



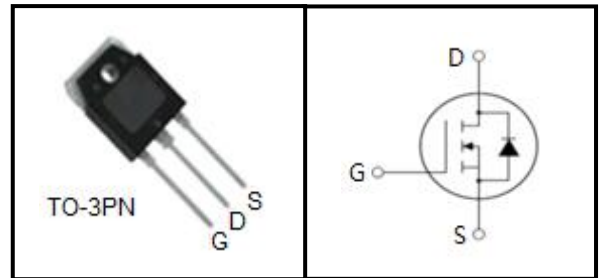
## 200V N-Channel MOSFET

### FEATURES

- Fast switching
- 100% avalanche tested
- Improved dv/dt capability

### APPLICATIONS

- Switch Mode Power Supply (SMPS)
- Uninterruptible Power Supply (UPS)
- Power Factor Correction (PFC)



Device Marking and Package Information		
Device	Package	Marking
TMV90N20H	TO-3PN	V90N20H



Absolute Maximum Ratings $T_C = 25^\circ\text{C}$ , unless otherwise noted			
Parameter	Symbol	Value	Unit
Drain-Source Voltage ( $V_{GS} = 0\text{V}$ )	$V_{DSS}$	200	V
Continuous Drain Current	$I_D$	90	A
Pulsed Drain Current (note1)	$I_{DM}$	360	A
Gate-Source Voltage	$V_{GSS}$	$\pm 20$	V
Single Pulse Avalanche Energy (note2)	$E_{AS}$	2000	mJ
Avalanche Current (note1)	$I_{AR}$	30	A
Repetitive Avalanche Energy (note1)	$E_{AR}$	25	mJ
Power Dissipation ( $T_C = 25^\circ\text{C}$ )	$P_D$	450	W
Operating Junction and Storage Temperature Range	$T_J, T_{stg}$	-55~+150	$^\circ\text{C}$

Thermal Resistance			
Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Case	$R_{thJC}$	0.28	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction-to-Ambient	$R_{thJA}$	60	



Specifications $T_J = 25^\circ\text{C}$ , unless otherwise noted						
Parameter	Symbol	Test Conditions	Value			Unit
			Min.	Typ.	Max.	
<b>Static</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	200	--	--	V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 200V, V_{GS} = 0V, T_J = 25^\circ\text{C}$	--	--	1	$\mu A$
Gate-Source Leakage	$I_{GSS}$	$V_{GS} = \pm 20V$	--	--	$\pm 100$	nA
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	2.0	--	4.0	V
Drain-Source On-Resistance (Note3)	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 45A$	--	18	23	m $\Omega$
<b>Dynamic</b>						
Input Capacitance	$C_{iss}$	$V_{GS} = 0V,$ $V_{DS} = 25V,$ $f = 1.0\text{MHz}$	--	6500	--	pF
Output Capacitance	$C_{oss}$		--	980	--	
Reverse Transfer Capacitance	$C_{rss}$		--	370	--	
Total Gate Charge	$Q_g$	$V_{DD} = 160V, I_D = 90A,$ $V_{GS} = 10V$	--	200	--	nC
Gate-Source Charge	$Q_{gs}$		--	28	--	
Gate-Drain Charge	$Q_{gd}$		--	60	--	
Turn-on Delay Time	$t_{d(on)}$	$V_{DD} = 100V, I_D = 90A,$ $R_G = 25\Omega$	--	45	--	ns
Turn-on Rise Time	$t_r$		--	70	--	
Turn-off Delay Time	$t_{d(off)}$		--	110	--	
Turn-off Fall Time	$t_f$		--	90	--	
<b>Drain-Source Body Diode Characteristics</b>						
Continuous Body Diode Current	$I_S$	$T_C = 25^\circ\text{C}$	--	--	90	A
Pulsed Diode Forward Current	$I_{SM}$		--	--	360	
Body Diode Voltage	$V_{SD}$	$T_J = 25^\circ\text{C}, I_{SD} = 90A, V_{GS} = 0V$	--	--	1.4	V
Reverse Recovery Time	$t_{rr}$	$V_{GS} = 0V, I_S = 90A,$ $di_F/dt = 100A/\mu s$	--	280	--	ns
Reverse Recovery Charge	$Q_{rr}$		--	2.4	--	$\mu C$

**Notes**

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2.  $I_{AS} = 30A, V_{DD} = 50V, R_G = 25\Omega$ , Starting  $T_J = 25^\circ\text{C}$
3. Pulse Test: Pulse width  $\leq 250\mu s$ , Duty Cycle  $\leq 1\%$



Figure A: Gate Charge Test Circuit and Waveform

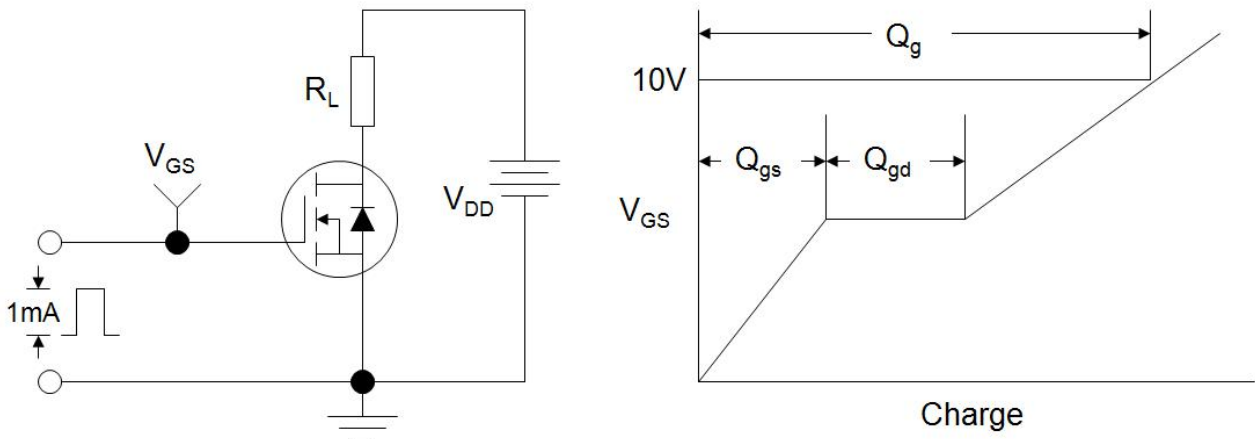


Figure B: Resistive Switching Test Circuit and Waveform

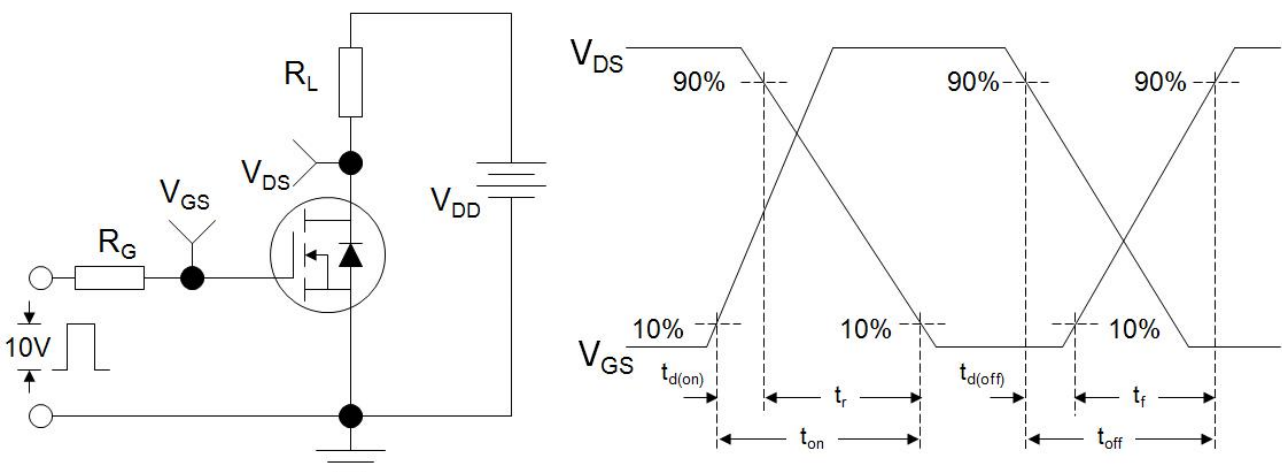
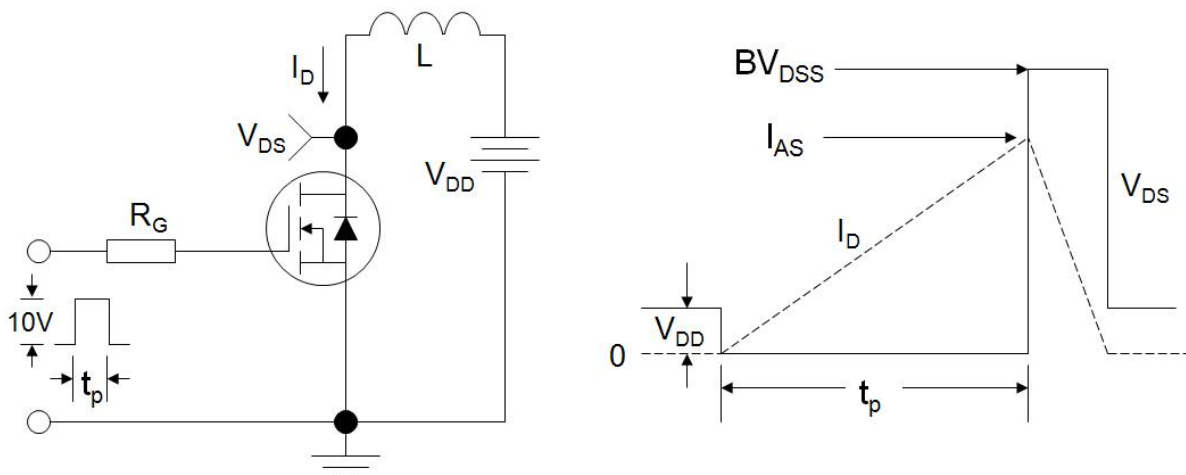
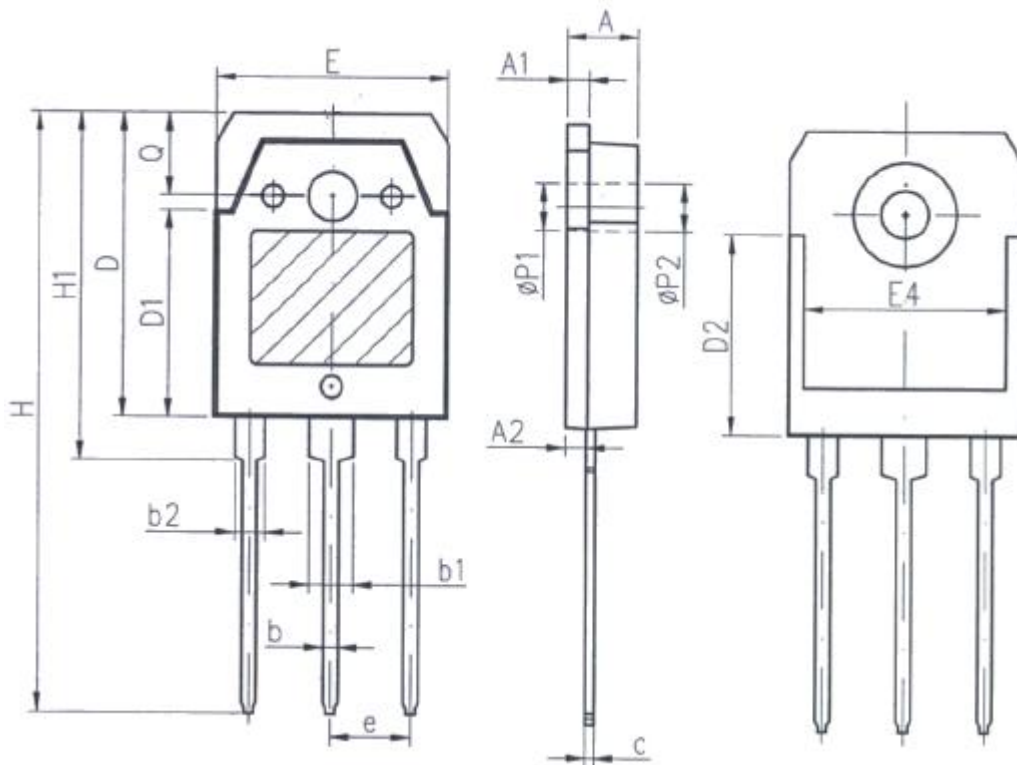


Figure C: Unclamped Inductive Switching Test Circuit and Waveform





## TO-3PN



Unit:mm		
Symbol	Min.	Max.
A	4.6	5
A1	1.4	1.65
A2	1.18	1.58
b	0.8	1.2
b1	2.8	3.2
b2	1.8	2.2
c	0.5	0.75
D	19.6	20.2
D1	13.55	14.25
D2	12.9REF	
E	15.35	15.85
E4	12.6	-
e	5.45TYP	
H	40.1	40.9
H1	23.15	23.65
P1	3.2REF	
P2	3.5REF	



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