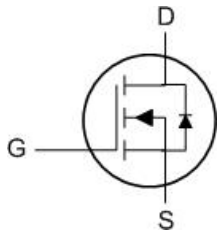
WLU5N50

N-Ch 500V Fast Switching MOSFETs

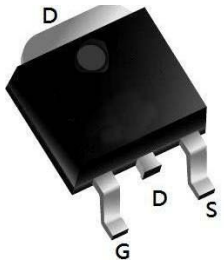
★ 100% EAS Guaranteed
★ Green Device Available
★ Excellent CdV/dt effect decline
★ Advanced VD MOSFETS



Description

The WLU5N50 is the Advanced VD N-ch MOSFETS, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications.
The WLU5N50 meet the RoHS and Green Product requirement 100% EAS guaranteed with full function reliability approved.

TO252 Pin Configuration



Product Summary

BVDSS	RDSON	ID
500V	1.45Ω	5A

Absolute Maximum Ratings

Symbol	Parameter	Value	Units
V_{DSS}	Drain-Source Voltage	500	V
I_D	Drain Current - Continuous (TC= 25°C)	5	A
	- Continuous (TC= 100°C)	2.6*	A
I_{DM}	Drain Current - Pulsed (Note 1)	20*	A
V_{GSS}	Gate-Source Voltage	± 30	V
E_{AS}	Single Pulsed Avalanche Energy (Note 2)	167	mJ
I_{AR}	Avalanche Current (Note 1)	5	A
E_{AR}	Repetitive Avalanche Energy (Note 1)	10.6	mJ
dv/dt	Peak Diode Recovery dv/dt (Note 3)	5	V/ns
P_D	Power Dissipation (TC = 25°C)	24.5	W
	- Derate above 25°C	0.2	W/°C
T_j , T_{stg}	Operating and Storage Temperature Range	-55 to +150	°C
T_L	Maximum lead temperature for soldering purposes,1/8" from case for 5 seconds	300	°C

Thermal Characteristics

Symbol	Parameter	Value	Units
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	4.20	°C/W
$R_{\theta JS}$	Thermal Resistance, Case-to-Sink Typ.	--	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	48.2	°C/W

Electrical Characteristics TC = 25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS} = 0 V, I_D = 250 μA	500			V
ΔBV_{DSS} / ΔT_J	Breakdown Voltage Temperature Coefficient	I_D = 250 μA, Referenc ed to 25°C		0.49		V/°C
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 500 V, V_{GS} = 0 V			1	μA
		V_{DS} = 400 V, TC = 125°C			10	μA
I_{GSSF}	Gate-Body Leakage Current, Forward	V_{GS} = 30 V, V_{DS} = 0 V			100	nA
I_{GSSR}	Gate-Body Leakage Current, Reverse	V_{GS} = -30 V, V_{DS} = 0 V			-100	nA
On Characteristics						
$V_{GS(TH)}$	Gate Threshold voltage	V_{DS}=V_{GS}, I_D =250 uA	2.0		4.0	V
$R_{DS(On)}$	Drain-Source on-state resistance	V_{GS}=10 V, I_D = 2A, T_J = 25°C		1.45	1.8	Ω
g_{FS}	Forward Transconductance	V_{DS} = 40 V, I_D = 2.5 A (Note 4)		2.90		S
Dynamic Characteristics						
C_{iss}	Input capacitance	V_{DS} = 25 V, V_{GS} = 0 V, f = 1.0 MHz		415		pF
C_{oss}	Output capacitance			58		pF
C_{rss}	Reverse transfer capacitance			1.4		pF
Switching Characteristics						
$t_{d(on)}$	Turn On Delay Time	V_{DD} = 250 V, ID = 5 A, R_G = 25 Ω (Note 4, 5)		7		ns
t_r	Rising Time			22		ns
$t_{d(off)}$	Turn Off Delay Time			15		ns
t_f	Fall Time			23		ns
Q_g	Total Gate Charge	V_{DS} = 400 V, ID = 5 A, V_{GS} = 10 V (Note 4, 5)		13		nC
Q_{gs}	Gate-Source Charge			4.9		nC
Q_{gd}	Gate-Drain Charge			2.3		nC
Drain-source Diode Characteristics and Maximum Ratings						
I_S	Maximum continuous Drain-source Diode Forward Current				5	A
I_{SM}	Maximum Pulsed Drain-Source Diode Forward Current				20	A
V_{SD}	Diode Forward Voltage	V_{GS}= 0 V, I_S = 5 A			1.2	V
t_{rr}	Reverse Recovery Time	V_{GS} = 0 V, I_S = 5 A, dI_F / dt = 100 A/μs Note 4)		289		ns
Q_{rr}	Reverse Recovery Charge			1.2		μC

Notes:
1. Repetitive Rating : Pulse width limited by maximum junction temperature
2. L = 10.6 mH, IAS = 5 A, VDD = 50V, RG = 25 Ω, Starting TJ = 25°C
3. ISD≤5A, di/dt ≤200A/us, VDD ≤ BVDSS, Starting TJ = 25°C
4. Pulse Test : Pulse width ≤ 300us, Duty cycle ≤ 2%
5. Essentially independent of operating temperature

Typical Characteristics

Table 7 Reverse diode characteristics

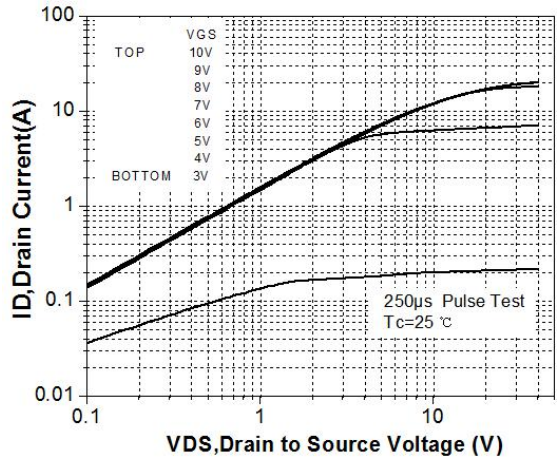


Figure 1. On-Region Characteristics

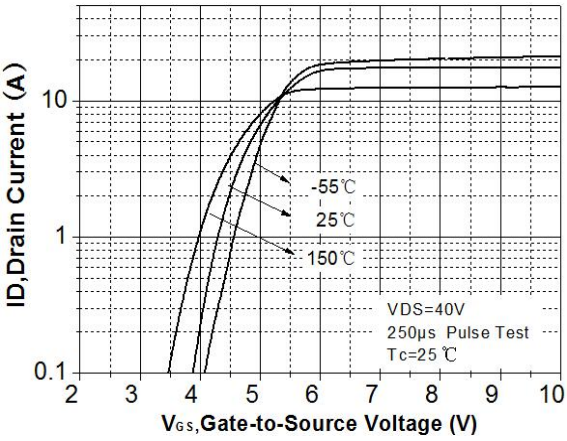


Figure 2. Transfer Characteristics

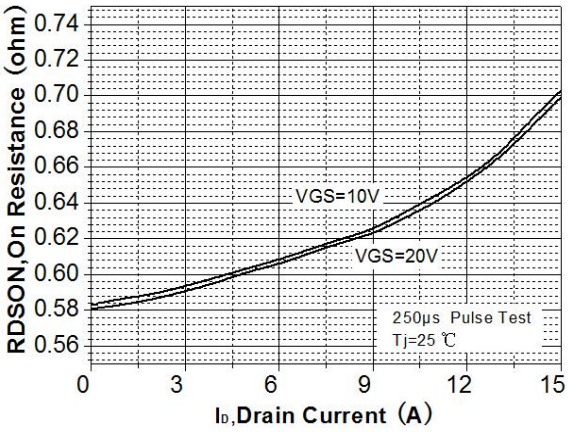


Figure 3. On-Resistance Variation vs Drain Current and Gate Voltage

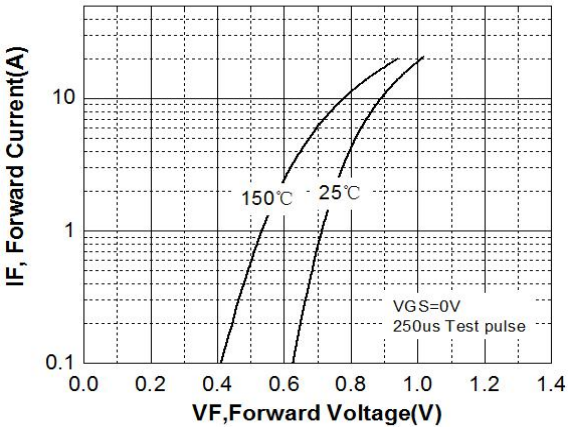


Figure 4. Body Diode Forward Voltage Variation with Source Current and Temperature

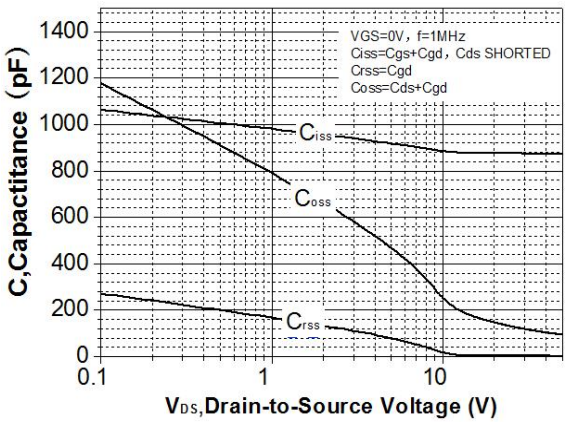


Figure 5. Capacitance Characteristics

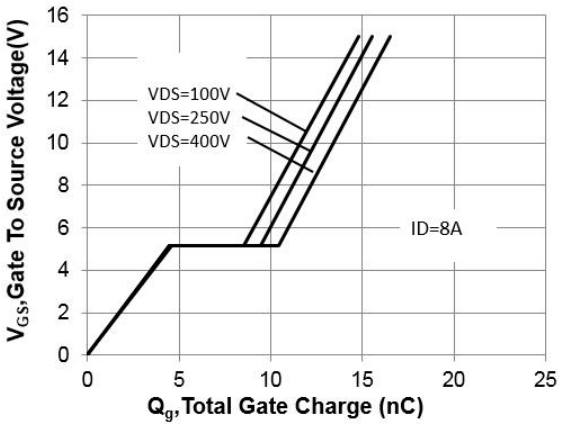


Figure 6. Gate Charge Characteristics

Typical Characteristics (Continued)

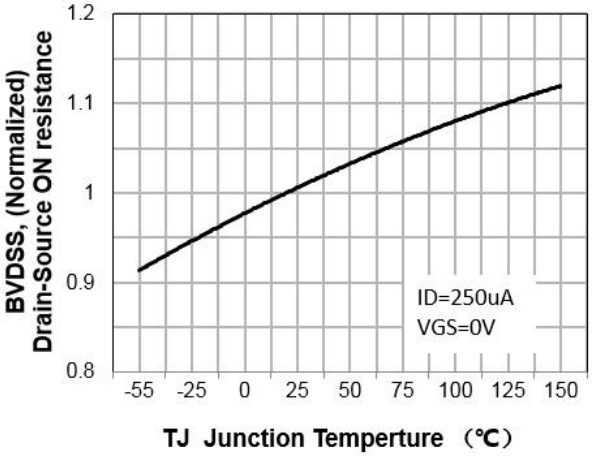


Figure 7. Breakdown Voltage Variation vs Temperature

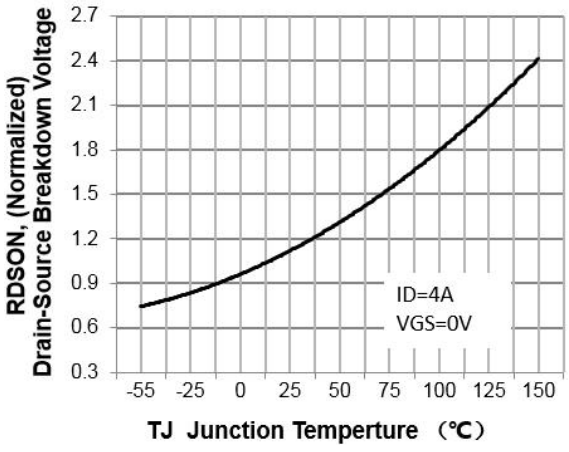


Figure 8. On-Resistance Variation vs Temperature

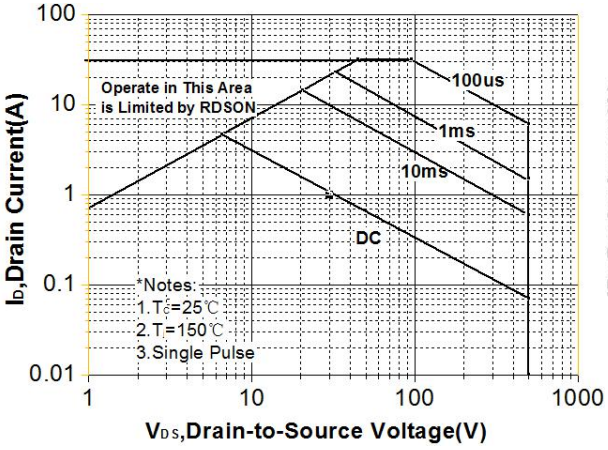


Figure 9. Maximum Safe Operating Area

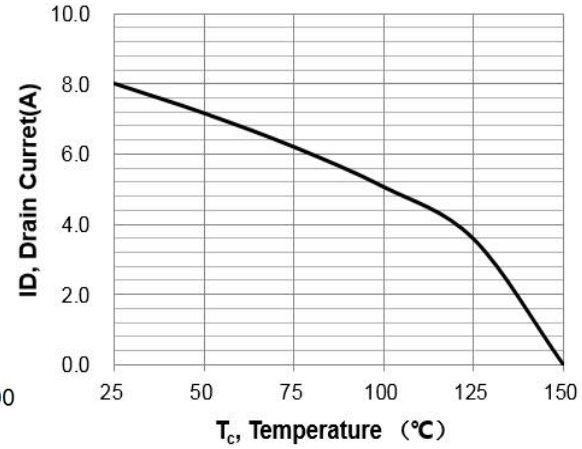


Figure 10. Maximum Drain Current vs Case Temperature

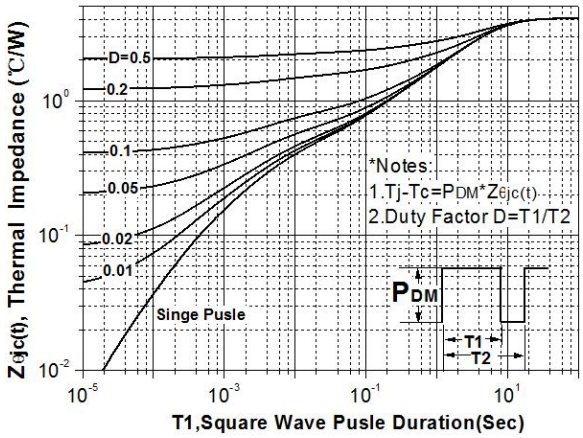
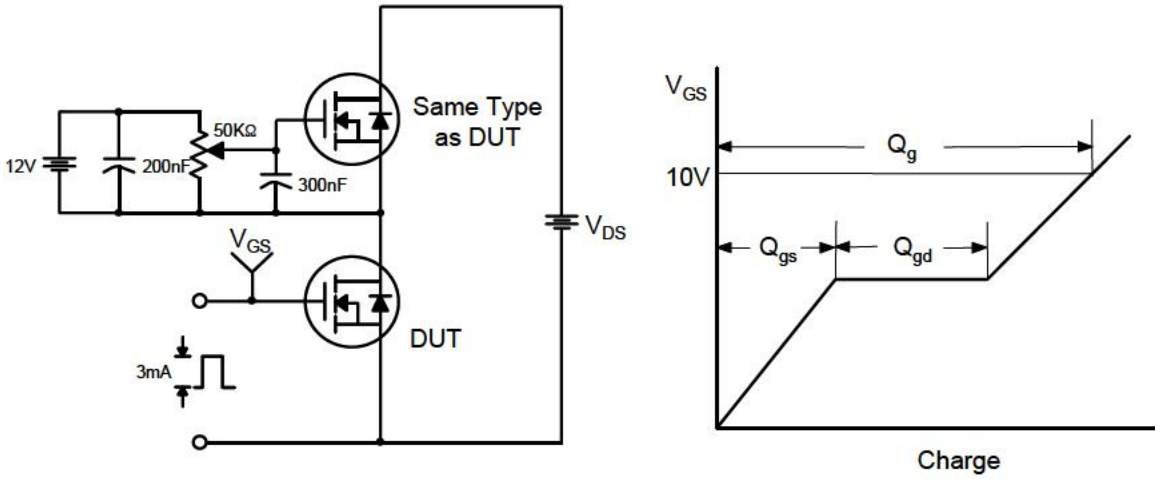
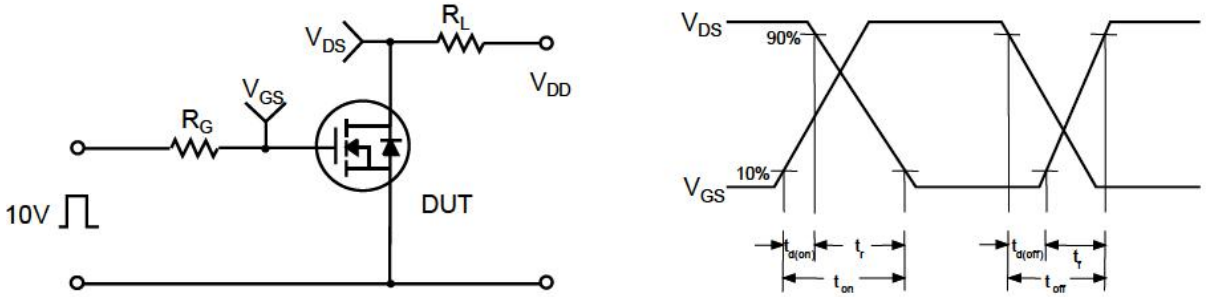


Figure 11. Transient Thermal Response Curve

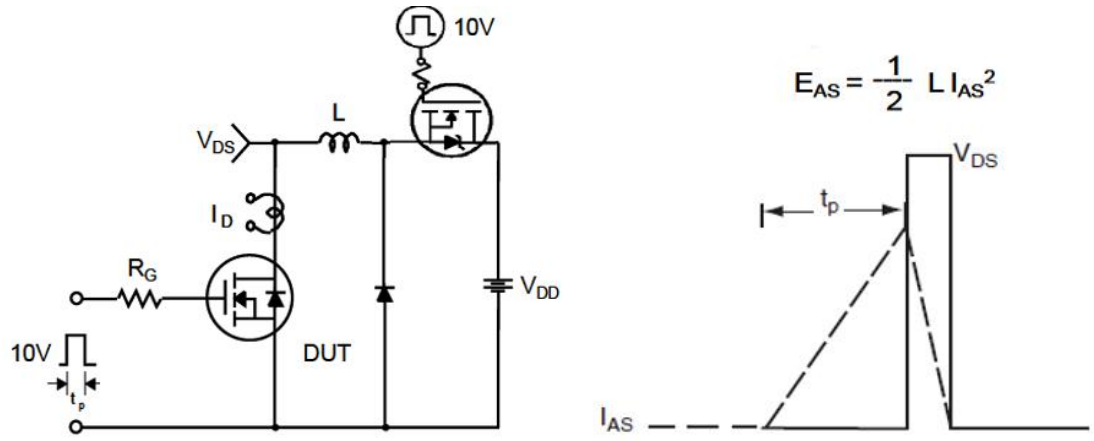
Gate Charge Test Circuit & Waveform



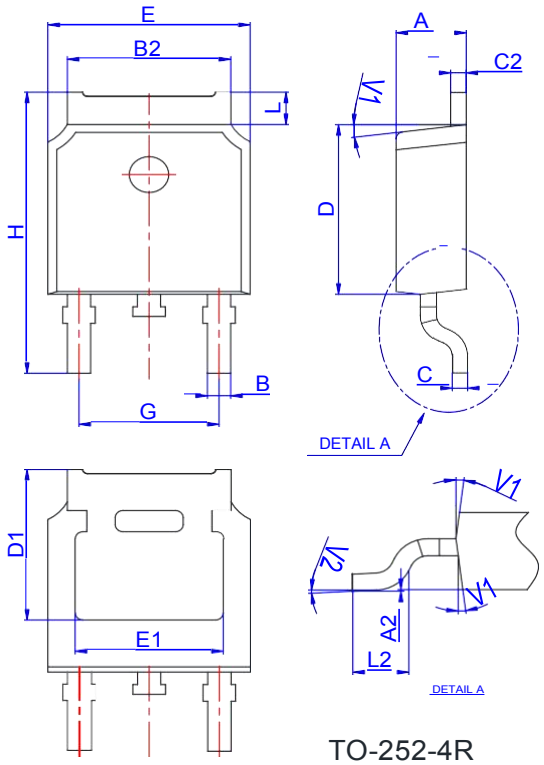
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching Test Circuit & Waveforms



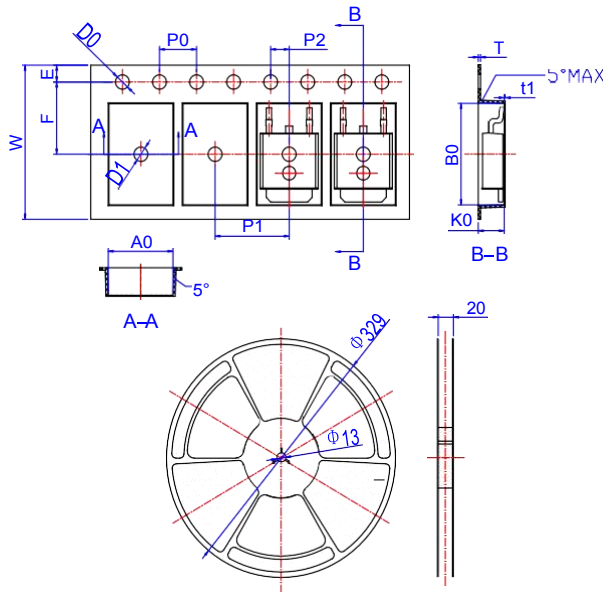
Package Mechanical Data-TO-252



TO-252-4R

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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