

Description:

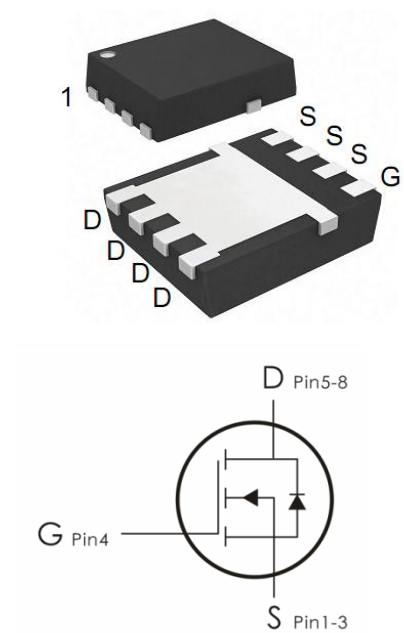
This P-Channel MOSFET uses advanced trench technology and

design to provide excellent $R_{DS(on)}$ with low gate charge.

It can be used in a wide variety of applications.

Features:

- 1) $V_{DS}=-20V, I_D=-90A, R_{DS(on)} < 2.3m\Omega @ V_{GS}=-10V$
- 2) Low gate charge.
- 3) Green device available.
- 4) Advanced high cell density trench technology for ultra low $R_{DS(on)}$.
- 5) Excellent package for good heat dissipation.



Absolute Maximum Ratings: ($T_C=25^\circ C$ unless otherwise noted)

Symbol	Parameter	Ratings	Units
V_{DS}	Drain-Source Voltage	-20	V
V_{GS}	Gate-Source Voltage	± 12	V
I_D	Continuous Drain Current- $T_C=25^\circ C$	-90	A
	Continuous Drain Current- $T_C=100^\circ C$	-54	
	Pulsed Drain Current ¹	-360	
P_D	Power Dissipation	42	W
T_J, T_{STG}	Operating and Storage Junction Temperature Range	-55 to +150	$^\circ C$

Thermal Characteristics:

Symbol	Parameter	Max	Units
$R_{\theta JC}$	Thermal Resistance, Junction to Case	3	$^\circ C/W$
$R_{\theta JA}$	Thermal Resistance Junction to mbient	62	

Part NO.	Marking	Package
HAN20P90	N20P90	DFN5*6-8

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

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Off Characteristics						
BV _{DSS}	Drain-Sourtce Breakdown Voltage	V _{GS} =0V, I _D =-250 μ A	-20	---	---	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{GS} =0V, V _{DS} =-20V	---	---	-1	μ A
I _{GSS}	Gate-Source Leakage Current	V _{GS} =± 12V, V _{DS} =0A	---	---	± 100	nA
On Characteristics ³						
V _{GS(th)}	GATE-Source Threshold Voltage	V _{GS} =V _{DS} , I _D =-250 μ A	-0.4	-0.6	-1	V
R _{DS(ON)}	Drain-Source On Resistance	V _{GS} =-10V, I _D =-20A	---	1.5	2.3	m Ω
		V _{GS} =-4.5V, I _D =-20A	---	1.8	2.5	
		V _{GS} =-2.5V, I _D =-20A	---	2.4	3.6	
G _{FS}	Forward Transconductance	V _{DS} =-10V, I _D =-3A	---	30	---	S
Dynamic Characteristics ⁴						
C _{iss}	Input Capacitance	V _{DS} =-15V, V _{GS} =0V, f=1MHz	---	13900	21000	pF
C _{OSS}	Output Capacitance		---	1710	2500	
C _{rss}	Reverse Transfer Capacitance		---	730	1100	
Switching Characteristics ⁴						
t _{d(on)}	Turn-On Delay Time ^{2, 4}	V _{DD} =-15V I _D =-1A, R _G =25 Ω V _{GS} =-4.5V	---	21.2	42	ns
t _r	Rise Time ^{2, 4}		---	20.6	40	ns
t _{d(off)}	Turn-Off Delay Time ^{2, 4}		---	26	52	ns
t _f	Fall Time ^{2, 4}		---	400	600	ns
Q _g	Total Gate Charge 3 ^{3, 4}	V _{GS} =-16V , V _{DS} =-4.5V I _D =-5A	---	149	225	nC
Q _{gs}	Gate-Source Charge ^{2, 4}		---	14.4	22	nC
Q _{gd}	Gate-Drain “Miller” Charge ^{2, 4}		---	42.8	65	nC
Drain-Source Diode Characteristics						
Symbol	Parameter	Conditions	Min	Typ	Max	Units

V_{SD}	Source-Drain Diode Forward Voltage	$V_{GS}=0V, I_S=-1A$	---	---	-1	V
I_S	Continuous Source Current	$V_G=V_D=0V$, Force Current	---	---	-90	A
I_{SM}	Pulsed Source Current		---	---	-180	

Notes:

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed , pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
3. Essentially independent of operating temperature.

Typical Characteristics: ($T_C=25^\circ C$ unless otherwise noted)

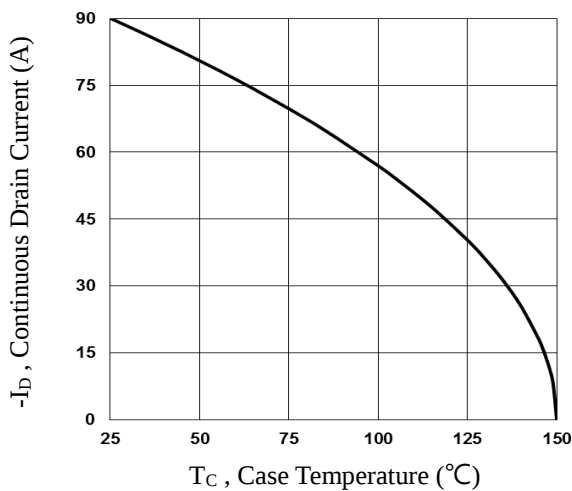


Fig.1 Continuous Drain Current vs. T_C

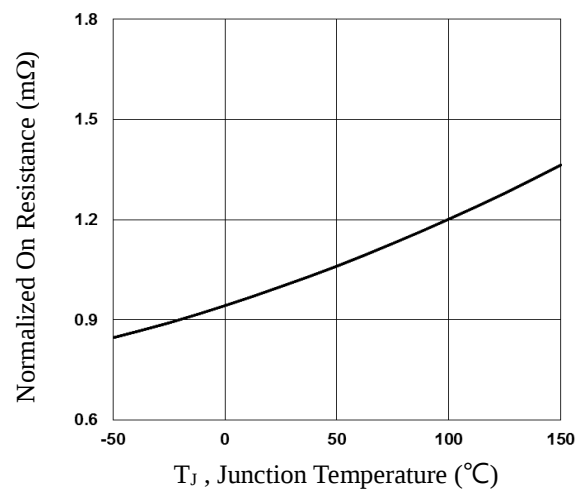


Fig.2 Normalized $R_{DS(on)}$ vs. T_J

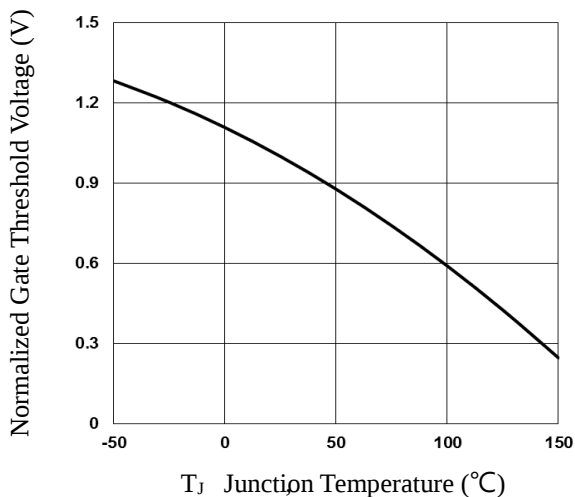


Fig.3 Normalized V_{th} vs. T_J

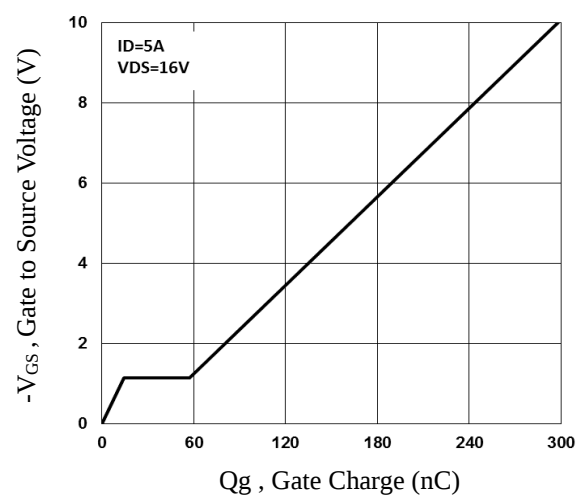


Fig.4 Gate Charge Waveform

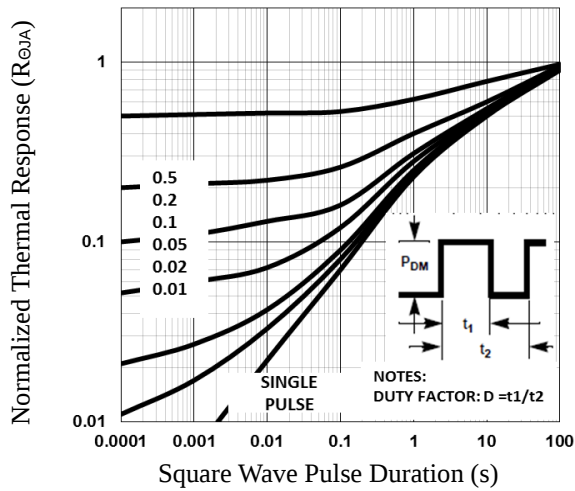


Fig.5 Normalized Transient Response

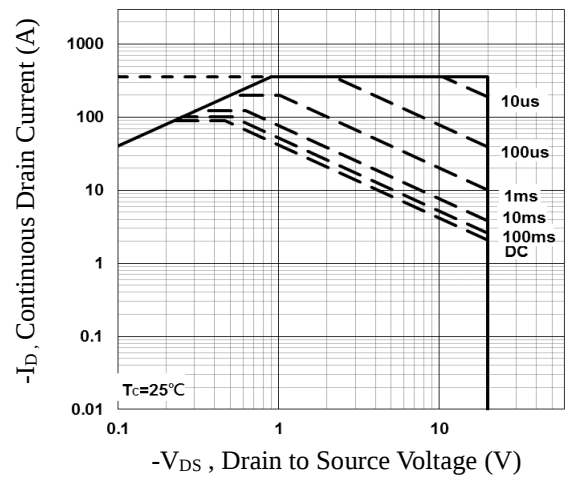


Fig.6 Maximum Safe Operation Area

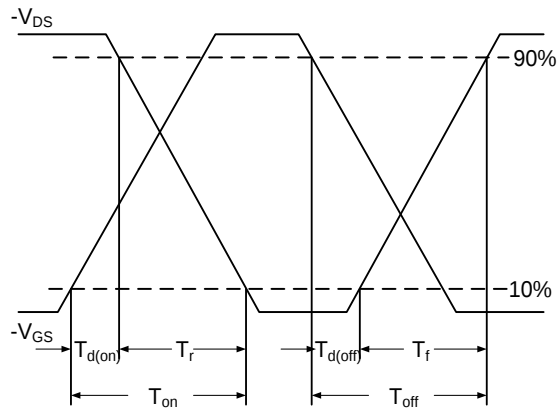


Fig.7 Switching Time Waveform

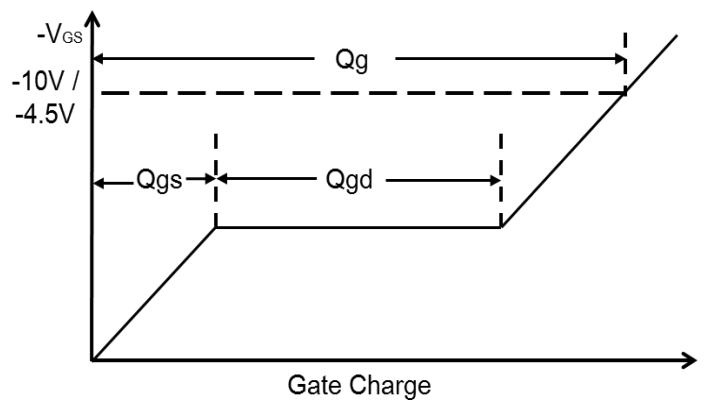


Fig.8 Gate Charge Waveform