

General Description

The MY9N20D is silicon N-CH 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.

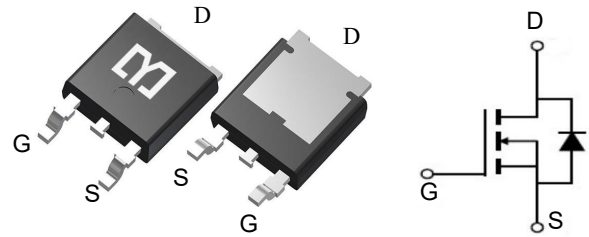


Features

V_{DSS}	200	V
I_D	9	A
$P_D(T_C=25^{\circ}C)$	74	W
$R_{DS(ON)}(at V_{GS}=4.5V)$	<300	m Ω

Application

- Uninterruptible Power Supply(UPS)
- Power Factor Correction (PFC)



Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
MY9N20D	TO-252-2L	9N20H	2500

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

Parameter	Symbol	Value	Unit
Drain-Source Voltage ($V_{GS} = 0V$)	V_{DSS}	200	V
Continuous Drain Current	I_D	9	A
Pulsed Drain Current	I_{DM}	36	A
Gate-Source Voltage	V_{GSS}	± 20	V
Single Pulse Avalanche Energy	E_{AS}	100	mJ
Avalanche Current	I_{AR}	7.5	A
Repetitive Avalanche Energy	E_{AR}	8.1	mJ
Power Dissipation ($T_C = 25^{\circ}C$)	P_D	74	W
Operating Junction and Storage Temperature Range	T_J, T_{stg}	$-55 \sim +150$	$^{\circ}C$
Thermal Resistance, Junction-to-Case	R_{thJC}	1.7	$^{\circ}C/W$
Thermal Resistance, Junction-to-Ambient	R_{thJA}	62.5	

Electrical Characteristics ($T_J=25\text{ }^{\circ}\text{C}$, unless otherwise noted)

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	200	222	--	V
Zero Gate Voltage Drain Current	$IDSS$	$V_{DS} = 200V, V_{GS} = 0V, T_J = 25^{\circ}\text{C}$	--	--	5	μA
		$V_{DS} = 160V, V_{GS} = 0V, T_J = 125^{\circ}\text{C}$	--	--	100	
Gate-Source Leakage	$IGSS$	$V_{GS} = \pm 20V$	--	--	± 100	nA
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	1.2	1.6	2.5	V
Drain-Source (Note3) On-Resistance	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 4.5A$	--	230	300	m Ω
Input Capacitance	C_{iss}	$V_{GS} = 0V,$ $V_{DS} = 25V, f = 1.0\text{MHz}$	--	684	--	pF
Output Capacitance	C_{oss}		--	103	--	
Reverse Transfer Capacitance	C_{rss}		--	37	--	
Total Gate Charge	Q_g	$V_{DD} = 160V, I_D = 9.0A, V_{GS} = 10V$	--	23	--	nC
Gate-Source Charge	Q_{gs}		--	2.5	--	
Gate-Drain Charge	Q_{gd}		--	10	--	
Turn-on Delay Time	$t_{d(on)}$	$V_{DD} = 100V, I_D = 9.0A, R_G = 25\Omega$	--	12	--	ns
Turn-on Rise Time	t_r		--	22	--	
Turn-off Delay Time	$t_{d(off)}$		--	50	--	
Turn-off Fall Time	t_f		--	48	--	
Continuous Body Diode Current	I_S	$T_C = 25^{\circ}\text{C}$	--	--	9	A
Pulsed Diode Forward Current	ISM		--	--	36	
Body Diode Voltage	V_{SD}	$T_J = 25^{\circ}\text{C}, I_{SD} = 9A, V_{GS} = 0V$	--	--	1.4	V
Reverse Recovery Time	t_{rr}	$V_{GS} = 0V, I_S = 9A, di_F/dt = 100A/\mu s$	--	190	--	ns
Reverse Recovery Charge	Q_{rr}		--	1.7	--	μC

Notes

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. $I_{AS} = 7.5A, V_{DD} = 50V, R_G = 25\Omega$, Starting $T_J = 25^{\circ}\text{C}$
3. Pulse Test: Pulse width $\leq 300\mu s$, Duty Cycle $\leq 1\%$

Typical Characteristics

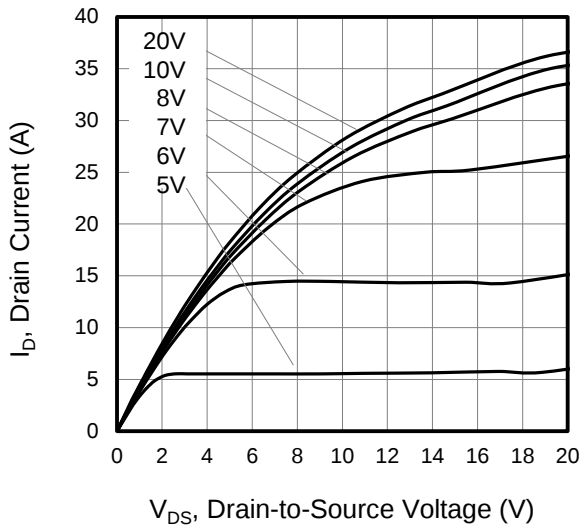


Figure 1. Output Characteristics ($T_J = 25^\circ\text{C}$)

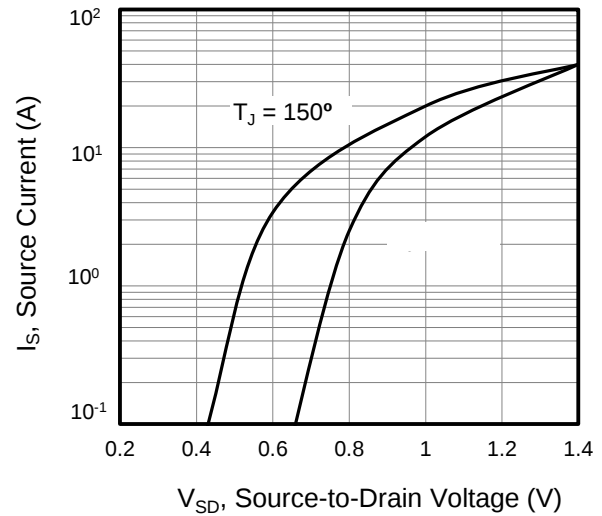


Figure 2. Body Diode Forward Voltage

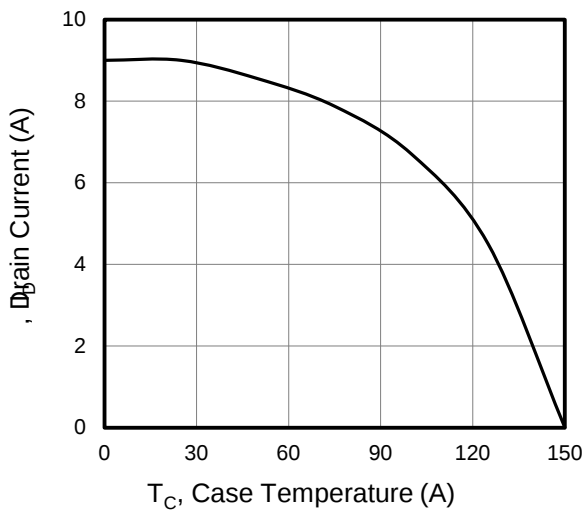


Figure 3. Drain Current vs. Temperature

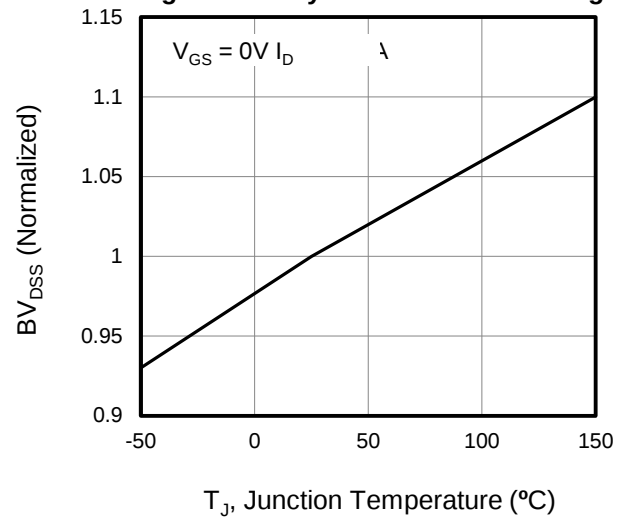


Figure 4. BV_{DSS} Variation vs. Temperature

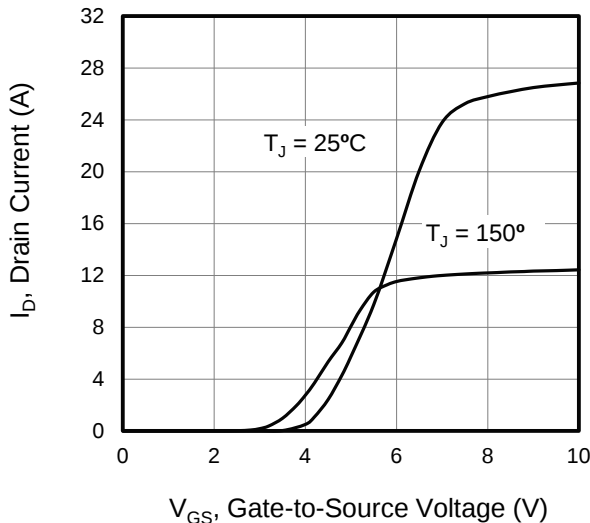


Figure 5. Transfer Characteristics

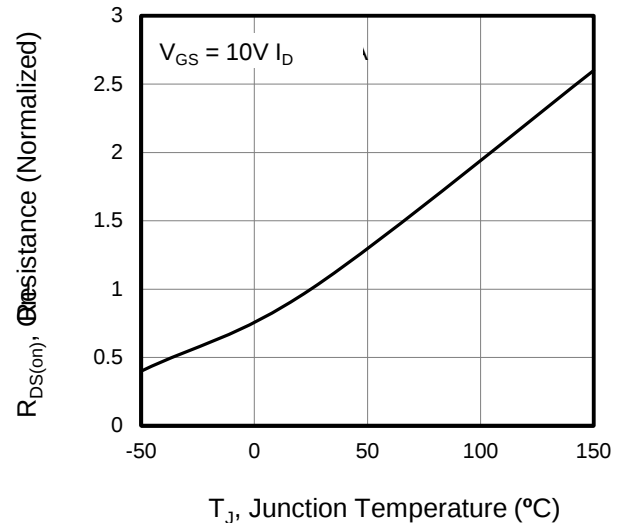


Figure 6. On-Resistance vs. Temperature

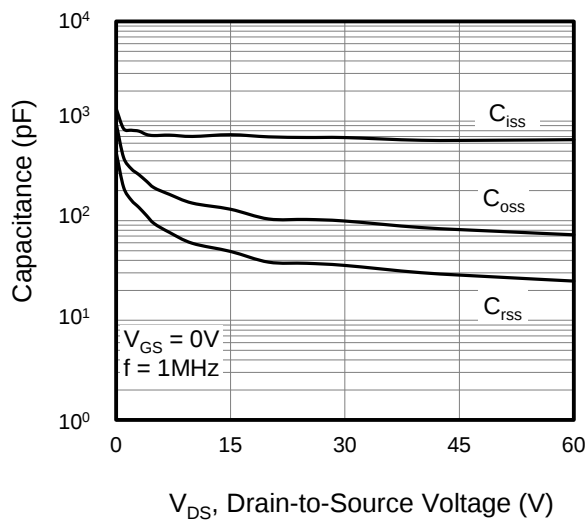


Figure 7. Capacitance

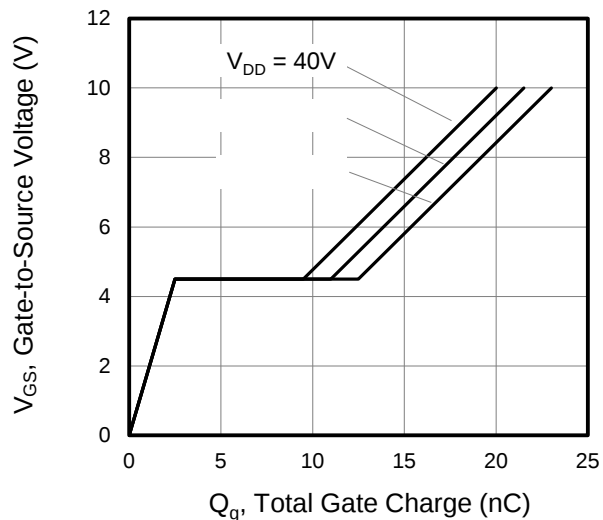


Figure 8. Gate Charge

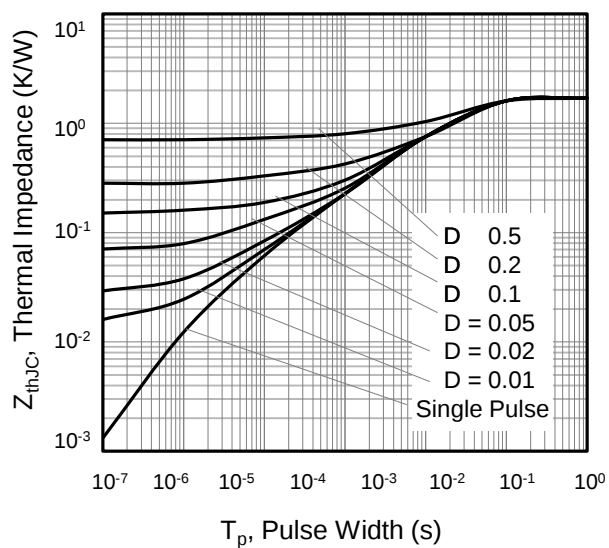


Figure 10. Transient Thermal Impedance

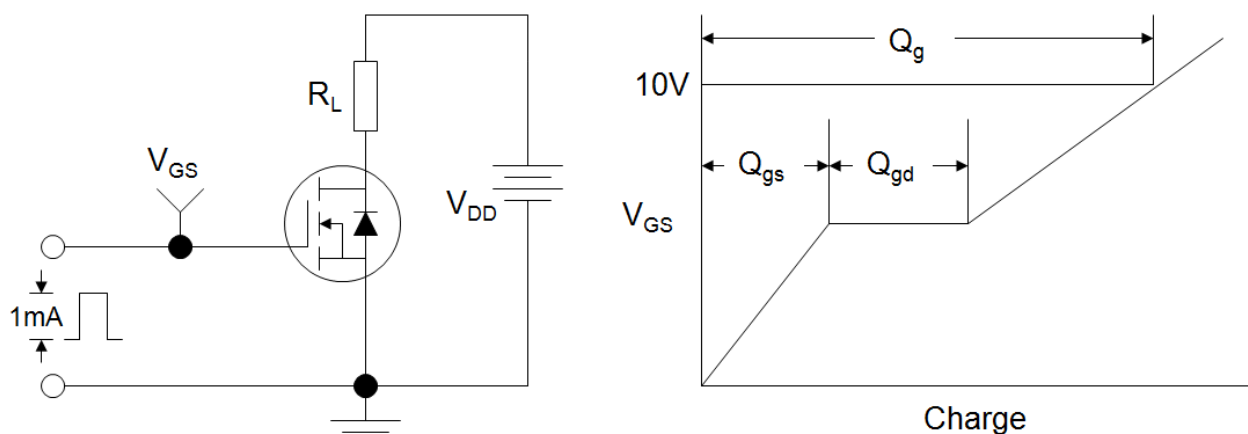


Figure A: Gate Charge Test Circuit and Waveform

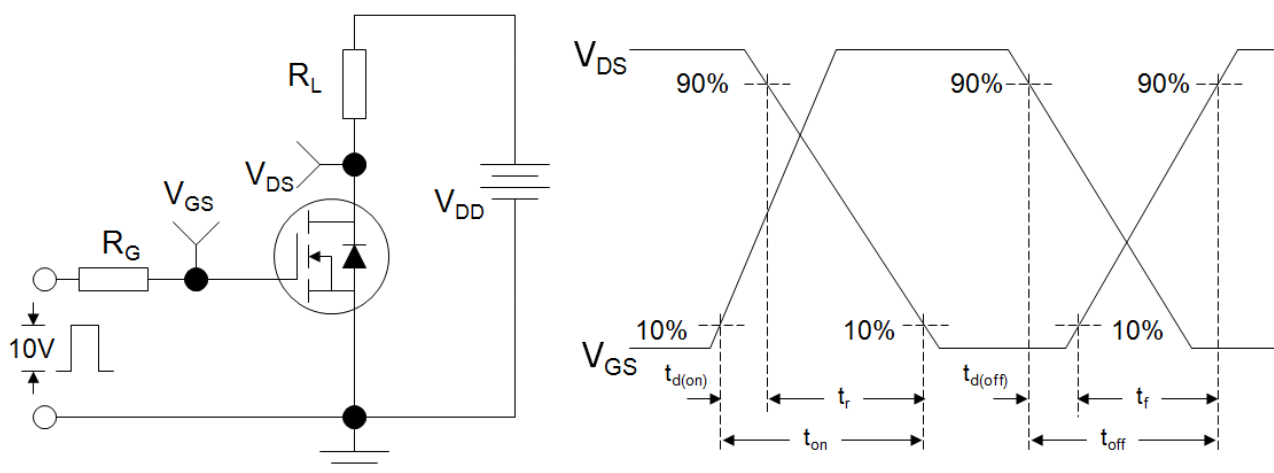


Figure B: Resistive Switching Test Circuit and Waveform

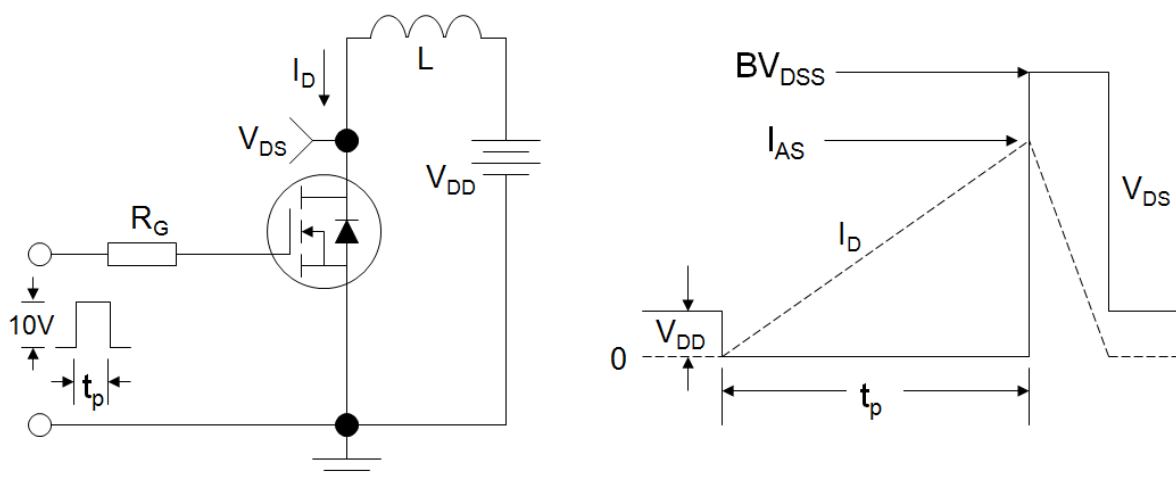
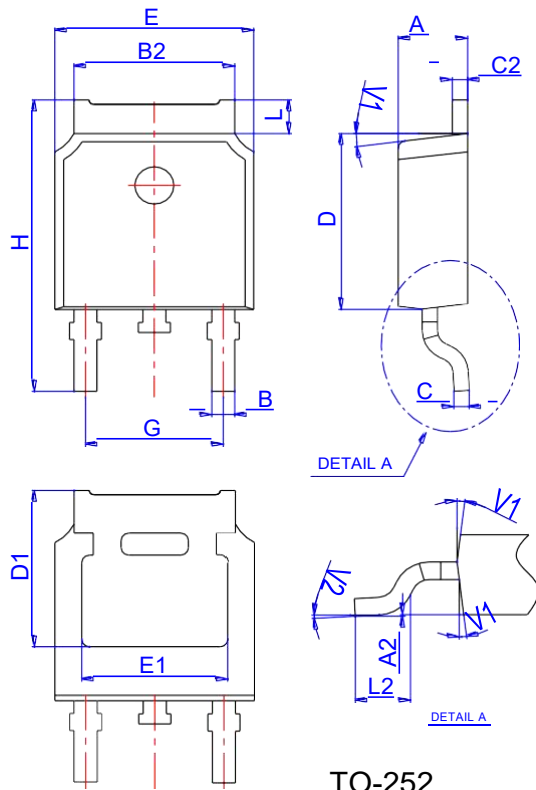


Figure C: Unclamped Inductive Switching Test Circuit and Waveform

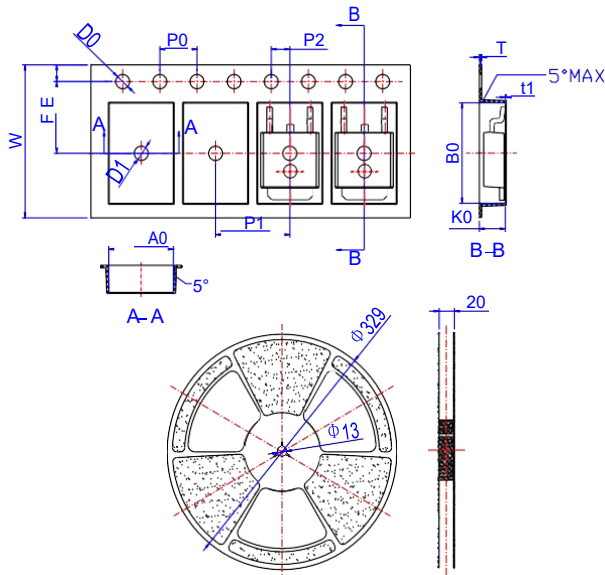
Package Mechanical Data-TO-252-JQ Single



TO-252

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.10		2.50	0.083		0.098
A2	0		0.10	0		0.004
B	0.66		0.86	0.026		0.034
B2	5.18		5.48	0.202		0.216
C	0.40		0.60	0.016		0.024
C2	0.44		0.58	0.017		0.023
D	5.90		6.30	0.232		0.248
D1	5.30REF			0.209REF		
E	6.40		6.80	0.252		0.268
E1	4.63			0.182		
G	4.47		4.67	0.176		0.184
H	9.50		10.70	0.374		0.421
L	1.09		1.21	0.043		0.048
L2	1.35		1.65	0.053		0.065
V1		7°			7°	
V2	0°		6°	0°		6°

Reel Specification-TO-252



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
W	15.90	16.00	16.10	0.626	0.630	0.634
E	1.65	1.75	1.85	0.065	0.069	0.073
F	7.40	7.50	7.60	0.291	0.295	0.299
D0	1.40	1.50	1.60	0.055	0.059	0.063
D1	1.40	1.50	1.60	0.055	0.059	0.063
P0	3.90	4.00	4.10	0.154	0.157	0.161
P1	7.90	8.00	8.10	0.311	0.315	0.319
P2	1.90	2.00	2.10	0.075	0.079	0.083
A0	6.85	6.90	7.00	0.270	0.271	0.276
B0	10.45	10.50	10.60	0.411	0.413	0.417
K0	2.68	2.78	2.88	0.105	0.109	0.113
T	0.24		0.27	0.009		0.011
t1	0.10			0.004		
10P0	39.80	40.00	40.20	1.567	1.575	1.583