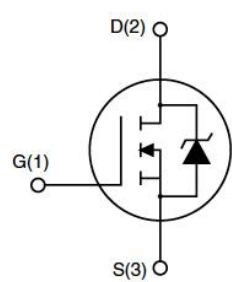


Features ➤ Super Low Gate Charge ➤ Green Device Available ➤ Excellent Cdv/dt effect decline ➤ Advanced high cell density Trench technology	Bvdss	Rdson	ID
	200V	450mΩ	5.5A
	Application ➤ DC Motor Control and Class D Amplifier ➤ Uninterruptible Power Supply (UPS) ➤ Automotive		

RoHS

Package 		
Marking and pin assignment	TO-252 top view	Schematic diagram

Package Marking and Ordering Information

Device Marking	Device	Device Package	Quantity
5N20	5N20	TO-252	2500

Absolute Maximum Ratings (T_C=25°C unless otherwise specified)

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V _{DSS}	200	V
Gate-Source Voltage		V _{GSS}	±20	V
Continuous Drain Current	T _C = 25°C	I _D	5.5	A
Pulsed Drain Current		I _{DM} ^{note1}	22	A
Power Dissipation		P _D	30	W
Operating and Storage Temperature Range		T _J , T _{STG}	150 / -55 to +150	°C
Maximum Temperature for Soldering		T _L	260	°C

Thermal Resistance Ratings

Parameter	Symbol	Value	Unit
Thermal Resistance Junction-Ambient	R _{θJA}	4.17	°C/W



Ordering Information

Ordering Number	Package	Pin Assignment			Packing
Halogen Free		G	D	S	
HL5N20	TO-252	1	2	3	Tape Reel

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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Drain-Source Breakdown Voltage	$B_{V_{DS}}$	$V_{GS}=0V$, $I_D=250\mu A$	200	---	---	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	$V_{GS}=10V$, $I_D=2A$	---	450	550	$m\Omega$
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS}=V_{DS}$, $I_D=250\mu A$	1	2	3	V
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=200V$, $V_{GS}=0V$	---	---	1	μA
Gate-Source Leakage Current	I_{GSS}	$V_{GS}=\pm 20V$, $V_{DS}=0V$	---	---	± 100	nA
Gate Resistance	R_g	$V_{DS}=\text{Open}$, $V_{GS}=0V$	---	1.35	---	Ω
Total Gate Charge	Q_g	$V_{GS}=10V$, $V_{DS}=100V$, $I_D=2A$	---	11.4	---	nC
Gate-Source Charge	Q_{gs}		---	1.75	---	
Gate-Drain Charge	Q_{gd}		---	2.9	---	
Turn-On Delay Time	$T_{d(on)}$	$V_{GS}=10V$, $V_{DS}=100V$, $I_D=2A$, $R_G=4\Omega$	---	6	---	ns
Rise Time	T_r		---	7	---	
Turn-Off Delay Time	$T_{d(off)}$		---	17	---	
Fall Time	T_f		---	8	---	
Input Capacitance	C_{iss}	$V_{DS}=100V$, $V_{GS}=0V$, $f=1\text{MHz}$	---	461	---	pF
Output Capacitance	C_{oss}		---	11.6	---	
Reverse Transfer Capacitance	C_{rss}		---	8.5	---	

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Units
Maximum Continuous Drain to Source Diode Forward Current	I_S	$T_c=25^{\circ}\text{C}$	-	-	5.5	A
Drain to Source Diode Forward Voltage	V_{SD}	$V_{GS}=0V$, $I_S=2A$	-	-	1.2	V
Reverse Recovery time	t_{rr}	$I_S=2A$, $V_{DD}=100V$	-	75	-	ns
Reverse Recovery Charge	Q_{rr}	$dI/dt=100A/\mu s$	-	198	-	nC

Notes:

1.Repetitive rating; pulse width limited by maximum junction temperature

Characteristics Curve:

Fig1: Typ. output characteristics

$$I_D = f(V_{DS})$$

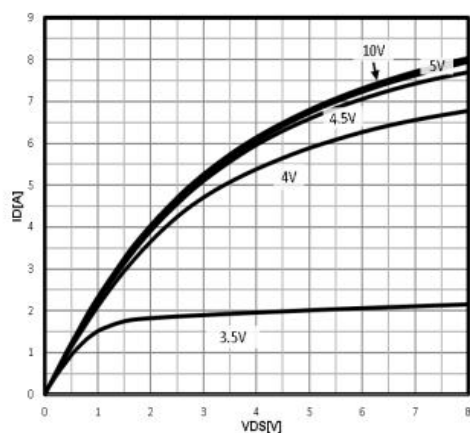


Fig2: Typ. drain-source on resistance

$$R_{DS(on)} = f(I_D)$$

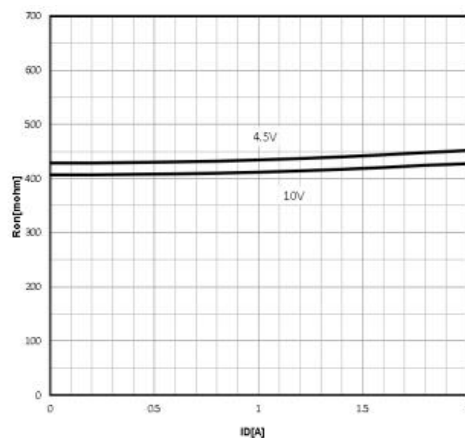


Fig3: Typ. gate charge

$$V_{GS} = f(Q_g) ; I_D = 2A$$

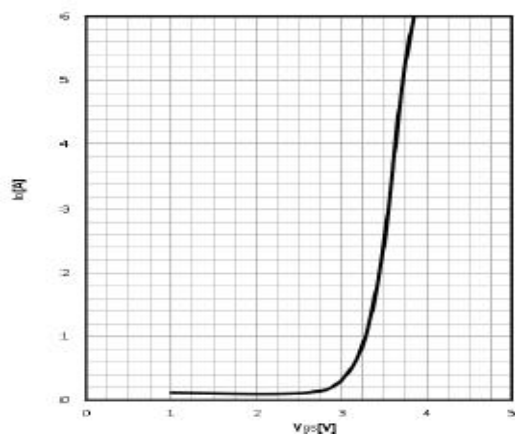


Fig4: Typ. capacitances

$$C = f(V_{DS}) ; V_{GS} = 0V ; f = 1MHz$$

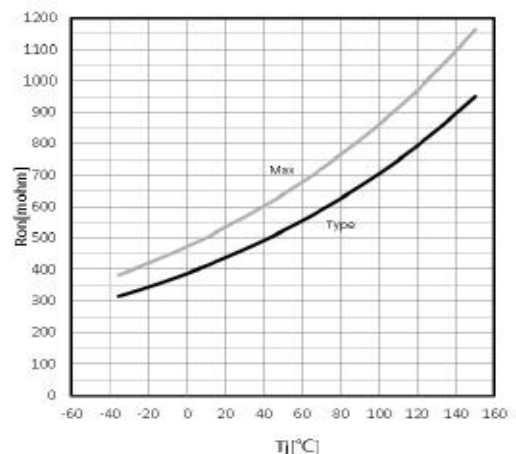


Fig5: Power Dissipation

$$P_{tot} = f(T_c)$$

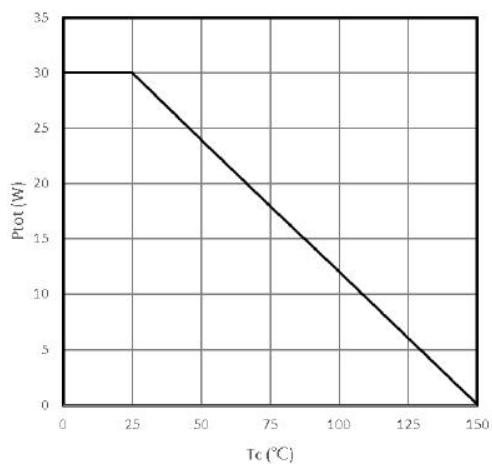


Fig6: Maximum Drain Current

$$I_D = f(T_c)$$

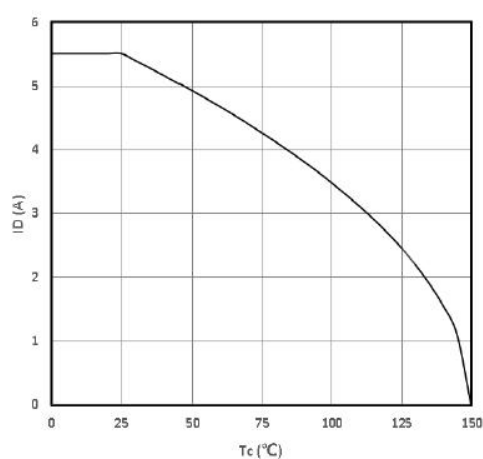


Fig7:Safe operating area Body

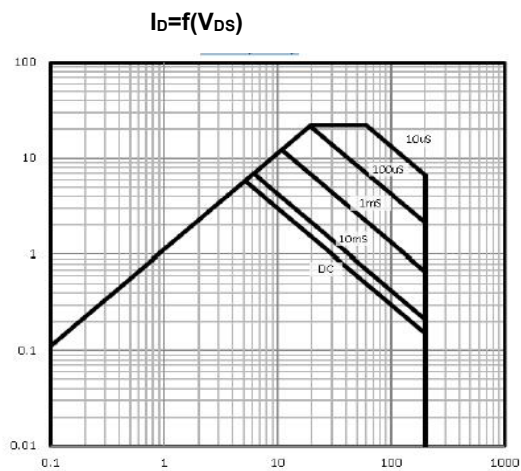


Fig8:Diode Forward Voltage Variation

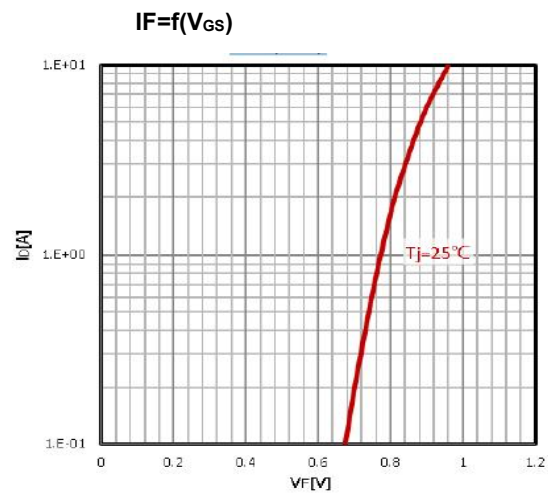
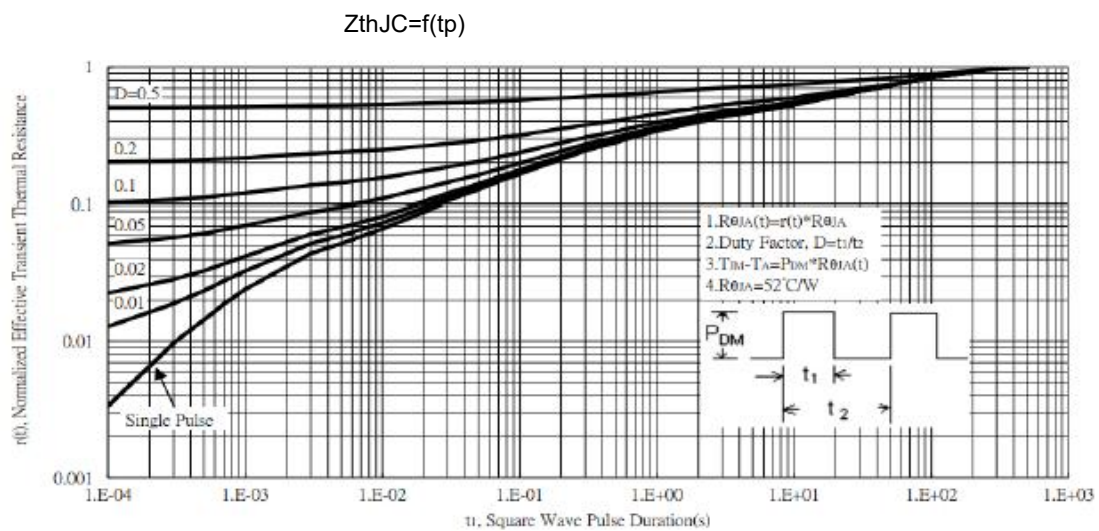
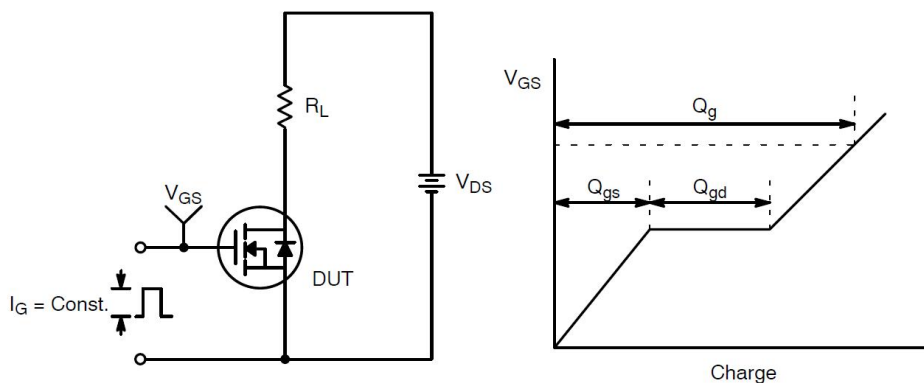


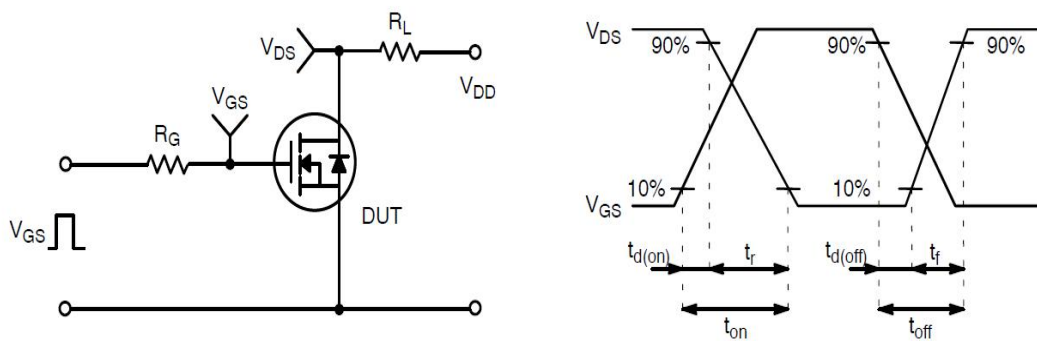
Fig9:Max. transient thermal impedance



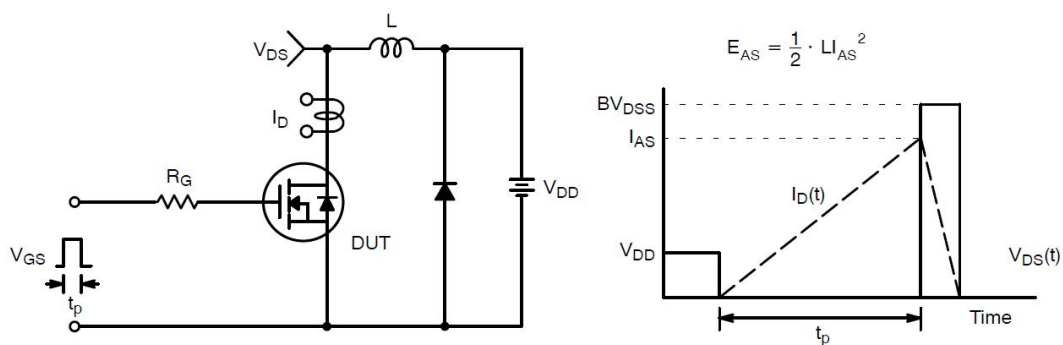
Test Circuit and Waveform



Gate Charge Test Circuit & Waveform

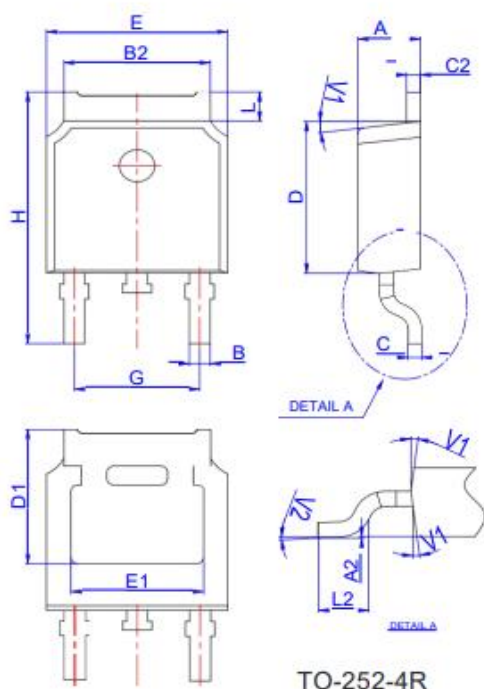


Resistive Switching Test Circuit & Waveforms



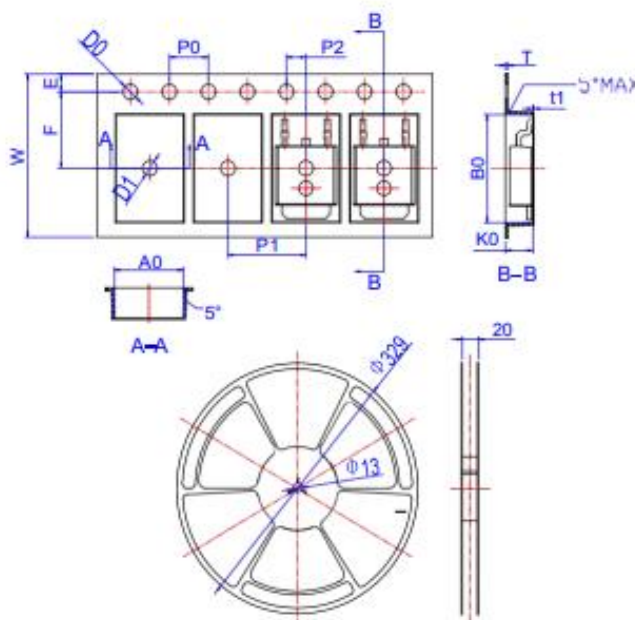
Unclamped Inductive Switching Test Circuit & Waveforms

Package Dimensions 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



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