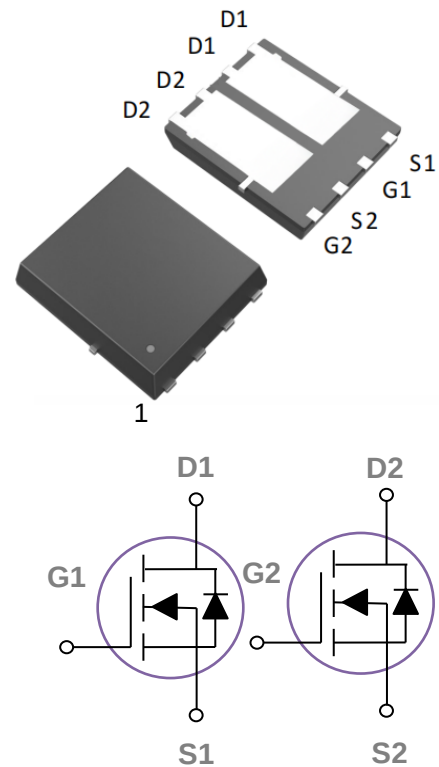


Description:

These Dual 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.

Features:

- 1) D1: $V_{DS}=40V, I_D=30A, R_{DS(ON)}=9m\Omega @V_{GS}=10V$
- 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	40	V
V_{GS}	Gate-Source Voltage	± 20	V
I_D	Continuous Drain Current-Continuous ($T_C=25^\circ C$)	30	A
	Continuous Drain Current- $T_C=100^\circ C$	19	
I_{DM}	Drain Current – Pulsed ¹	120	A
E_{AS}	Single Pulse Avalanche Energy ²	64	mJ
I_{AS}	Single Pulse Avalanche Current ²	36	A
P_D	Power Dissipation ($T_C=25^\circ C$)	46	W
	Power Dissipation – Derate above $25^\circ C$	0.37	W/ $^\circ C$
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	2.7	$^{\circ}\text{C}/\text{W}$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	62	

Package Marking and Ordering Information:

Part NO.	Marking	Package
DON30DN04	30DN04	DFN5*6-8D

Electrical Characteristics D1: ($T_C=25^{\circ}\text{C}$ unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Off Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	40	---	---	V
I_{DSS}	Drain-Source Leakage Current	$V_{GS}=0V, V_{DS}=40V, T_J=25^{\circ}\text{C}$	---	---	1	μA
		$V_{GS}=0V, V_{DS}=32V, T_J=25^{\circ}\text{C}$	---	---	10	
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0A$	---	---	± 100	nA
On Characteristics						
$V_{GS(th)}$	GATE-Source Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\mu A$	1	1.6	2.5	V
$R_{DS(on)}$	Drain-Source On Resistance ³	$V_{GS}=10V, I_D=8A$	---	7.2	9	m Ω
		$V_{GS}=4.5V, I_D=5A$	---	9.5	12	
G_{FS}	Forward Transconductance	$V_{DS}=10V, I_D=10A$	---	13	---	S
Dynamic Characteristics						
C_{iss}	Input Capacitance	$V_{DS}=25V, V_{GS}=0V, f=1\text{MHz}$	---	1220	2200	pF
C_{oss}	Output Capacitance		---	130	250	
C_{rss}	Reverse Transfer Capacitance		---	55	110	
R_G	Reverse Transfer Capacitance Gate resistance	$V_{GS}=0V, V_{DS}=0V, F=1\text{MHz}$	---	2.2	---	Ω
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time ^{3,4}	$V_{DD}=15V, V_{GS}=10V, R_G=3.3, I_D=1A$	---	13.2	25	ns
t_r	Rise Time ^{3,4}		---	2.2	5	ns

t_{d(off)}	Turn-Off Delay Time ^{3,4}		---	27	130	ns
t_f	Fall Time ^{3,4}		---	4.5	10	ns
Q_g	Total Gate Charge ^{3,4}	V _{DS} =20V , V _{GS} =4.5V , I _D =8A	---	12.2	24	nC
Q_{gs}	Gate-Source Charge ^{3,4}		---	3.3	7	nC
Q_{gd}	Gate-Drain “Miller” Charge ^{3,4}		---	6.7	13	nC
Drain-Source Diode Characteristics						
EAS	Single Pulse Avalanche Energy	V _{DD} =25V, L=0.1mH, IAS=6A	1.8			mj
V_{SD}	Source-Drain Diode Forward Voltage ²	V _{GS} =0V , I _S =1A , T _J =25℃	---	---	1	V
I_S	Continuous Source Current		---	---	30	A
I_{sm}	Pulsed Source Current ³		---	---	60	

Notes:

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. $V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=36A, R_G=25\Omega$, 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)

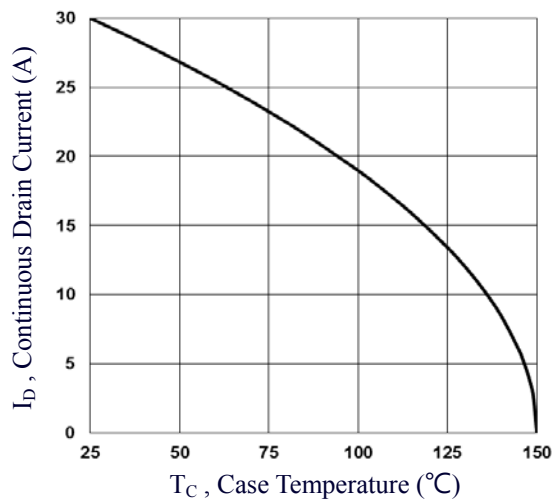


Fig.1 Continuous Drain Current vs. T_C

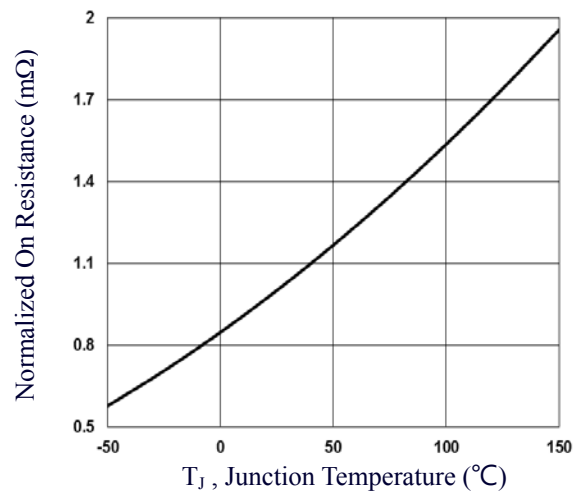


Fig.2 Normalized $R_{DS(on)}$ vs. T_J

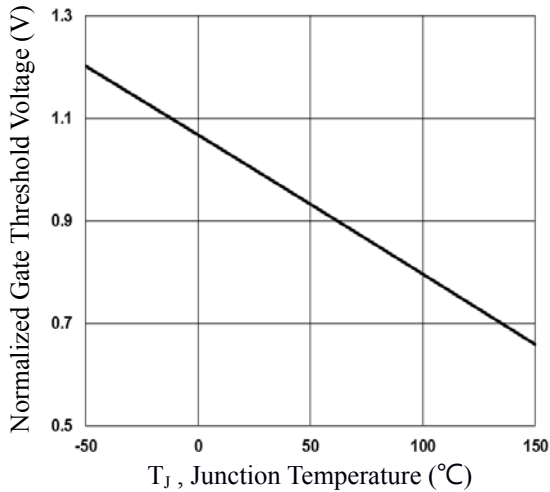


Fig.3 Normalized V_{th} vs. T_j

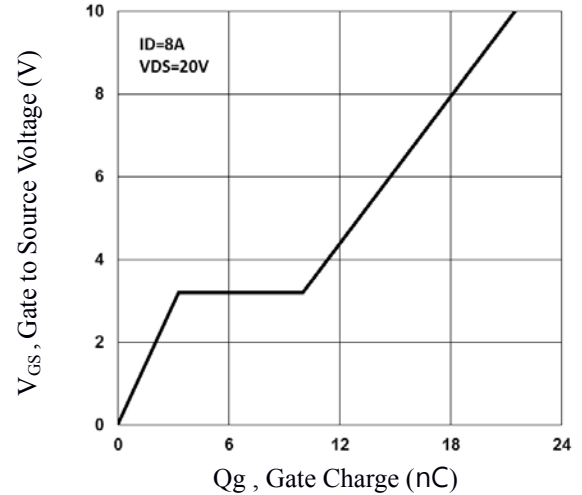


Fig.4 Gate Charge Waveform

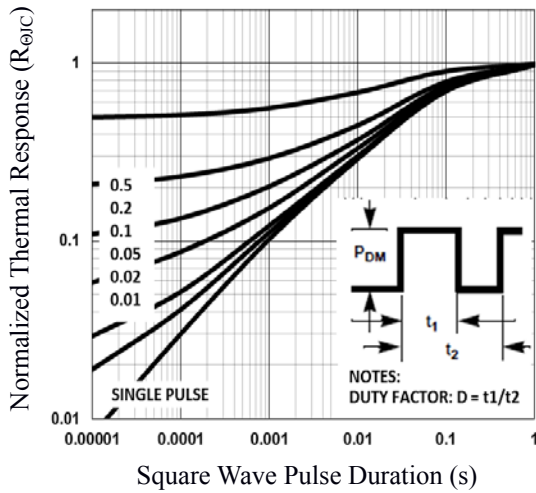


Fig.5 Normalized Transient Impedance

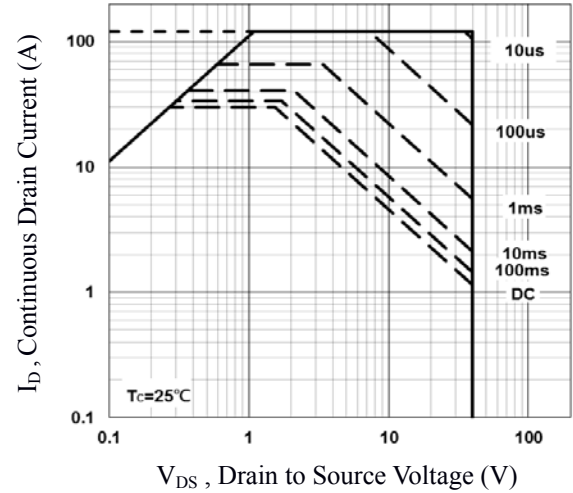


Fig.6 Maximum Safe Operation Area

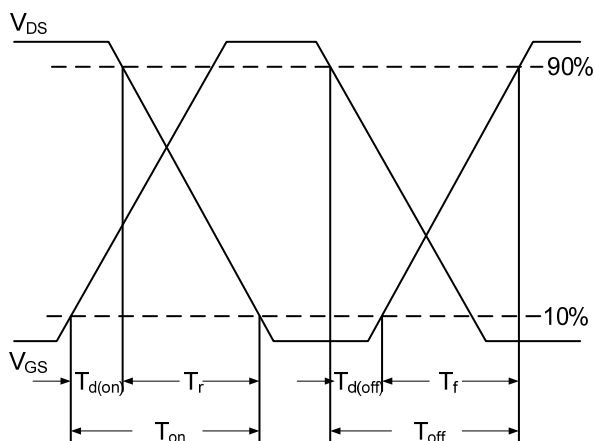


Fig.7 Switching Time Waveform

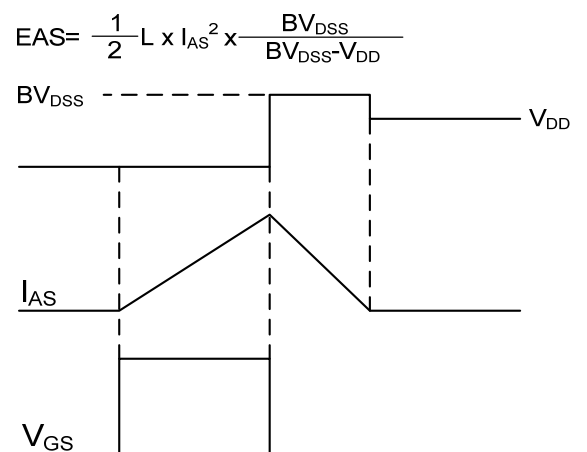
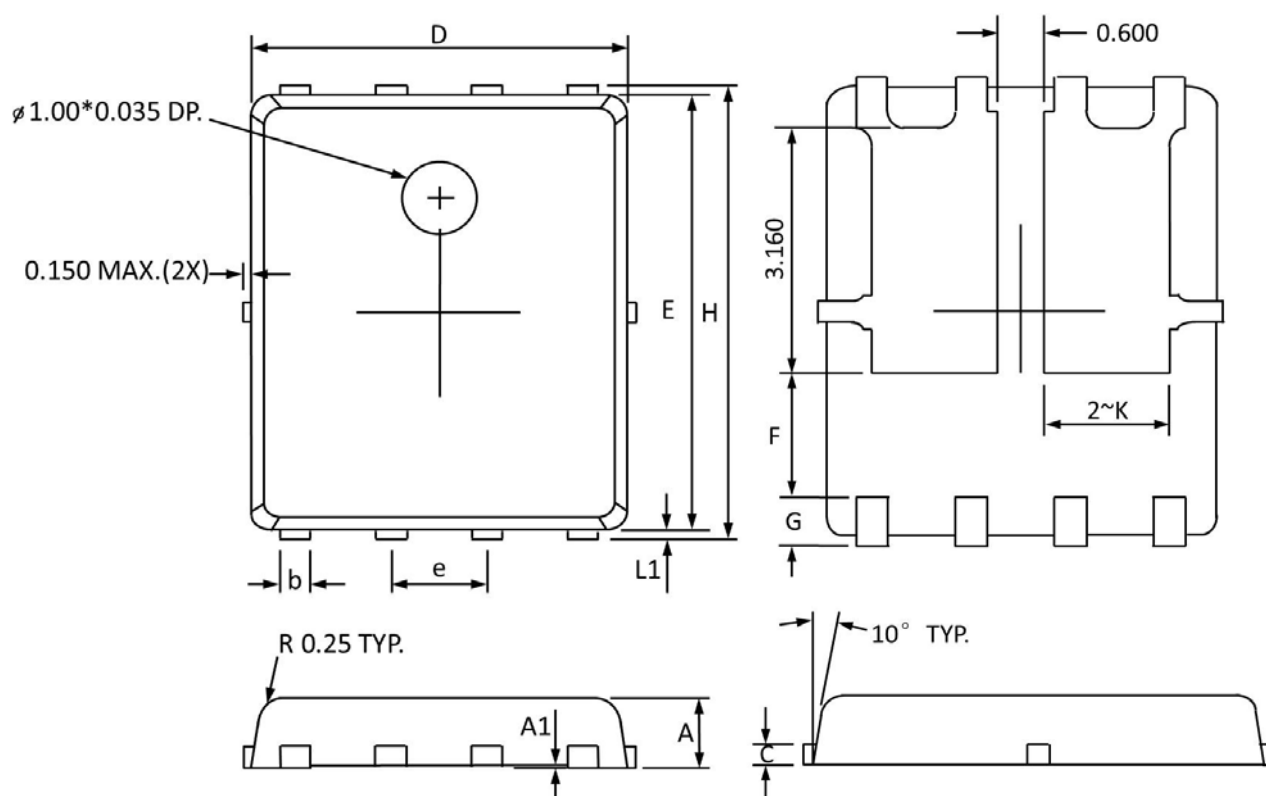


Fig.8 EAS Waveform



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.800	1.000	0.032	0.039
A1	0.000	0.005	0.000	0.000
b	0.350	0.490	0.014	0.019
C	0.254 Ref		0.254 Ref	
D	4.900	5.100	0.193	0.200
E	5.700	5.900	0.225	0.232
e	1.27 BSC		1.27 BSC	
F	1.600 Ref		1.600 Ref	
G	0.600 Ref		0.600 Ref	
H	5.950	6.200	0.235	0.244
L1	0.100	0.180	0.004	0.007
K	1.600 Ref		1.600 Ref	