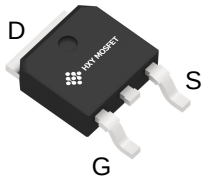
Description

The HXY5N50D can be used in various power swithching circuit for system miniaturization and higher efficiency.The package form is TO-252-2L, which accords with the RoHS standard.



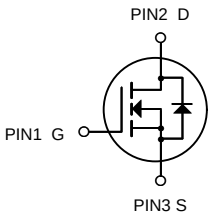
TO-252-2L

General Features

V_{DS} = 500V,I_D =5A
$R_{DS(ON)}$ < 1.8Ω@ V_{GS}=10V

Application

● Power switch circuit of adaptor and charger.



N-Channel MOSFET

Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
HXY5N50D	TO252-2L	5N50 XXX YYYY	2500

Absolute Maximum Ratings@T_j=25ºC(unless otherwise specified)

Symbol	Parameter	Rating	Units
VDS	Drain-Source Voltage	500	V
VGS	Gate-Source Voltage	±30	V
I_D@T_C=25℃	Drain Current, V_{GS} @ 4.5V	5	A
I_D@T_C=100℃	Drain Current, V_{GS} @ 4.5V	2.6	A
IDM	Pulsed Drain Current[1]	20	A
P_D@T_C=25℃	Total Power Dissipation	24.5	W
E_{AS}	Single Pulse Avalanche Energy[4]	167	mJ
TSTG	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃

Electrical Characteristics（Tc= 25℃ unless otherwise specified）:

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

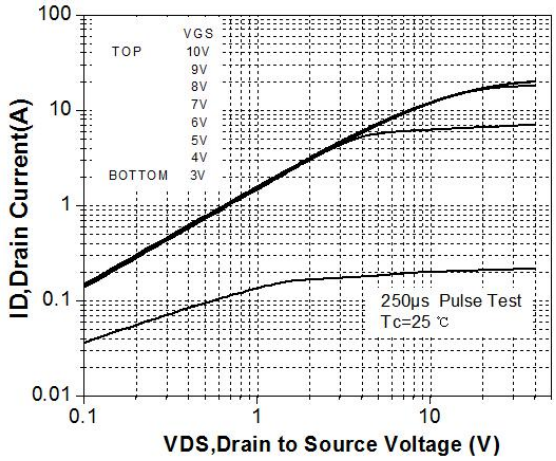


Figure 1. On-Region Characteristics

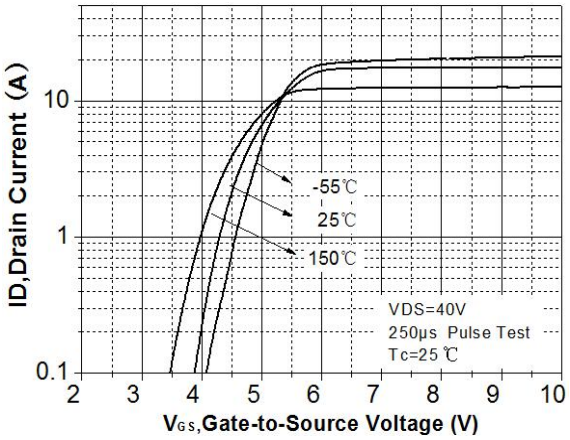


Figure 2. Transfer Characteristics

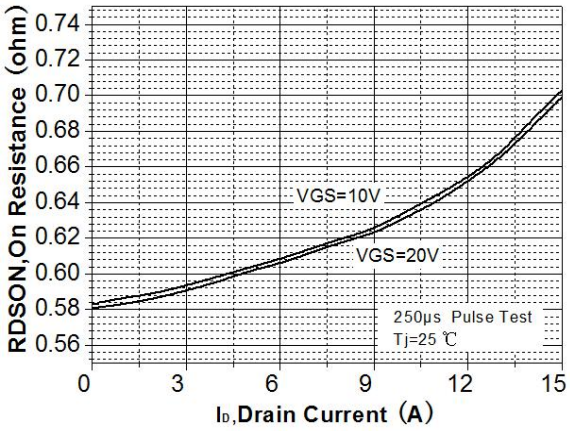


Figure 3. On-Resistance Variation vs Drain Current and Gate Voltage

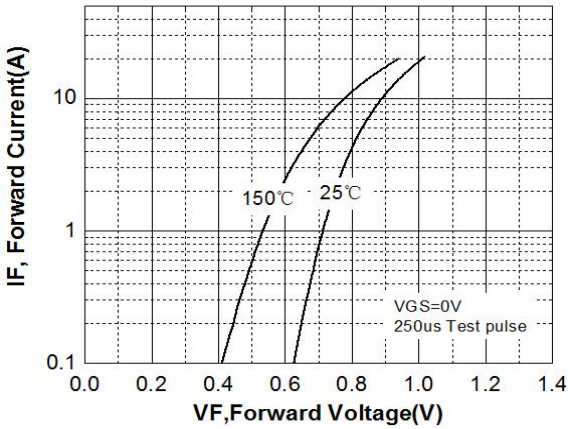


Figure 4. Body Diode Forward Voltage Variation with Source Current and Temperature

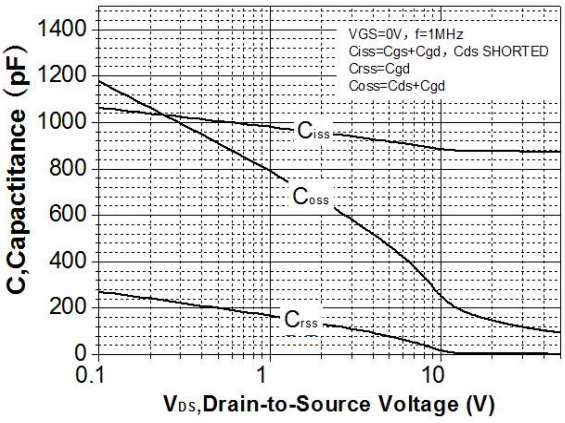


Figure 5. Capacitance Characteristics

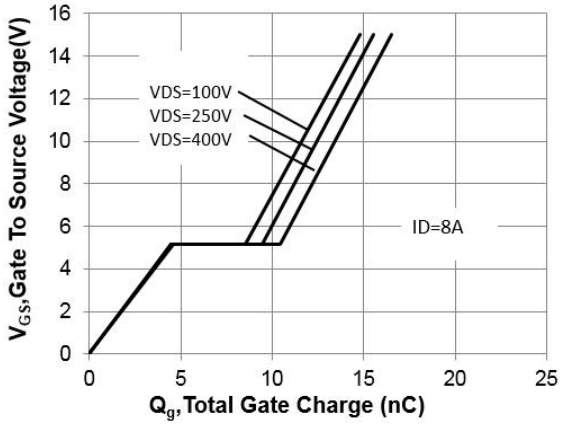


Figure 6. Gate Charge Characteristics

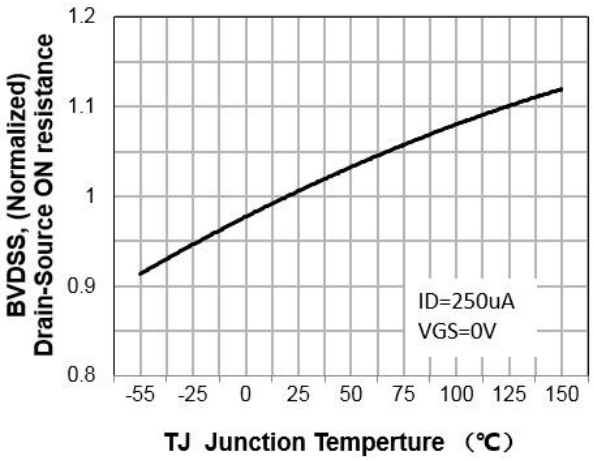


Figure 7. Breakdown Voltage Variation vs Temperature

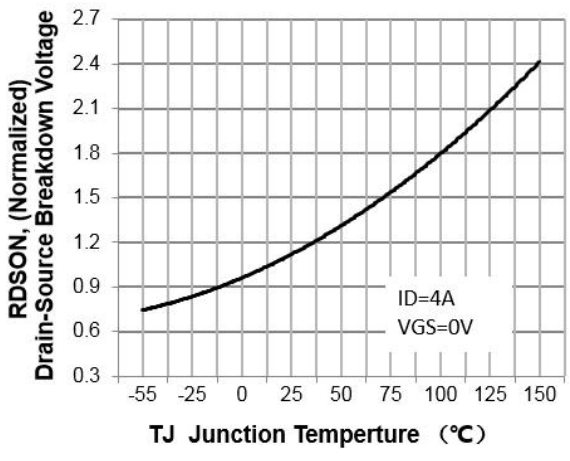


Figure 8. On-Resistance Variation vs Temperature

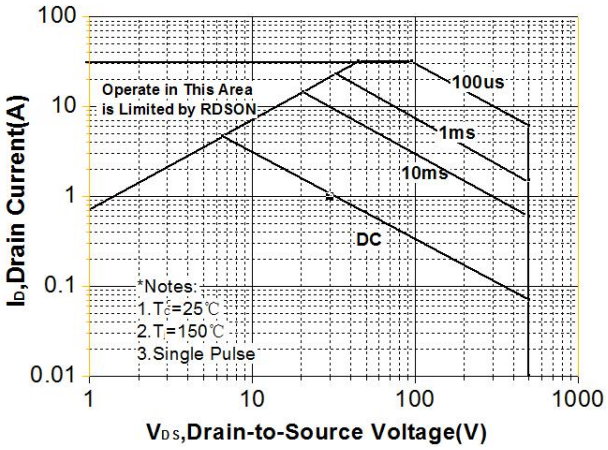


Figure 9. Maximum Safe Operating Area

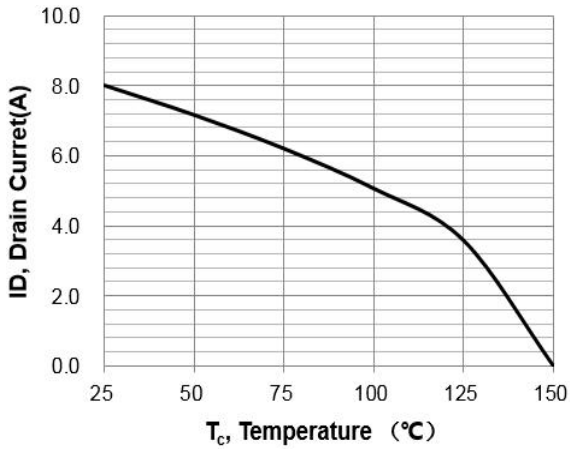
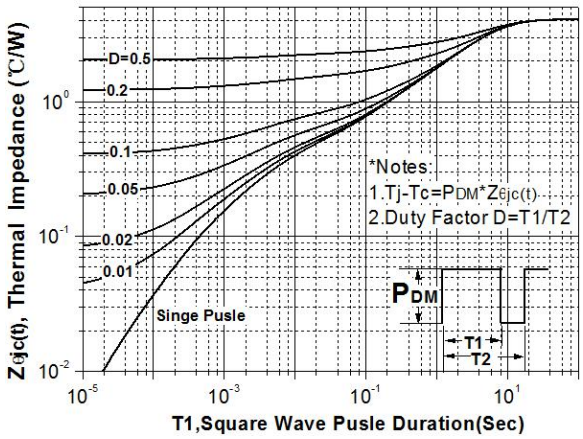
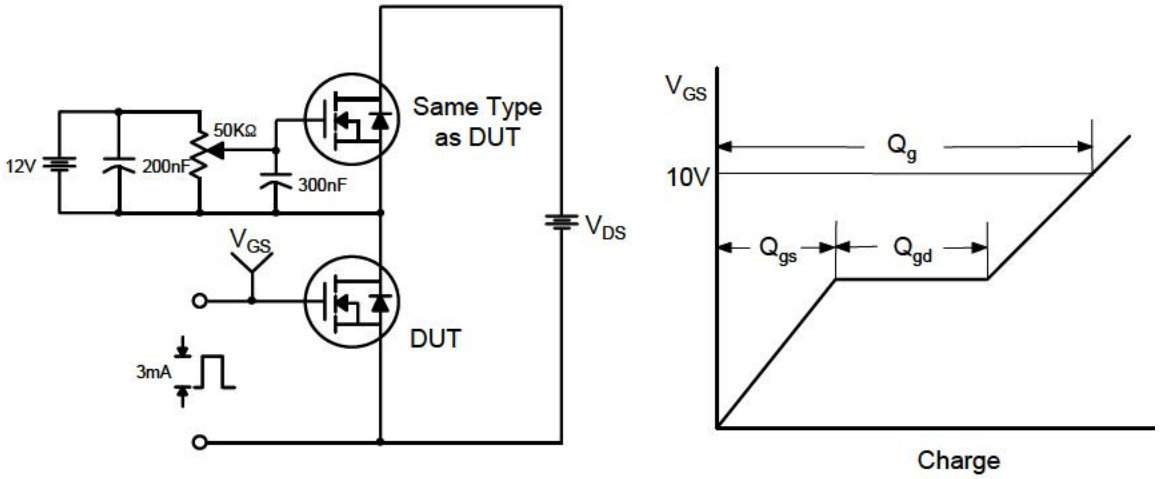


Figure 10. Maximum Drain Current vs Case Temperature Figure

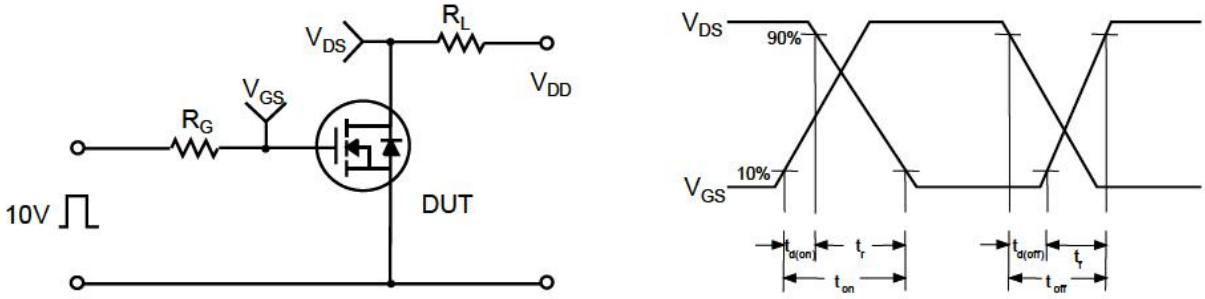


11. Transient Thermal Response Curve

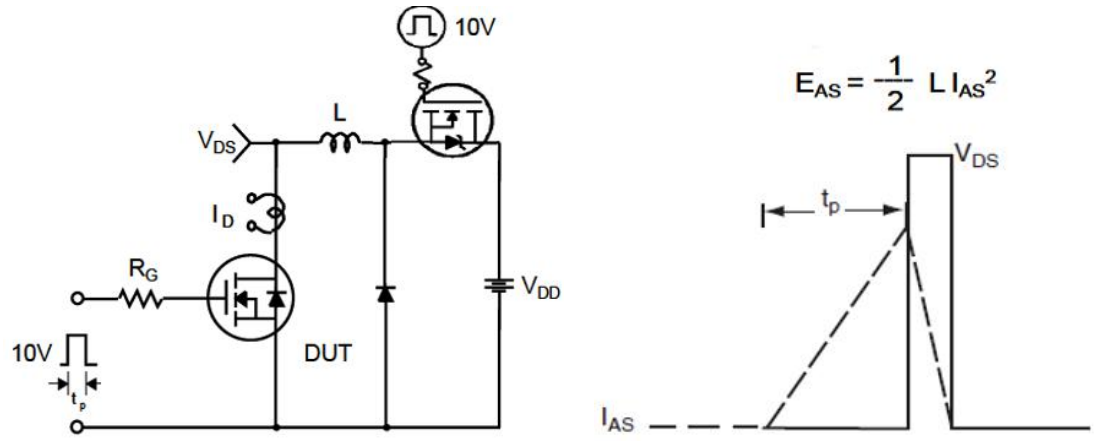
Gate Charge Test Circuit & Waveform



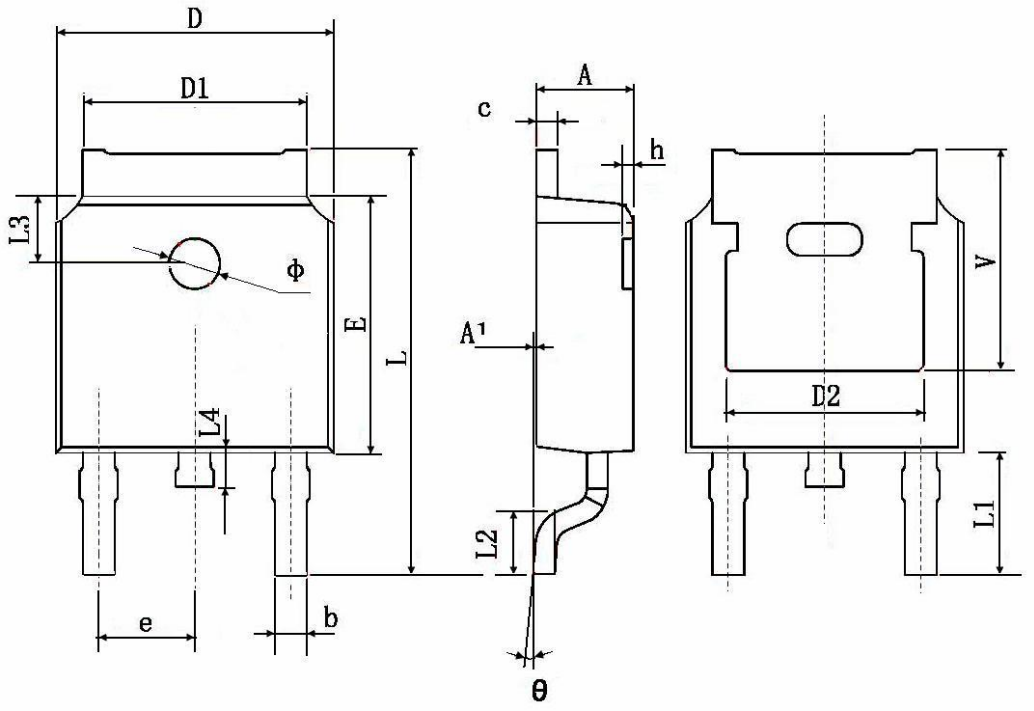
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching Test Circuit & Waveforms



TO252-2L Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.660	0.860	0.026	0.034
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	0.483 TYP.		0.190 TYP.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.800	10.400	0.386	0.409
L1	2.900 TYP.		0.114 TYP.	
L2	1.400	1.700	0.055	0.067
L3	1.600 TYP.		0.063 TYP.	
L4	0.600	1.000	0.024	0.039
Φ	1.100	1.300	0.043	0.051
θ	0°	8°	0°	8°
h	0.000	0.300	0.000	0.012
V	5.350 TYP.		0.211 TYP.	

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