LSU05N65A

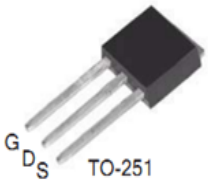
N-Channel MOSFET

Lead Free Package and Finish

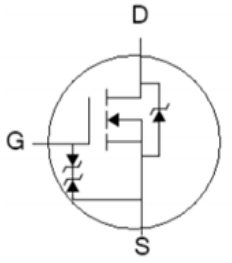
Applications:
- Adaptor
- Charger
- SMPS

V_{DSS}	$R_{DS(ON)}$(Typ.)	I_D
650V	2.3Ω	5A

Features:
- RoHS Compliant
- Low ON Resistance
- Low Gate Charge
- Peak Current vs Pulse Width Curve
- Inductive Switching Curves



Packages
Not to Scale



Ordering Information

PART NUMBER	PACKAGE	BRAND
LSU05N65A	TO-251	***IPS***

Absolute Maximum Ratings

T_C=25℃ unless otherwise specified

Symbol	Parameter	LSU05N65A	Units
V_{DSS}	Drain-to-Source Voltage	650	V
I_D	Continuous Drain Current	5	A
I_{DM}	Pulsed Drain Current, V_{GS}@10V (NOTE *2)	20	A
P_D	Power Dissipation	70	W
	Derating Factor above 25℃	0.56	W/℃
V_{GS}	Gate-to-Source Voltage	±20	V
E_{AS}	Single Pulse Avalanche Energy(L=10mH)	150	mJ
E_{AR}	Avalanche Energy ,Repetitive	30	mJ
I_{AR}	Avalanche Current	2.5	A
VESD(G-S)	Gate to Source ESD(HBM-C=100pF,R=1.5KΩ)	3000	V
T_L	Maximum Temperature for Soldering	300	℃
T_J and T_{STG}	Operating Junction and Storage Temperature Range (NOTE *1)	-55 to150	

Thermal Resistance

Symbol	Parameter	Typ.	Max.	Units	Test Conditions
$R_{\theta JC}$	Junction-to-Case		1.78	℃/W	Water cooled heatsink, P_D adjusted for a peak junction temperature of +150℃.
$R_{\theta JA}$	Junction-to-Ambient		62.5		1 cubic foot chamber, free air.

OFF Characteristics T_C=25℃ unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
BV_{DSS}	Drain-to-Source Breakdown Voltage	650	--	--	V℃	V_{GS}=0V, I_D=250μA
I_{DSS}	Drain-to-Source Leakage Current	--	--	1	μA	V_{DS}=650V, V_{GS}=0V T_J=25℃
		--	--	100		V_{DS}=520V, V_{GS}=0V T_J=125℃
I_{GSS}	Gate-to-Source Forward Leakage	--	--	+10	uA	V_{GS}=+20V
	Gate-to-Source Reverse Leakage	--	--	-10		V_{GS}= -20V

ON Characteristics T_J=25℃ unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
$R_{DS(ON)}$	StaticDrain-to-Source On-Resistance(NOTE *3)	--	2.3	2.8	Ω	V_{GS}=10V, I_D=2.5A
$V_{GS(TH)}$	Gate Threshold Voltage	2	--	4	V	V_{DS}=V_{GS},I_D=250μA
g_{fs}	Forward Transconductance(NOTE *3)	--	3.5	--	S	V_{DS}=15V, I_D=2.5A

Dynamic Characteristics Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
C_{iss}	Input Capacitance	--	560	--	pF	V_{GS}= 0V,V_{DS} = 25V f =1.0MHz
C_{oss}	Output Capacitance	--	50	--		
C_{rss}	Reverse Transfer Capacitance	--	2.2	--		
Q_g	Total Gate Charge	--	13	--	nC	I_D=5A,V_{DD}=520V V_{GS} = 10V
Q_{gs}	Gate-to-Source Charge	--	2.7	--		
Q_{gd}	Gate-to-Drain (“Miller”) Charge	--	5.5	--		

Resistive Switching Characteristics Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
$t_{d(ON)}$	Turn-on Delay Time	--	14		ns	V_{DD}=325V, I_D=5A, V_G=10V R_G=10Ω
t_{rise}	Rise Time	--	22			
$t_{d(OFF)}$	Turn-Off Delay Time	--	29			
t_{fall}	Fall Time	--	15			

Source-Drain Diode Characteristics Tc=25℃ unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
I_S	Continuous Source Current (Body Diode)	--	--	5	A	T_C=25℃
I_{SM}	Maximum Pulsed Current (Body Diode)	--	--	20	A	
V_{SD}	Diode Forward Voltage	--	--	1.5	V	I_{SD}=5A, V_{GS}=0V
t_{rr}	Reverse Recovery Time	--	250	--	ns	I_F= I_S di/dt=100A/us
Q_{rr}	Reverse Recovery Charge	--	1200	--	nC	

Notes:

*1. T_J = +25℃ to +150℃.

*2. Repetitive rating; pulse width limited by maximum junction temperature.

*3. Pulse width < 380μs; duty cycle < 2%.

Test Circuits and Waveforms

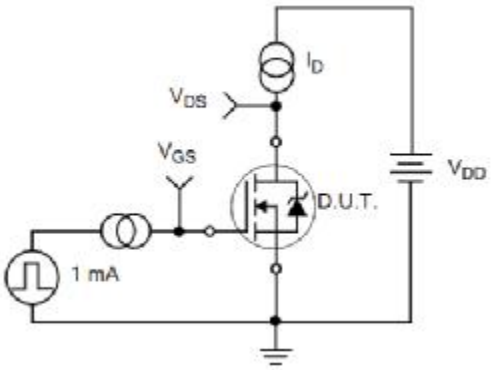


Figure 1. Gate Charge Test Circuit

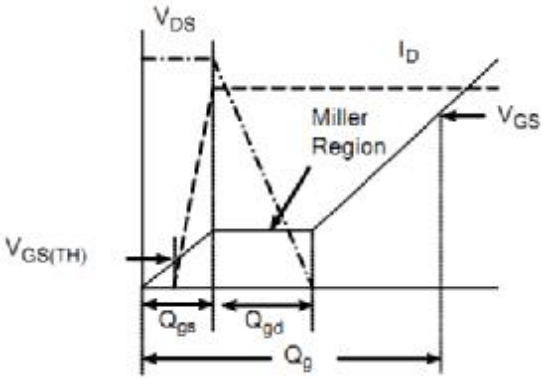


Figure 2. Gate Charge Waveforms

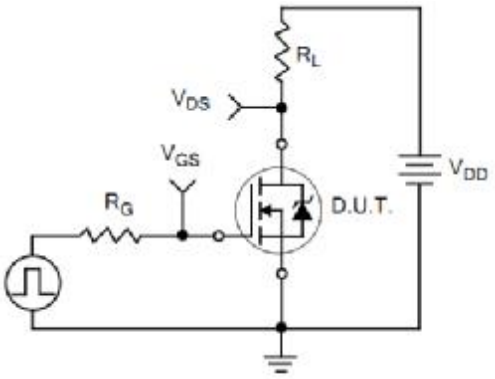


Figure 3. Resistive Switching Test Circuit

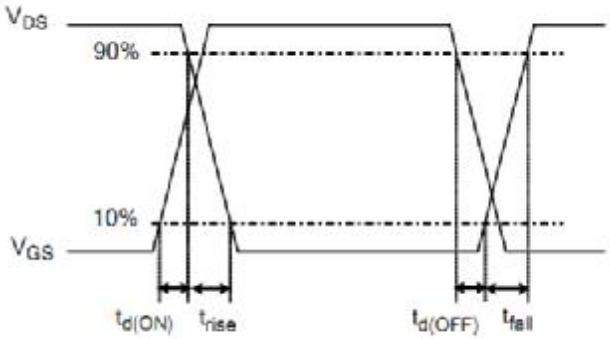


Figure 4. Resistive Switching Waveforms

Test Circuits and Waveforms

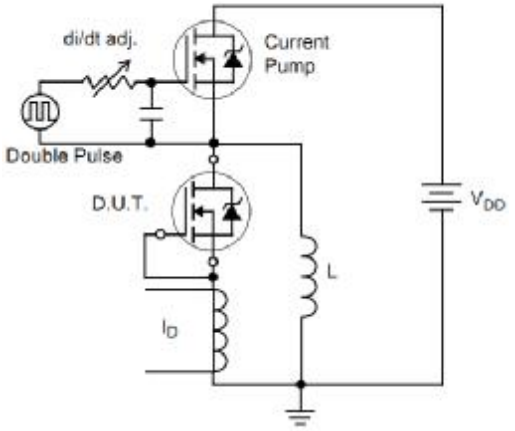


Figure 5. Diode Reverse Recovery Test Circuit

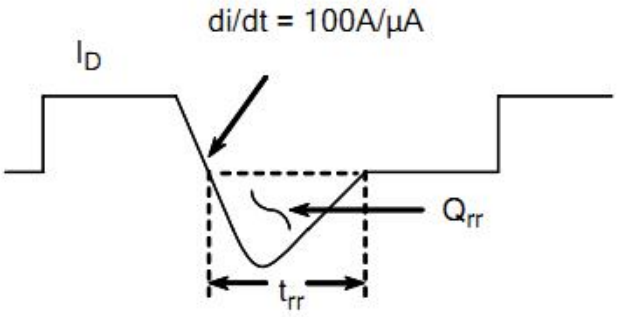


Figure 6. Diode Reverse Recovery Waveform

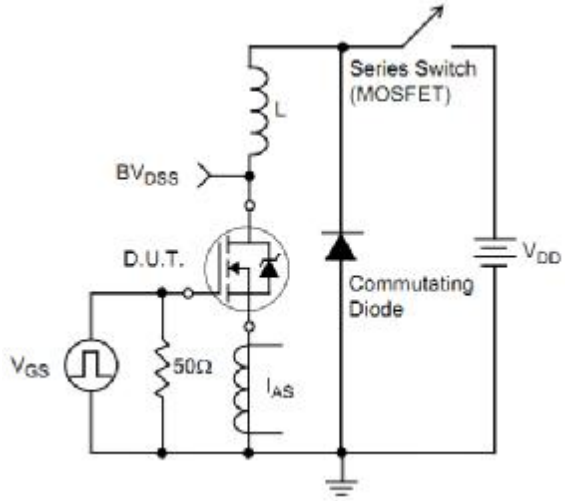
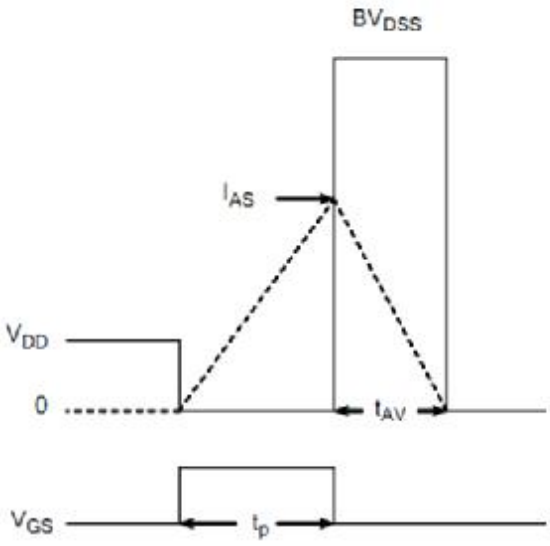


Figure7. Unclamped Inductive Switching Test Circuit



$$E_{AS} = \frac{I_{AS}^2 L}{2}$$

Figure 8. Unclamped Inductive Switching Waveform

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