



Description

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

General Features

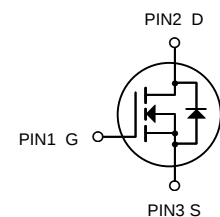
$V_{DS} = 500V, I_D = 5A$
 $R_{DS(ON)} < 1.8\Omega @ V_{GS}=10V$

Application

- Power switch circuit of adaptor and charger.



TO252-2L



N-Channel MOSFET

Package Marking and Ordering Information

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

Absolute Maximum Ratings@ $T_J=25^{\circ}C$ (unless otherwise specified)

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



Electrical Characteristics ($T_c = 25^\circ\text{C}$ 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		289		ns
Q _{rr}	Reverse Recovery Charge	Note 4)		1.2		μC

Notes:

1. Repetitive Rating : Pulse width limited by maximum junction temperature
2. $L = 10.6\text{ mH}$, $I_{AS} = 5\text{ A}$, $V_{DD} = 50\text{ V}$, $R_G = 25\text{ }\Omega$, Starting $T_J = 25^\circ\text{C}$
3. $I_{SD} \leq 5\text{ A}$, $di/dt \leq 200\text{ A}/\mu\text{s}$, $V_{DD} \leq BV_{DSS}$, Starting $T_J = 25^\circ\text{C}$
4. Pulse Test : Pulse width $\leq 300\mu\text{s}$, Duty cycle $\leq 2\%$
5. Essentially independent of operating temperature



Typical Characteristics

Table 7 Reverse diode characteristics

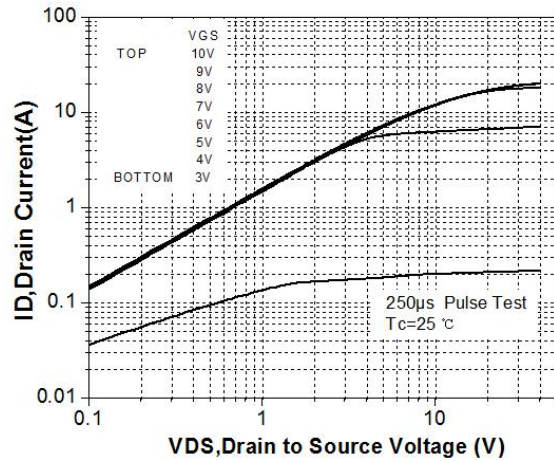


Figure 1. On-Region Characteristics

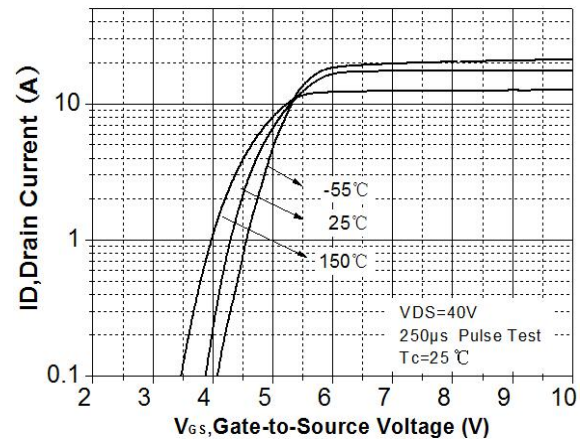


Figure 2. Transfer Characteristics

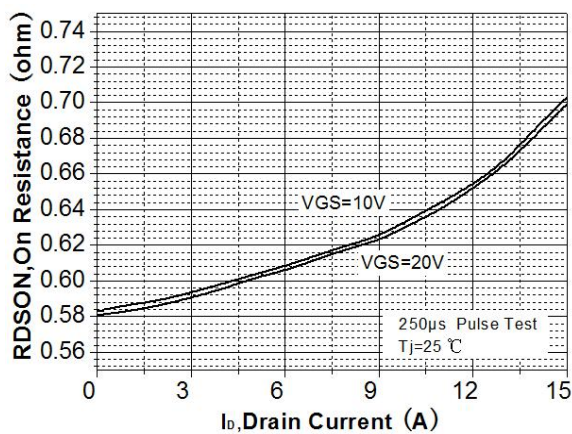


Figure 3. On-Resistance Variation vs. Drain Current and Gate Voltage

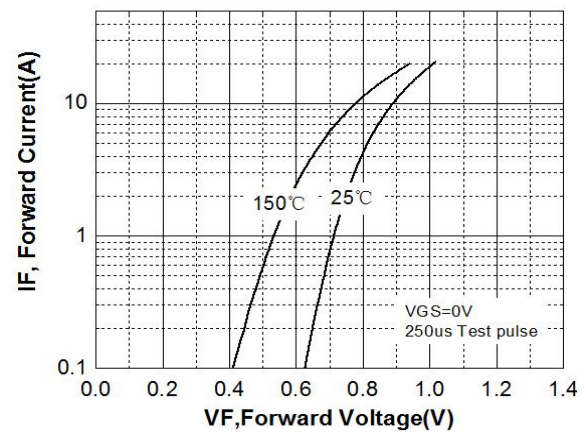


Figure 4. Body Diode Forward Voltage Variation with Source Current and Temperature

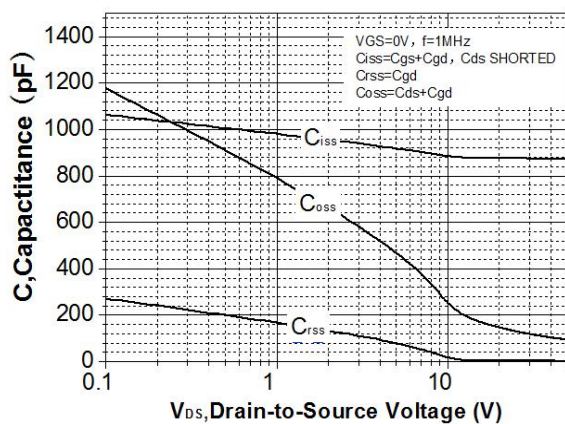


Figure 5. Capacitance Characteristics

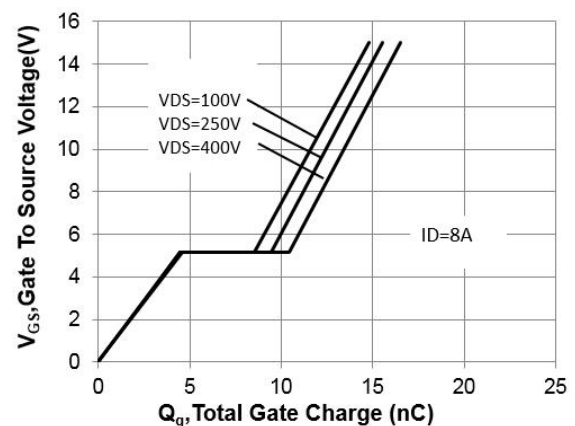


Figure 6. Gate Charge Characteristics

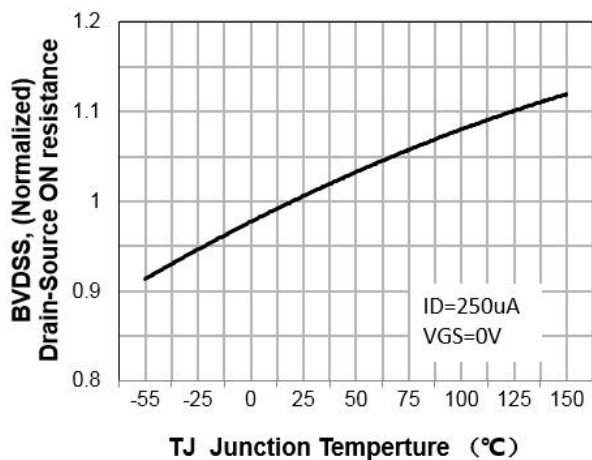


Figure 7. Breakdown Voltage Variation vs Temperature

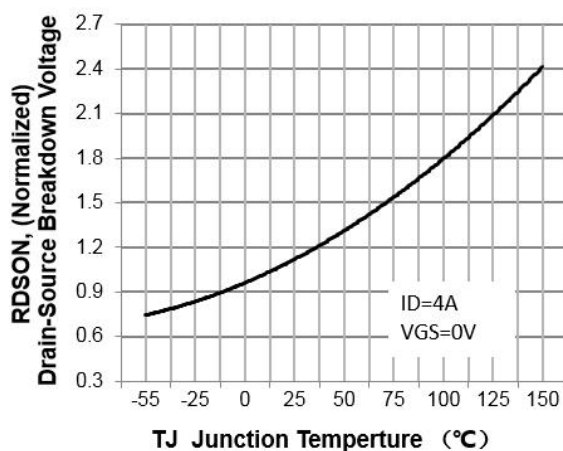


Figure 8. On-Resistance Variation vs Temperature

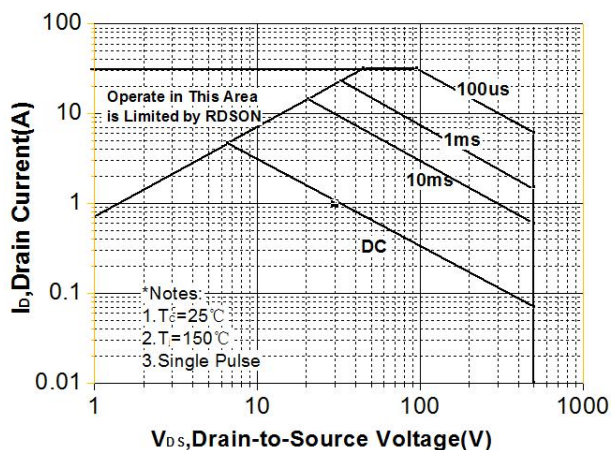


Figure 9. Maximum Safe Operating Area

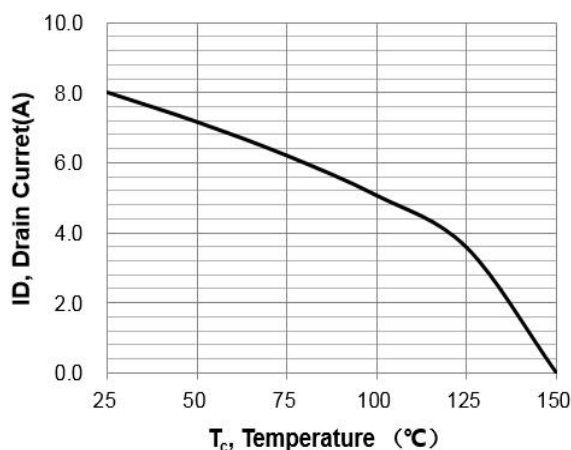
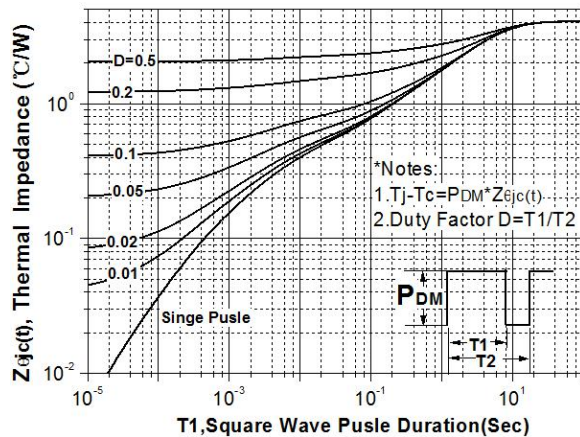


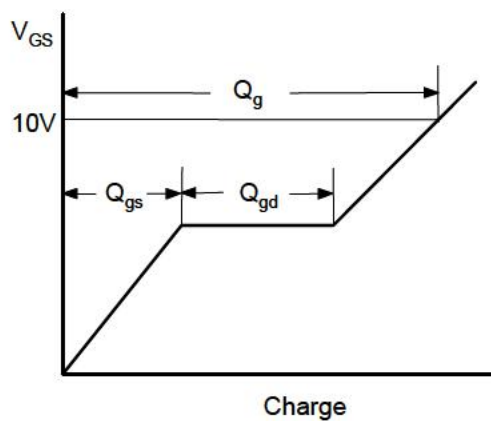
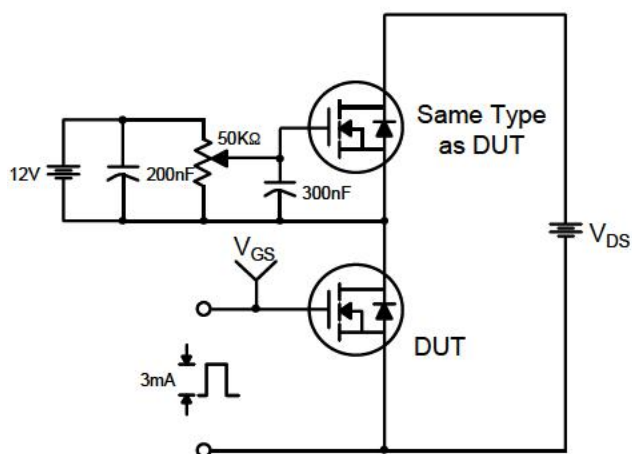
Figure 10. Maximum Drain Current vs Case Temperature



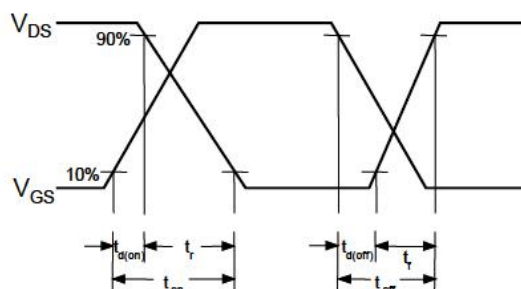
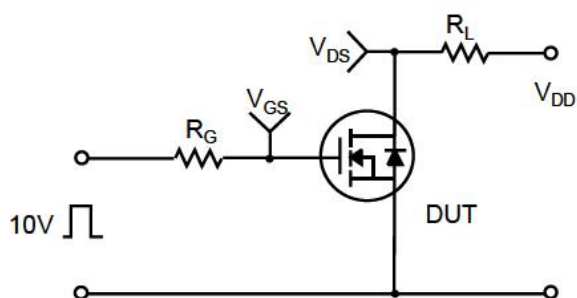
11. Transient Thermal Response Curve



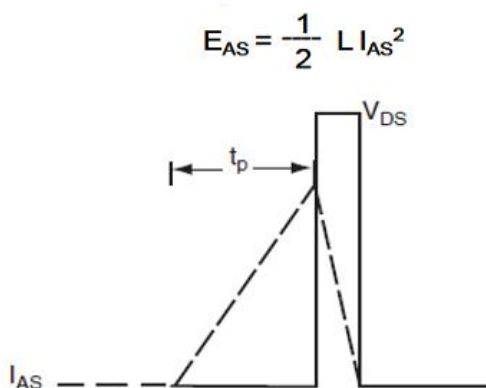
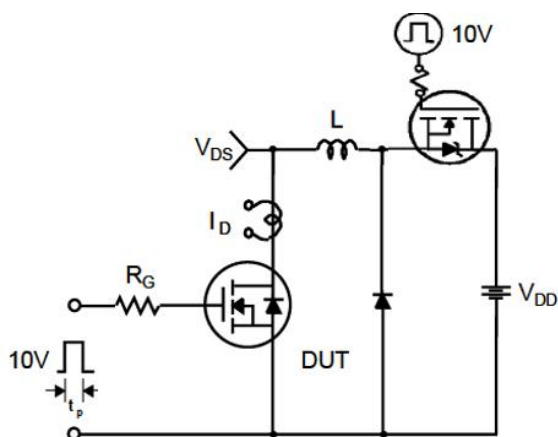
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms

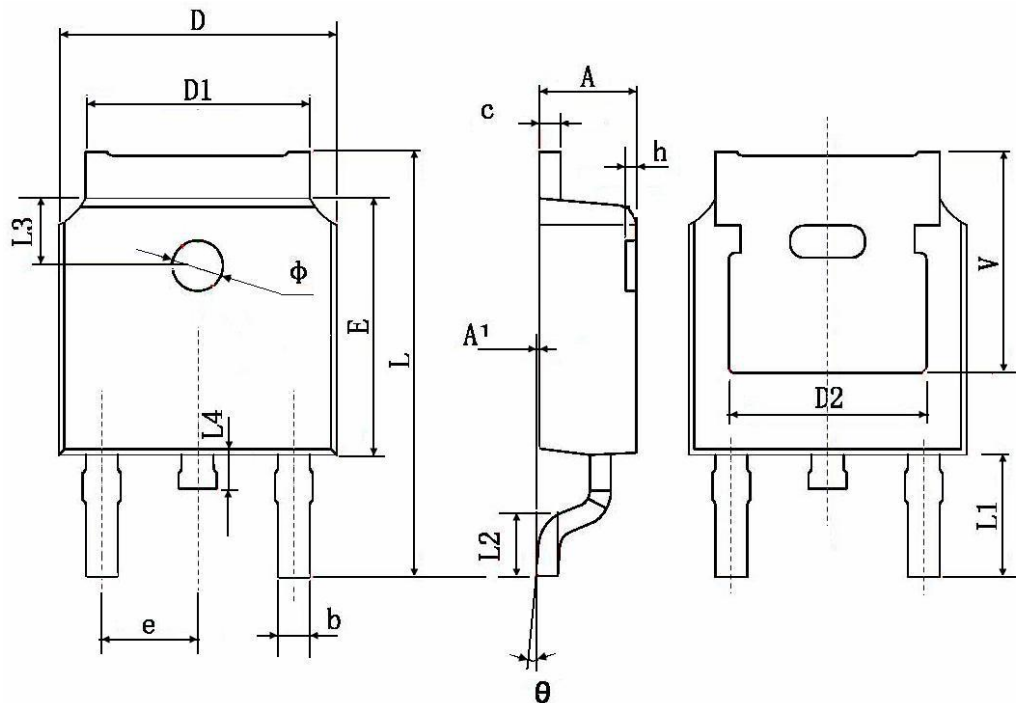


Unclamped Inductive Switching Test Circuit & Waveforms





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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