

General Description:

HM15N25F, the silicon N-channel Enhanced VDMOSFETs, is obtained by the self-aligned planar Technology which reduce the conduction loss, improve switching performance and enhance the avalanche energy. The transistor can be used in various power switching circuit for system miniaturization and higher efficiency. The package form is VQ/442H, which accords with the RoHS standard.

Features:

- Fast Switching
- Low ON Resistance($R_{ds(on)} \leq 0.47\Omega$)
- 100% Single Pulse avalanche energy Test

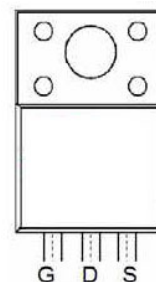
Applications:

Automotive、DC Motor Control and Class D Amplifier.

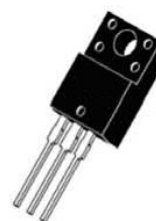
Absolute ($T_c = 25^\circ\text{C}$ unless otherwise specified):

Symbol	Parameter	Rating	Units
V_{DSS}	Drain-to-Source Voltage	250	V
I_D	Continuous Drain Current	15	A
	Continuous Drain Current $T_c = 100^\circ\text{C}$	10.5	A
I_{DM}^{a1}	Pulsed Drain Current	45	A
V_{GS}	Gate-to-Source Voltage	± 30	V
dv/dt^{a2}	Peak Diode Recovery dv/dt	5.0	V/ns
P_D	Power Dissipation	75	W
T_J, T_{stg}	Operating Junction and Storage Temperature Range	150, -55 to 150	$^\circ\text{C}$

V_{DSS}	250	V
I_D	15	A
$P_D(T_c=25^\circ\text{C})$	75	W
$R_{DS(ON)Typ}$	0.18	Ω



Marking and pin assignment



TO-220F top view

Electrical Characteristics (Tc= 25℃ unless otherwise specified):

OFF Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
V _{DSS}	Drain to Source Breakdown Voltage	V _{GS} =0V, I _D =250μA	250	--	--	V
Δ BV _{DSS} / Δ T _J	Bvdss Temperature Coefficient	ID=250uA, Reference 25℃	--	0.33	--	V/℃
I _{DSS}	Drain to Source Leakage Current	V _{DS} = 200V, V _{GS} = 0V, T _a = 25℃	--	--	1	μA
		V _{DS} =160V, V _{GS} = 0V, T _a = 125℃	--	--	100	
I _{GSS(F)}	Gate to Source Forward Leakage	V _{GS} =+30V	--	--	100	nA
I _{GSS(R)}	Gate to Source Reverse Leakage	V _{GS} =-30V	--	--	-100	nA

ON Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
R _{DS(ON)}	Drain-to-Source On-Resistance	V _{GS} =10V, I _D =4A	--	0.18	0.22	Ω
V _{GS(TH)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = 250μA	2.0	3.0	4.0	V
Pulse width tp ≤ 300μs, δ ≤ 2%						

Dynamic Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
g _{fs}	Forward Trans conductance	V _{DS} =15V, I _D =15A	--	5.2	--	S
R _g	Gate resistance	f = 1.0MHz		2.5		Ω
C _{iss}	Input Capacitance	V _{GS} = 0V V _{DS} = 25V f = 1.0MHz		557		PF
C _{oss}	Output Capacitance			83		
C _{rss}	Reverse Transfer Capacitance			7.8		

Resistive Switching Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
t _{d(ON)}	Turn-on Delay Time	I _D =15A V _{DD} = 125V V _{GS} = 10V R _G =10Ω	--	11.4	--	ns
t _r	Rise Time		--	3.9	--	
t _{d(OFF)}	Turn-Off Delay Time		--	20	--	
t _f	Fall Time		--	4.4	--	
Q _g	Total Gate Charge	I _D =15A V _{DD} =200V V _{GS} = 10V	--	12.8	--	nC
Q _{gs}	Gate to Source Charge		--	3	--	
Q _{gd}	Gate to Drain ("Miller") Charge		--	6	--	

Source-Drain Diode Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
I _S	Continuous Source Current (Body Diode)		--	--	15	A
I _{SM}	Maximum Pulsed Current (Body Diode)		--	--	45	A
V _{SD}	Diode Forward Voltage	I _S =15A,V _{GS} =0V	--	--	1.5	V
trr	Reverse Recovery Time	I _S =10.0A,T _j = 25°C dI _F /dt=100A/us, V _{GS} =0V	--		--	ns
Q _{rr}	Reverse Recovery Charge		--		--	nC
I _{RRM}	Reverse Recovery Current		--		--	A
Pulse width tp≤300μs,δ≤2%						

^{a1}: Repetitive rating; pulse width limited by maximum junction temperature

^{a2}: $I_{SD}=15A, di/dt \leq 100A/us, V_{DD} \leq BV_{DS}, \text{Start } T_j=25^{\circ}C$

^{a3}: Recommend soldering temperature defined by IPC/JEDEC J-STD 020

Test Circuit and Waveform

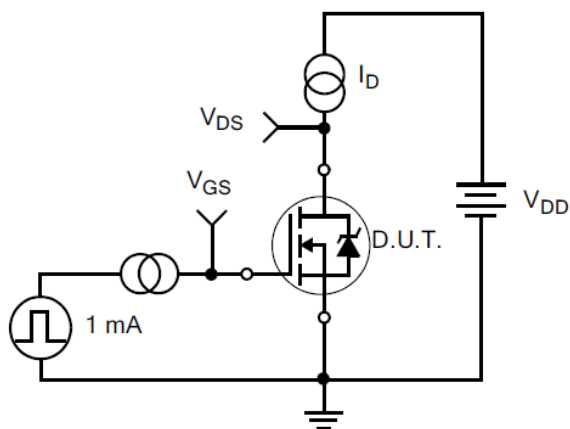


Figure 17. Gate Charge Test Circuit

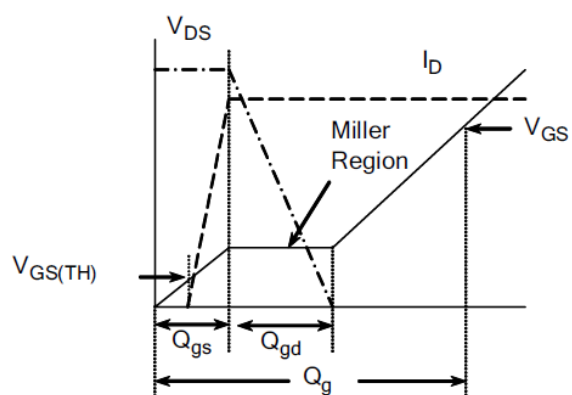


Figure 18. Gate Charge Waveform

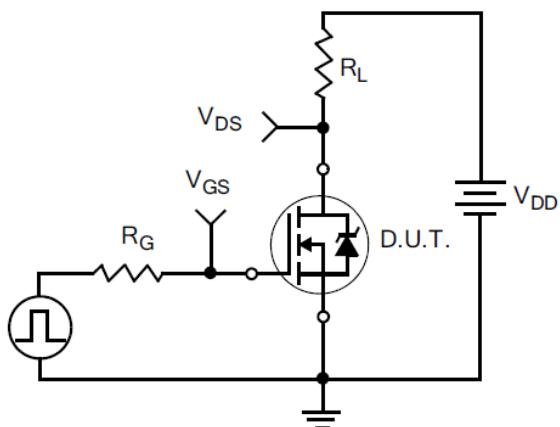


Figure 19. Resistive Switching Test Circuit

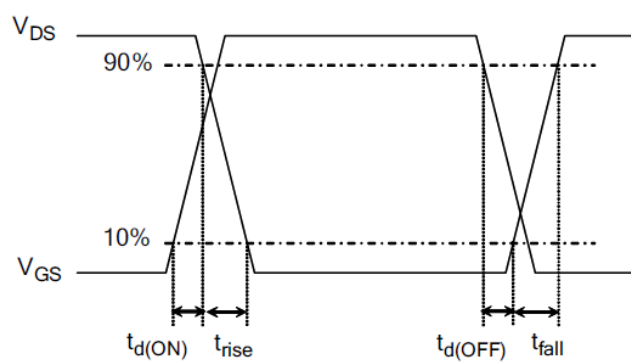


Figure 20. Resistive Switching Waveforms

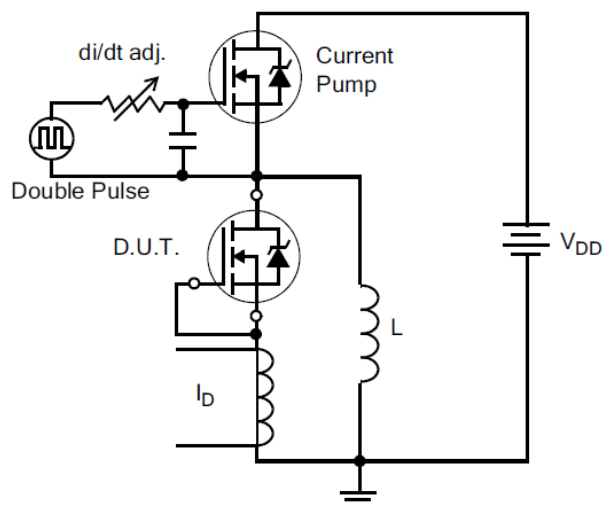


Figure 21. Diode Reverse Recovery Test Circuit

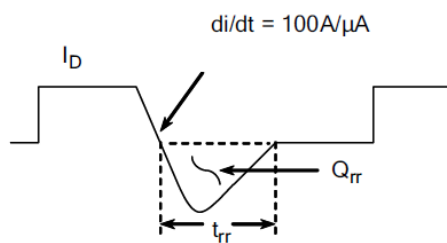


Figure 22. Diode Reverse Recovery Waveform

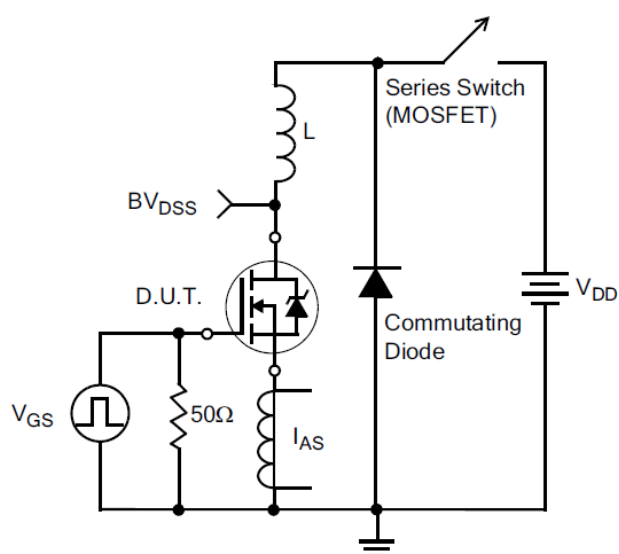


Figure 23. Unclamped Inductive Switching Test Circuit

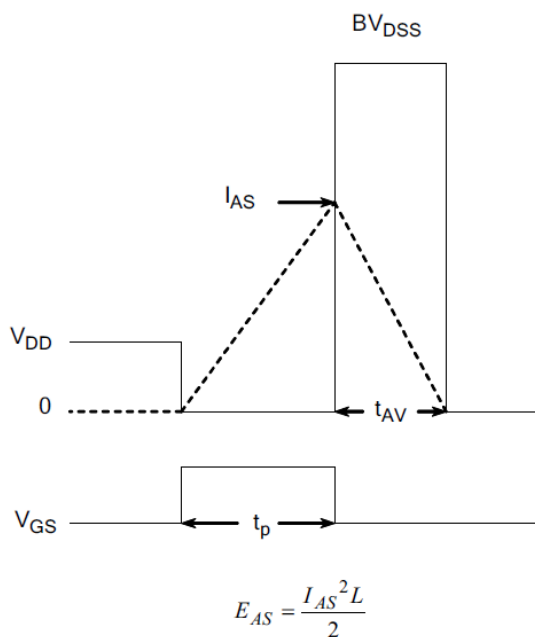
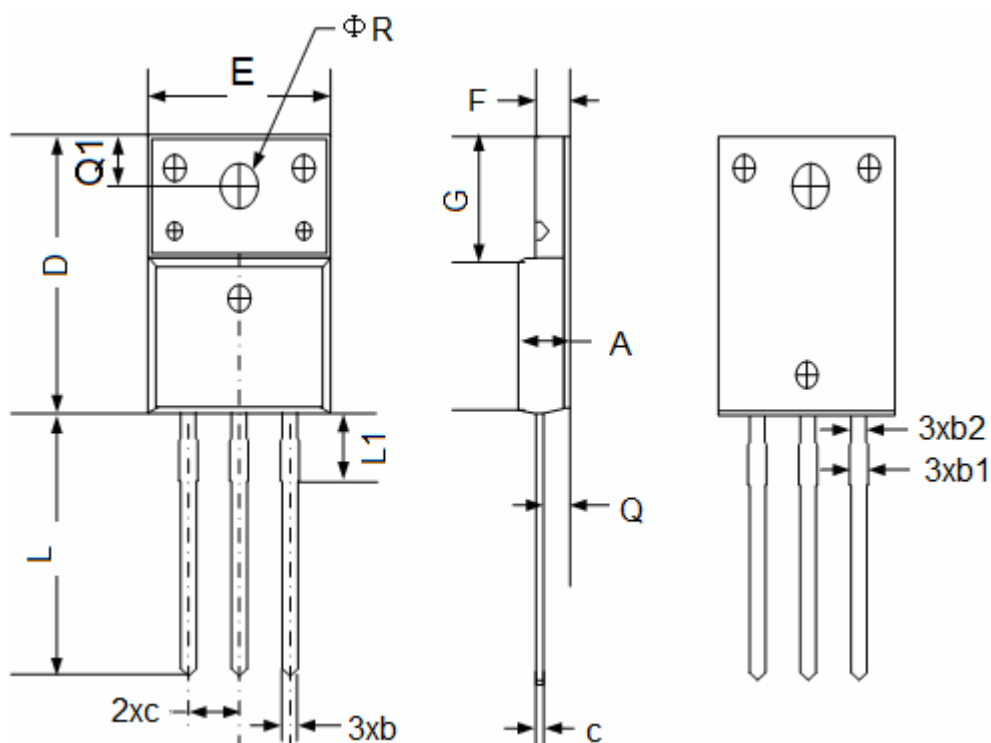


Figure 24. Unclamped Inductive Switching Waveforms

TO-220F Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.50	4.83	0.18	0.19
b	0.70	0.91	0.03	0.04
b1	1.20	1.47	0.05	0.06
b2	1.10	1.38	0.04	0.05
c	0.45	0.63	0.02	0.02
D	15.67	16.07	0.62	0.63
e	2.54 BSC		0.10 BSC	
E	9.96	10.36	0.39	0.41
F	2.34	2.74	0.09	0.11
G	6.48	6.90	0.26	0.27
L	12.68	13.30	0.50	0.52
L1	3.13	3.50	0.12	0.14
Q	2.56	2.93	0.10	0.12
Q1	3.20	3.40	0.13	0.13
ΦR	3.08	3.28	0.12	0.13