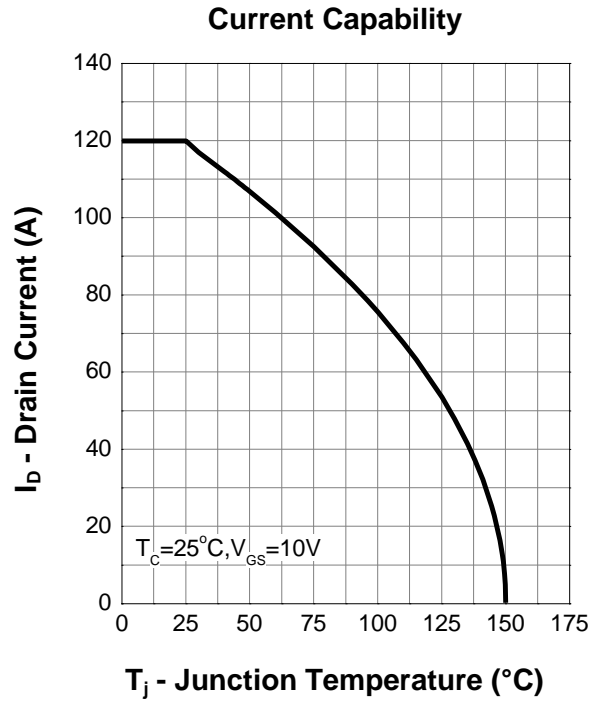
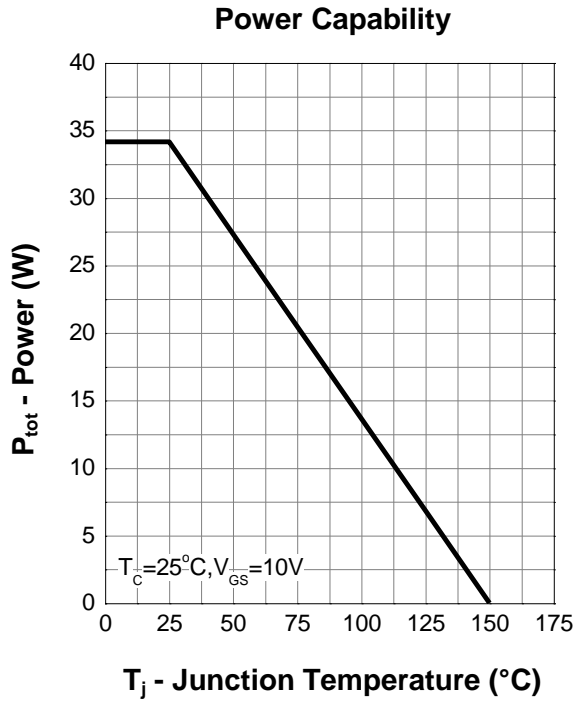
Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
<b>Off Characteristic</b>						
V <sub>(BR)DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	30	-	-	V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> =30V, V <sub>GS</sub> =0V,	-	-	1.0	μA
I <sub>GSS</sub>	Gate to Body Leakage Current	V <sub>DS</sub> =0V, V <sub>GS</sub> =±20V	-	-	±100	nA
<b>On Characteristics</b>						
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	1.0	1.8	2.5	V
R <sub>DS(on)</sub> <sup>a</sup>	Static Drain-Source on-Resistance	V <sub>GS</sub> =10V, I <sub>D</sub> =20A	-	1.0	1.4	mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =10A	-	1.6	2.0	
g <sub>FS</sub>	Forward Transconductance	V <sub>DS</sub> =10V, I <sub>D</sub> =10A	-	15.5	-	S
<b>Dynamic Characteristics</b> <sup>b</sup>						
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =25V, V <sub>GS</sub> =0V, f=1.0MHz	-	3930	-	pF
C <sub>oss</sub>	Output Capacitance		-	1020	-	pF
C <sub>rss</sub>	Reverse Transfer Capacitance		-	167	-	pF
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =15V, I <sub>D</sub> =24A, V <sub>GS</sub> =10V	-	82	-	nC
Q <sub>gs</sub>	Gate-Source Charge		-	14	-	nC
Q <sub>gd</sub>	Gate-Drain("Miller") Charge		-	15	-	nC
<b>Switching Characteristics</b> <sup>b</sup>						
t <sub>d(on)</sub>	Turn-on Delay Time	V <sub>DD</sub> =15V, I <sub>D</sub> =15A, R <sub>GEN</sub> =3.3Ω, V <sub>GS</sub> =10V	-	15.6	-	ns
t <sub>r</sub>	Turn-on Rise Time		-	23.5	-	ns
t <sub>d(off)</sub>	Turn-off Delay Time		-	62.8	-	ns
t <sub>f</sub>	Turn-off Fall Time		-	15.2	-	ns
<b>Drain-Source Diode Characteristics and Maximum Ratings</b>						
I <sub>S</sub>	Maximum Continuous Drain to Source Diode Forward Current		-	-	120	A
I <sub>SM</sub>	Maximum Pulsed Drain to Source Diode Forward Current		-	-	314	A
V <sub>SD</sub> <sup>a</sup>	Drain to Source Diode Forward Voltage	V <sub>GS</sub> =0V, I <sub>S</sub> =20A	-	-	1.2	V
t <sub>rr</sub>	Body Diode Reverse Recovery Time		-	57	-	ns
Q <sub>rr</sub>	Body Diode Reverse Recovery Charge	I <sub>F</sub> =30A, dI/dt=100A/μs	-	71	-	nC

Notes :

a : Pulse test ; pulse width ≤ 300 μs, duty cycle ≤ 2 %

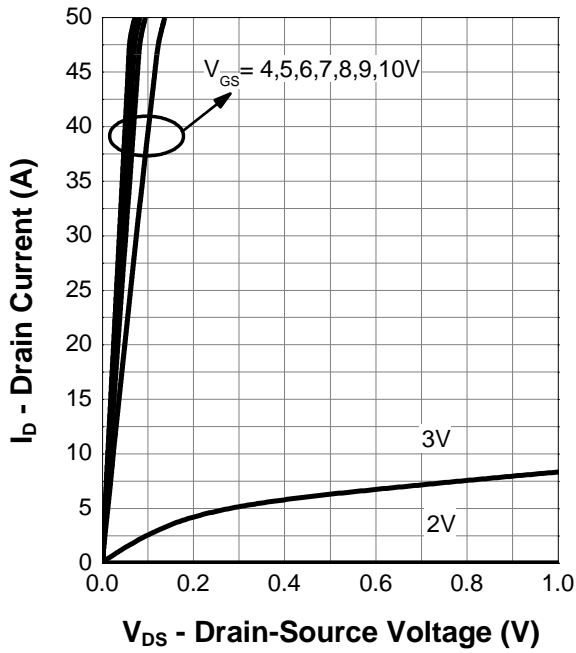
b : Guaranteed by design, not subject to production testing

Typical Characteristics (Cont.)

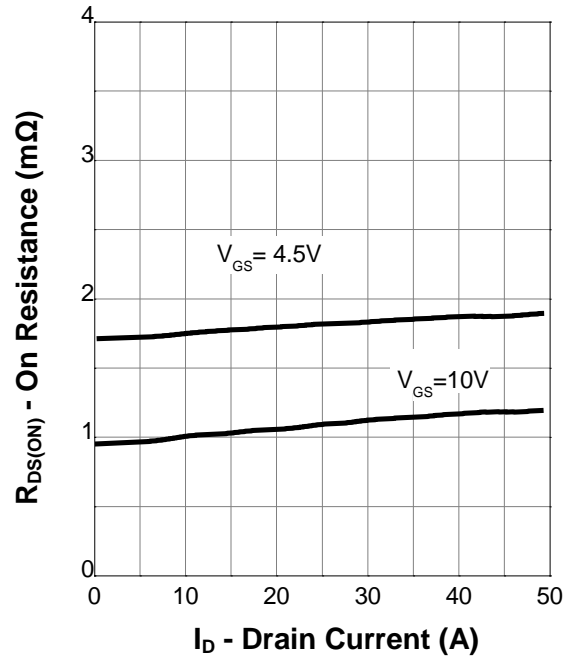


Typical Characteristics ( Cont.)

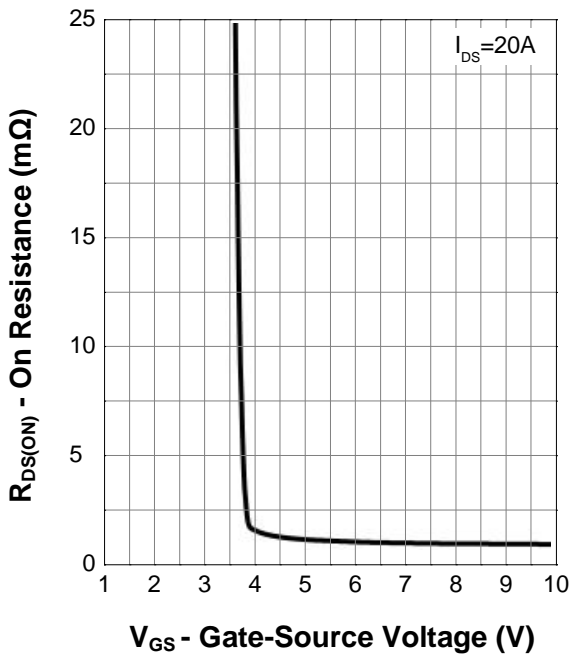
Output Characteristics



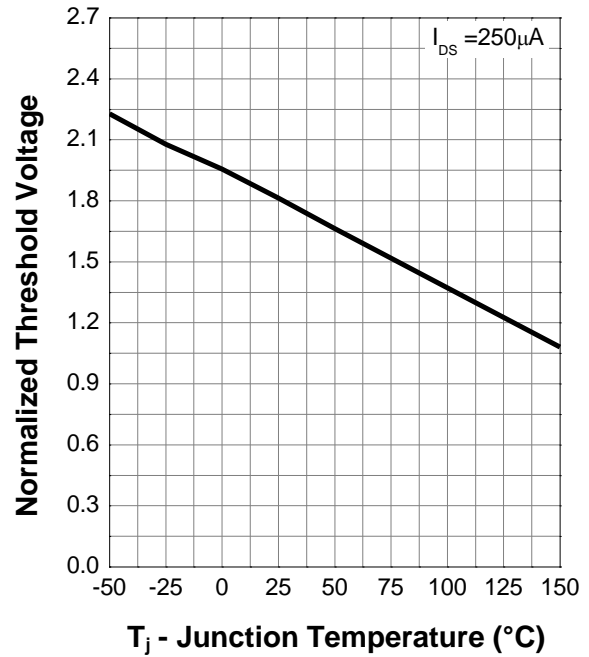
On Resistance



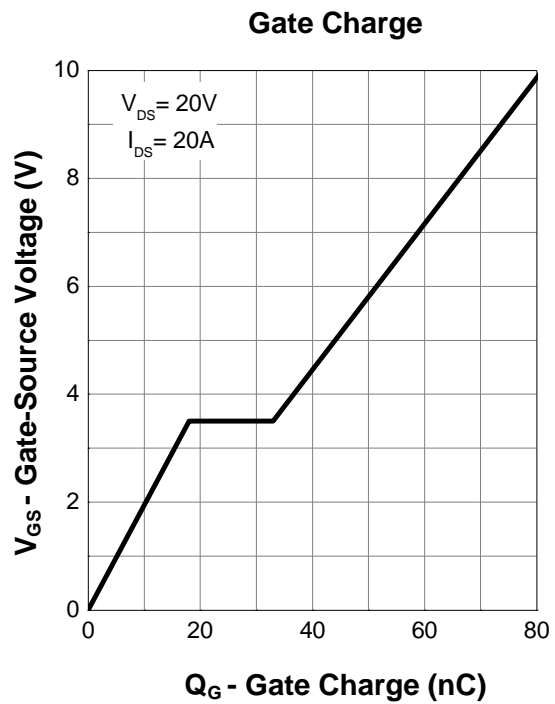
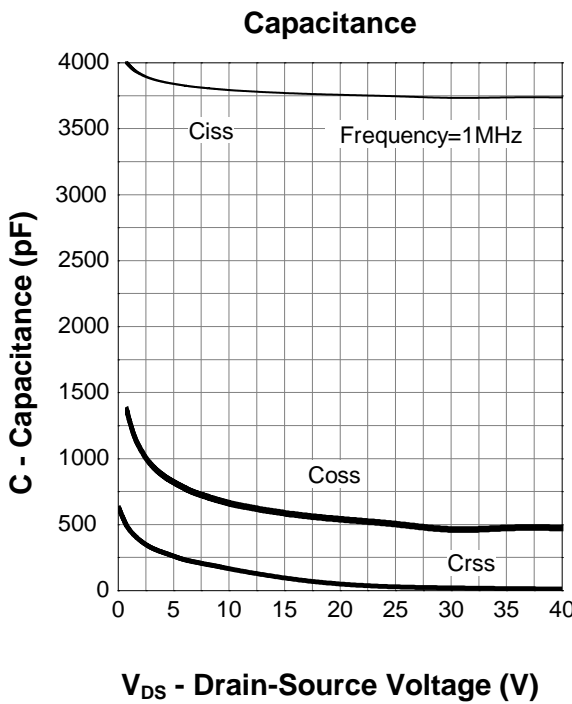
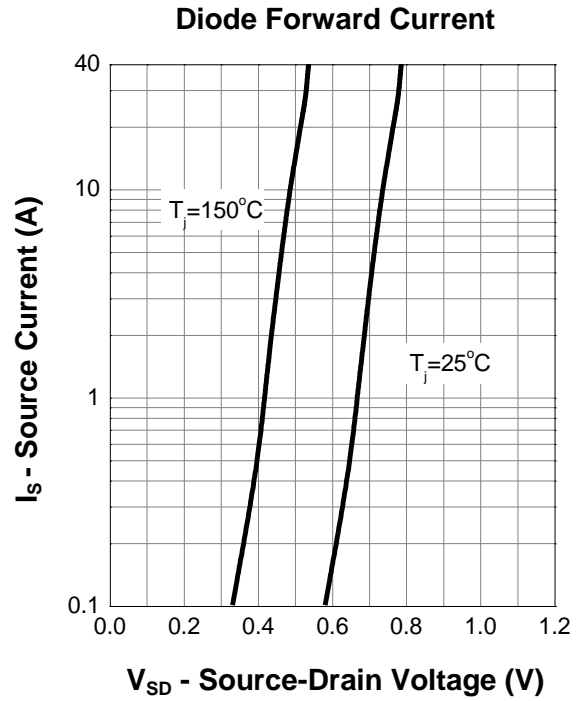
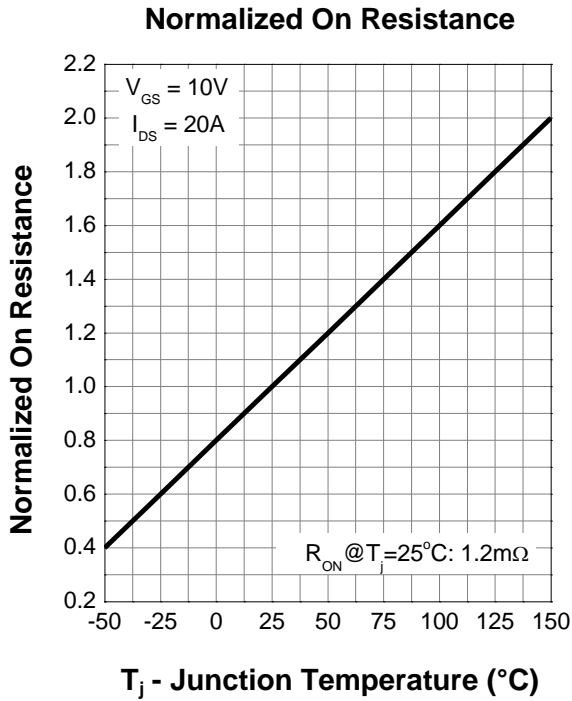
Transfer Characteristics



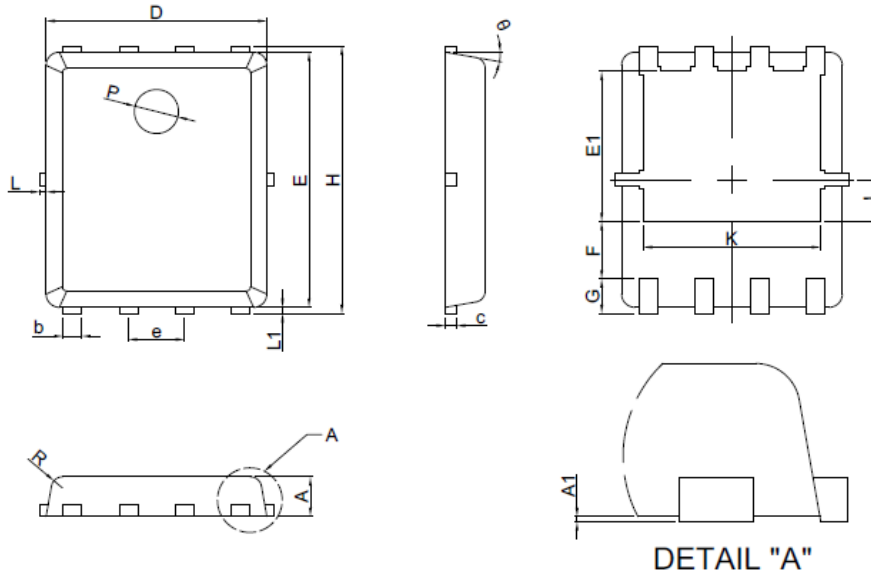
Normalized Threshold Voltage



Typical Characteristics ( Cont.)



Package Dimensions : PDFN5x6-8L



Symbol	Dimensions In Millimeters	
	MIN.	MAX.
A	0.80	1.00
A1	0.00	0.05
b	0.35	0.49
c	0.254REF	
D	4.90	5.10
F	1.40REF	
E	5.70	5.90
e	1.27BSC	
H	5.95	6.20
L1	0.10	0.18
G	0.60REF	
K	4.00REF	
L	-	0.15
J	0.95BSC	
P	1.00REF	
E1	3.40REF	
θ	6°	14°
R	0.25REF	