

FH30120D

N-Channel Trench Power MOSFET

Features

- 30V,120A
- $R_{DS(ON)}=2.9m\Omega$ (Typ.) @ $V_{GS}=10V$
- $R_{DS(ON)}=4.3m\Omega$ (Typ.) @ $V_{GS}=4.5V$
- Advanced Trench Technology
- Provide Excellent $R_{DS(ON)}$ and Low Gate Charge

Application

- Load Switch
- PWM Application
- Power management



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

Symbol	Parameter	Max.	Units
V_{DSS}	Drain-Source Voltage	30	V
V_{GSS}	Gate-Source Voltage	± 20	V
I_D	Continuous Drain Current	$T_C = 25^\circ\text{C}$	120
		$T_C = 100^\circ\text{C}$	68
I_{DM}	Pulsed Drain Current ^{note1}	400	A
E_{AS}	Single Pulsed Avalanche Energy ^{note2}	180	mJ
P_D	Power Dissipation	95	W
$R_{\theta JC}$	Thermal Resistance, Junction to Case	1.7	$^\circ\text{C}/\text{W}$
T_J, T_{STG}	Operating and Storage Temperature Range	-55 to +175	$^\circ\text{C}$

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

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
Off Characteristic						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	30	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=30V, V_{GS}=0V,$	-	-	1.0	μA
I_{GSS}	Gate to Body Leakage Current	$V_{DS}=0V, V_{GS}=\pm 20V$	-	-	± 100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	1.0	1.6	2.5	V
$R_{DS(on)}$	Static Drain-Source on-Resistance <small>note3</small>	$V_{GS}=10V, I_D=30A$	-	2.9	3.8	m Ω
		$V_{GS}=4.5V, I_D=20A$	-	4.3	5.9	
g_{FS}	Forward Transconductance	$V_{DS}=10V, I_D=10A$	-	15.5	-	S
Dynamic Characteristics						
C_{iss}	Input Capacitance	$V_{DS}=25V, V_{GS}=0V,$ $f=1.0MHz$	-	2200	-	pF
C_{oss}	Output Capacitance		-	280	-	pF
C_{rSS}	Reverse Transfer Capacitance		-	177	-	pF
Q_g	Total Gate Charge	$V_{DS}=15V, I_D=24A,$ $V_{GS}=10V$	-	42	-	nC
Q_{gs}	Gate-Source Charge		-	4	-	nC
Q_{gd}	Gate-Drain("Miller") Charge		-	13	-	nC
Switching Characteristics						
$t_{d(on)}$	Turn-on Delay Time	$V_{DD}=15V,$ $I_D=15A, R_{GEN}=3.3\Omega,$ $V_{GS}=10V$	-	12.6	-	ns
t_r	Turn-on Rise Time		-	19.5	-	ns
$t_{d(off)}$	Turn-off Delay Time		-	42.8	-	ns
t_f	Turn-off Fall Time		-	13.2	-	ns
Drain-Source Diode Characteristics and Maximum Ratings						
I_S	Maximum Continuous Drain to Source Diode Forward Current		-	-	120	A
I_{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	400	A
V_{SD}	Drain to Source Diode Forward Voltage	$V_{GS}=0V, I_S=30A$	-	-	1.2	V
t_{rr}	Body Diode Reverse Recovery Time	$I_F=30A, di/dt=100A/\mu s$	-	19	-	ns
Q_{rr}	Body Diode Reverse Recovery Charge		-	11	-	nC

Notes:1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature

2. EAS condition: $T_J=25^\circ\text{C}, V_{DD}=25V, V_G=10V, R_G=25\Omega$

3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$

Typical Performance Characteristics

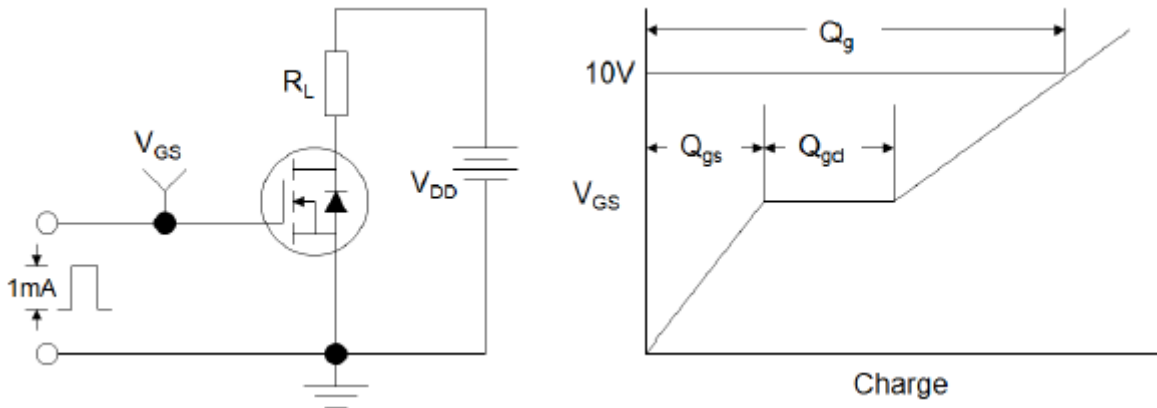


Figure1:Gate Charge Test Circuit & Waveform

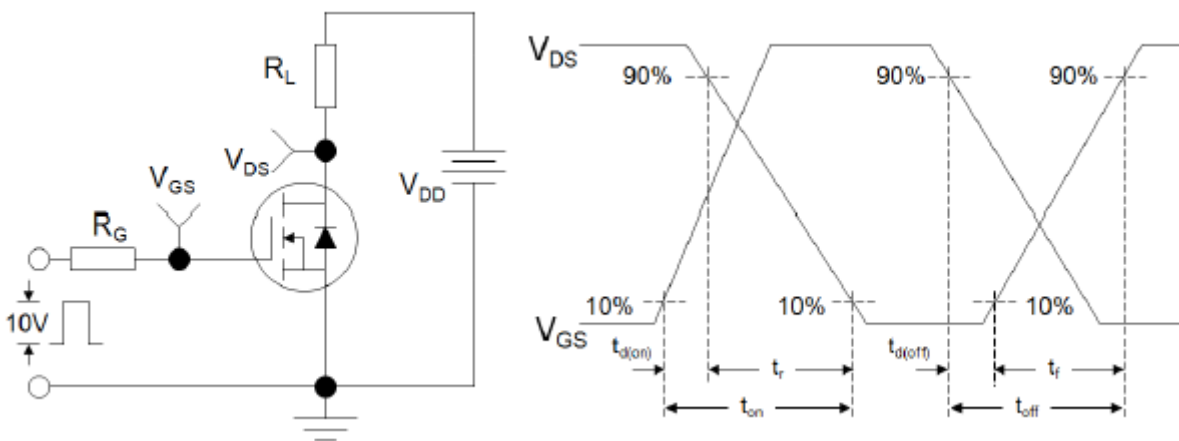


Figure 2: Resistive Switching Test Circuit & Waveforms

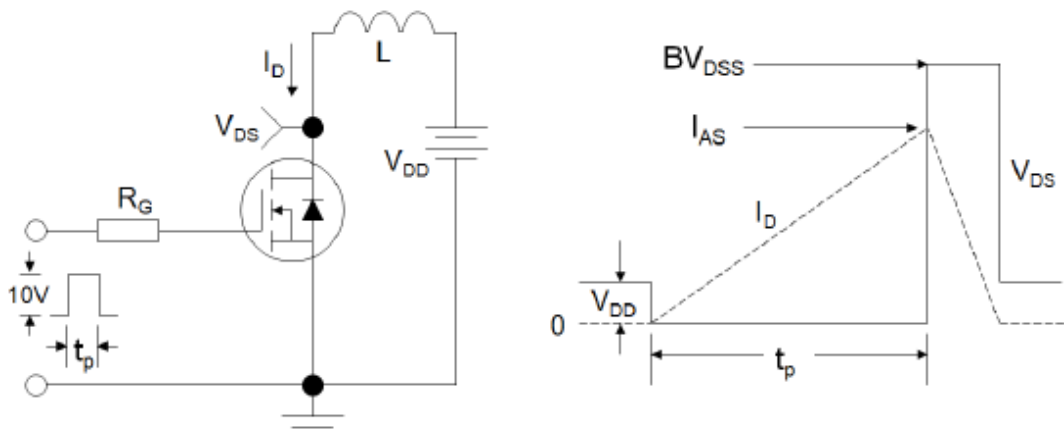


Figure 3:Unclamped Inductive Switching Test Circuit & Waveforms

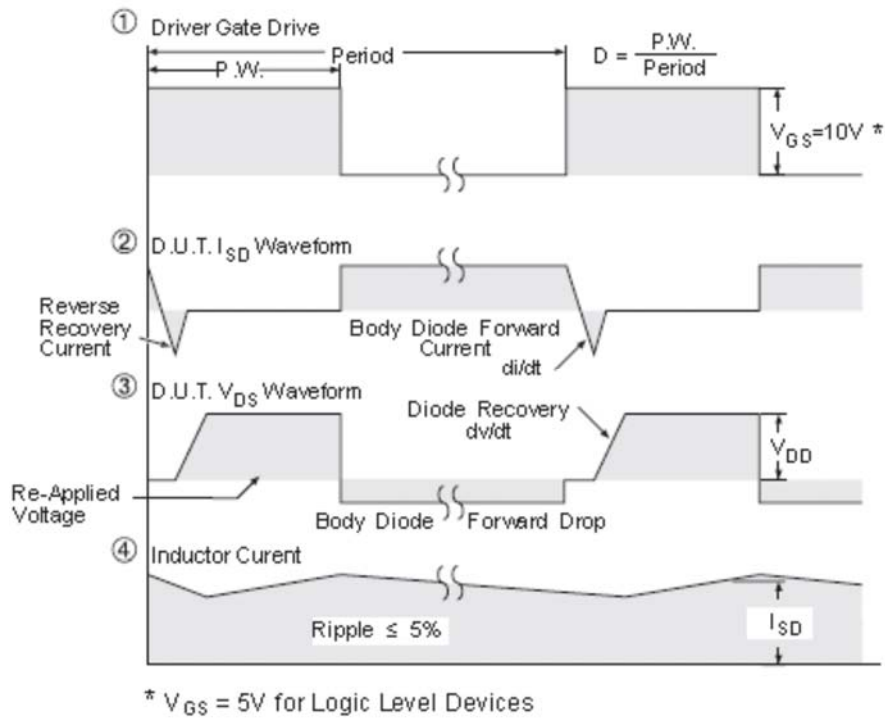
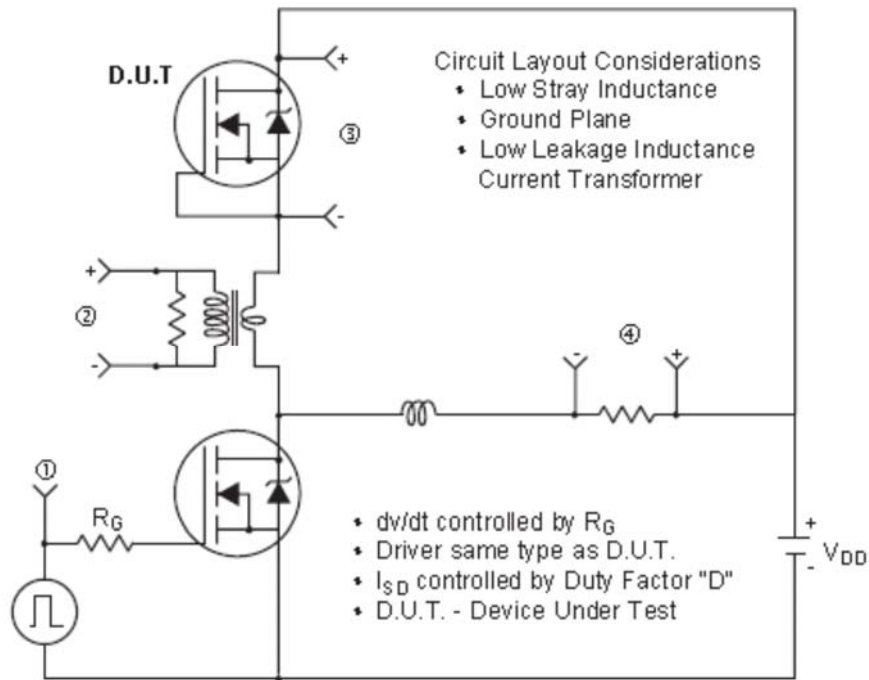
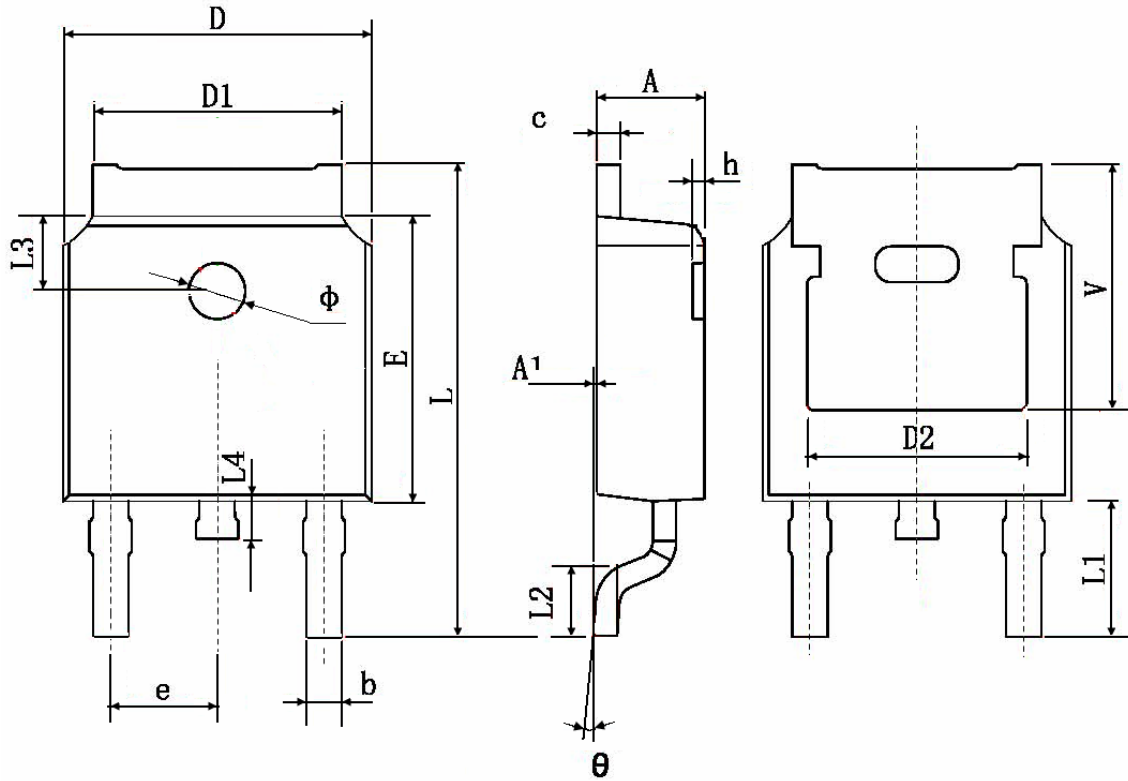


Figure 4: Peak Diode Recovery dv/dt Test Circuit & Waveforms (For N-channel)

Package Information : TO-252



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.660	0.860	0.026	0.034
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	4.830 TYP.		0.190 TYP.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.800	10.400	0.386	0.409
L1	2.900 TYP.		0.114 TYP.	
L2	1.400	1.700	0.055	0.067
L3	1.600 TYP.		0.063 TYP.	
L4	0.600	1.000	0.024	0.039
φ	1.100	1.300	0.043	0.051
θ	0°	8°	0°	8°
h	0.000	0.300	0.000	0.012
V	5.350 TYP.		0.211 TYP.	