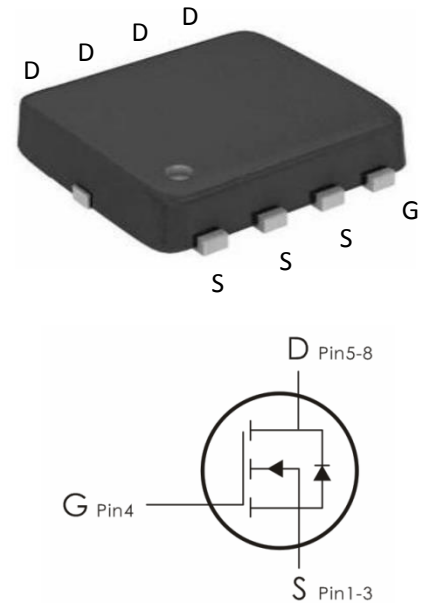


Description:

This N-Channel MOSFET uses advanced trench technology 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.

Features:

- 1) $V_{DS}=30V, I_D=35A, R_{DS(ON)}=12m\Omega @ V_{GS}=10V$
- 2) Improved dv/dt capability
- 3) Fast switching
- 4) 100% EAS Guaranteed
- 5) Green Device Available.



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

Symbol	Parameter	Ratings	Units
V_{DS}	Drain-Source Voltage	30	V
V_{GS}	Gate-Source Voltage	± 20	V
I_D	Continuous Drain Current-Continuous ($TC=25^\circ C$)	35	A
	Continuous Drain Current- $TC=100^\circ C$	22	
I_{DM}	Drain Current – Pulsed ¹	140	A
E_{AS}	Single Pulse Avalanche Energy ²	13	mJ
P_D	Power Dissipation ($TC=25^\circ C$)	27	W
	Power Dissipation – Derate above $25^\circ C$	0.21	W/ $^\circ C$
T_J, T_{STG}	Operating and Storage Junction Temperature Range	-55 to +150	$^\circ C$

Thermal Characteristics:

Symbol	Parameter	Max	Units
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R_{θJC}	Thermal Resistance, Junction to Case	4.6	°C/W
R_{θJA}	Thermal Resistance, Junction to Ambient	62	

Package Marking and Ordering Information:

Part NO.	Marking	Package
HAQ3020	HAQ3020	DNF3*3

Electrical Characteristics: (T_C=25°C unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Off Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250 μA	30	---	---	V
I _{DSS}	Drain-Source Leakage Current	V _{GS} =0V, V _{DS} =30V, T _J =25℃	---	---	1	μA
		V _{GS} =0V, V _{DS} =30V, T _J =125℃			10	μA
I _{GSS}	Gate-Source Leakage Current	V _{GS} =±20V, V _{DS} =0A	---	---	±100	nA
On Characteristics						
V _{GS(th)}	GATE-Source Threshold Voltage	V _{GS} =V _{DS} , I _D =250 μA	1.2	1.8	2.5	V
R _{DS(ON)}	Drain-Source On Resistance ³	V _{GS} =10V, I _D =10A	---	9.4	12	mΩ
		V _{GS} =4.5V, I _D =5A	---	13	18	
G _{FS}	Forward Transconductance	V _{DS} =10V, I _D =3A	---	6.4	---	S
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} =25V, V _{GS} =0V, f=1MHz	---	620	900	pF
C _{oss}	Output Capacitance		---	85	125	
C _{rss}	Reverse Transfer Capacitance		---	60	90	
Switching Characteristics						
t _{d(on)}	Turn-On Delay Time ^{3,4}	V _{DD} =15V, V _{GS} =10V, R _G =6, I _D =1A	---	3.8	7	ns
t _r	Rise Time ^{3,4}		---	10	19	ns
t _{d(off)}	Turn-Off Delay Time ^{3,4}		---	22	42	ns
t _f	Fall Time ^{3,4}		---	6.6	13	ns
Q _g	Total Gate Charge ^{3,4}		---	7.4	12	nC

Q_{gs}	Gate-Source Charge ^{3,4}	V _{DS} =15V, V _{GS} =4.5V , I _D =5A	---	2.3	5	nC
Q_{gd}	Gate-Drain “Miller” Charge ^{3,4}		---	3	6	nC
Drain-Source Diode Characteristics						
V_{SD}	Source-Drain Diode Forward Voltage ²	V _{GS} =0V, I _S =1A, T _J =25℃	---	---	1	V
LS	Reverse Recovery Time	V _G =V _D =0V , Force Current V _{GS} =0V , I _S =1A , T _J =25℃	---	70	A	
LSM_r	Reverse Recovery Charge		---	35	A	

Notes:

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. $V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=16A, R_G=25\Omega$, Starting $T_J=25^\circ C$.
3. The data tested by pulsed , pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
4. Essentially independent of operating temperature.

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

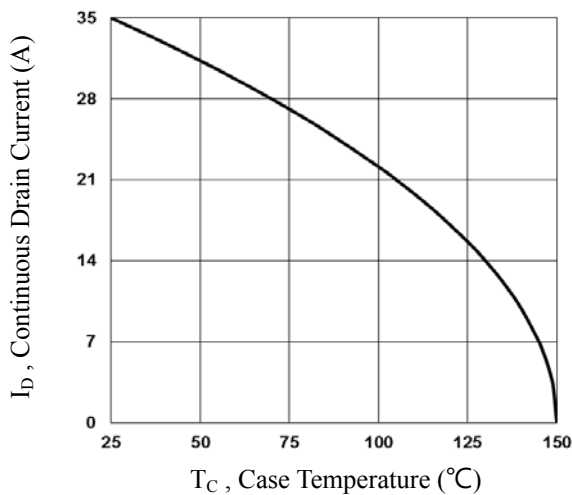


Fig.1 Continuous Drain Current vs. T_C

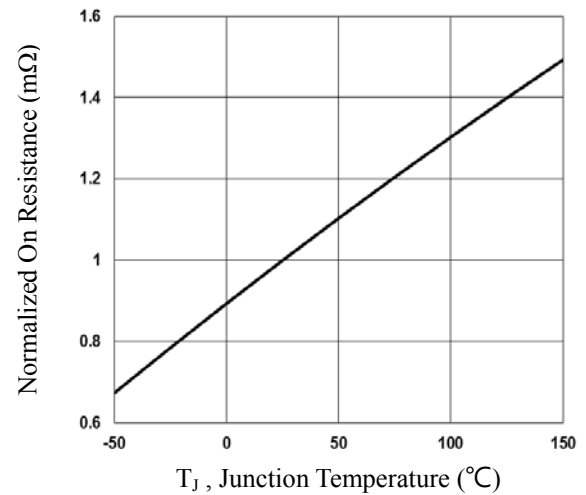


Fig.2 Normalized $R_{DS(on)}$ vs. T_J

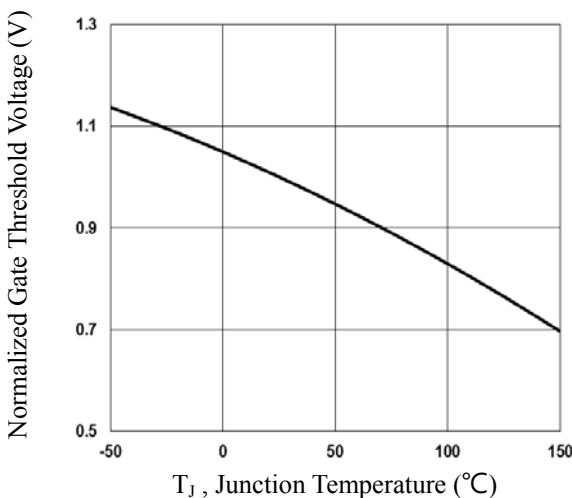


Fig.3 Normalized V_{th} vs. T_J

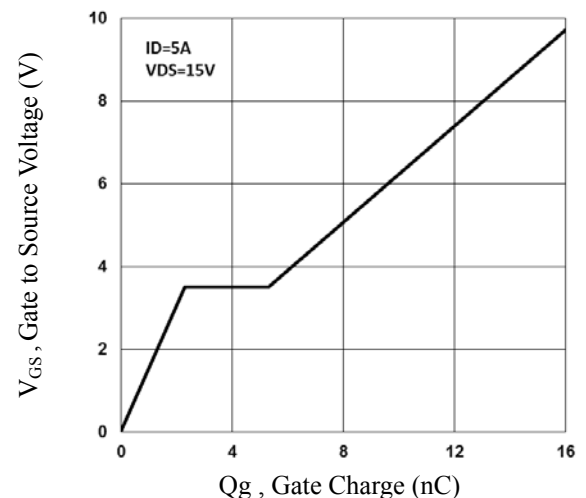


Fig.4 Gate Charge Waveform

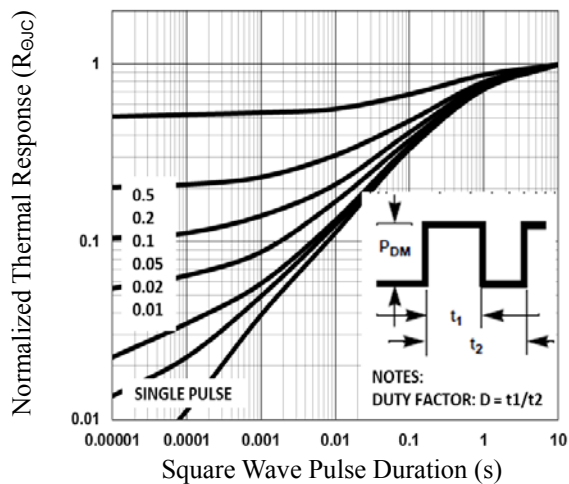


Fig.5 Normalized Transient Response

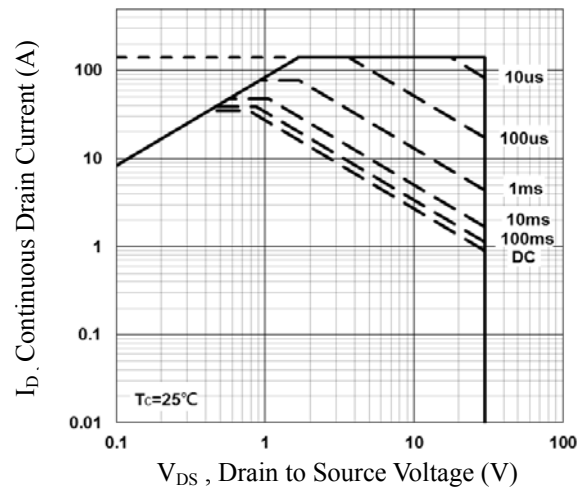


Fig.6 Maximum Safe Operation Area

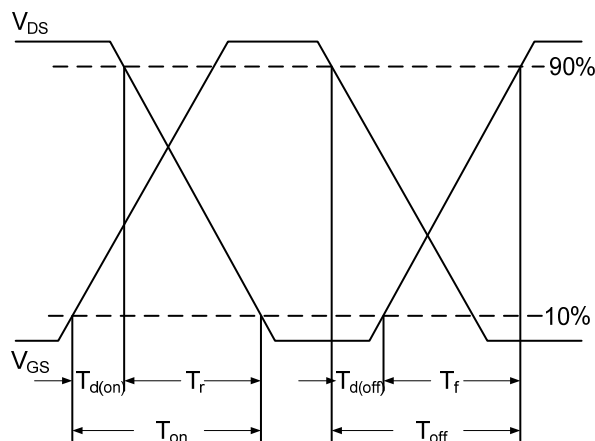


Fig.7 Switching Time Waveform

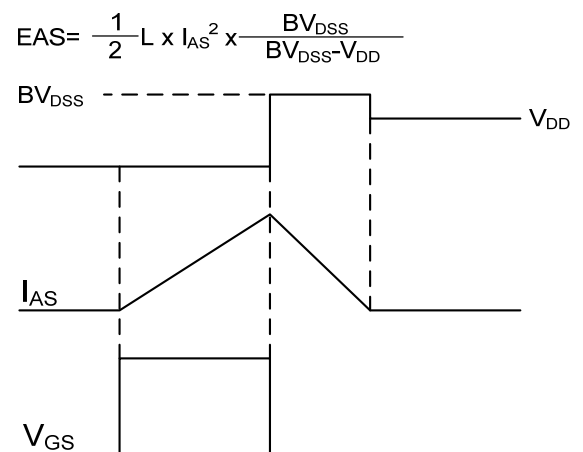


Fig.8 EAS Waveform