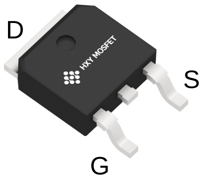
HUAXUANYANG HXY
ELECTRONICS CO.,LTD

SPD04N50C3

Silicon N-Channel Power MOSFET

Description

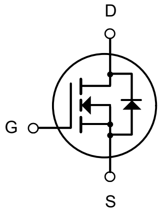
The SPD04N50C3 can be used in various power swithching circuit for system miniaturization and higher efficiency.The package form is TO-252-2L, which accords with the RoHS standard.



TO-252-2L

General Features

V_{DS} = 500V,I_D = 4A
$R_{DS(ON)}$ < 3Ω@ V_{GS}=10V



N-Channel MOSFET

Application

- Power switch circuit of adaptor and charger.

Package Marking and Ordering Information

Product ID	**Pack**	**Marking**	**Qty(PCS)**
SPD04N50C3	TO-252-2L	5N50 XXX YYYY	2500

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

Symbol	Parameter	Rating	Units
VDS	Drain-Source Voltage	500	V
VGS	Gate-Source Voltage	$\pm$30	V
I_D@T_C=25℃	Drain Current, V_{GS} @ 10V	4	A
I_D@T_C=100℃	Drain Current, V_{GS} @ 10V	2	A
IDM	Pulsed Drain Current[1]	15	A
P_D@T_C=25℃	Total Power Dissipation	32.9	W
E_{AS}	Single Pulse Avalanche Energy[4]	67	mJ
TSTG	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃

Electrical Characteristics (T_J=25°C, unless otherwise noted)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
V(BR)DSS	Drain-Source Breakdown Voltage	V_{GS} = 0V, I_D = 250μA	500	550	--	V
IDSS	Zero Gate Voltage Drain Current	V_{DS}= 650V, V_{GS}= 0V, T_J=25ºC	--	--	1	μA
IGSS	Gate-Source Leakage	V_{GS} = ±30V	--	--	±100	nA
VGS(th)	Gate-Source Threshold Voltage	V_{DS} = V_{GS}, I_D = 250μA	2.0	3.0	4.0	V
RDS(on)	Drain-Source On-Resistance (Note3)	V_{GS} = 10V, I_D = 3.5A	--	2.4	3.0	Ω
C_{iss}	Input Capacitance	V_{GS} = 0V, V_{DS} = 25V, f = 1.0MHz	--	310	--	pF
C_{oss}	Output Capacitance		--	39	--	
C_{rss}	Reverse Transfer Capacitance		--	6	--	
Q_g	Total Gate Charge	V_{DD}=400V, I_D = 3A, V_{GS} = 10V	--	8	--	nC
Q_{gs}	Gate-Source Charge		--	1.2	--	
Q_{gd}	Gate-Drain Charge		--	5	--	
td(on)	Turn-on Delay Time	V_{DD}=250V, I_D = 3A, R_G = 25Ω	--	7.8	--	ns
t_r	Turn-on Rise Time		--	33	--	
td(off)	Turn-off Delay Time		--	23	--	
t_f	Turn-off Fall Time		--	59	--	
IS	Continuous Body Diode Current	T_C = 25 ºC	--	--	4	A
ISM	Pulsed Diode Forward Current		--	--	12	A
V_{SD}	Body Diode Voltage	T_J = 25ºC, I_{SD} = 3A, V_{GS} = 0V	--	--	1.4	V
trr	Reverse Recovery Time	V_{GS} = 0V,I_S = 3A, di_F/dt =100A / μs	--	80	--	ns
Q_{rr}	Reverse Recovery Charge		--	1.8	--	μC

Note :

1、The data tested by surface mounted on a 1 inch2 FR-4 board with 2OZ copper.

2、The EAS data shows Max. rating . IAS = 2.4A, V_{DD} = 50V, R_G = 25 Ω, Starting T_J = 25 ºC

3、The test condition is Pulse Test: Pulse width ≤ 300μs, Duty Cycle ≤ 1%

4、The power dissipation is limited by 150℃ junction temperature

5、The data is theoretically the same as ID and IDM , in real applications , should be limited by total power dissipation.

Typical Characteristics

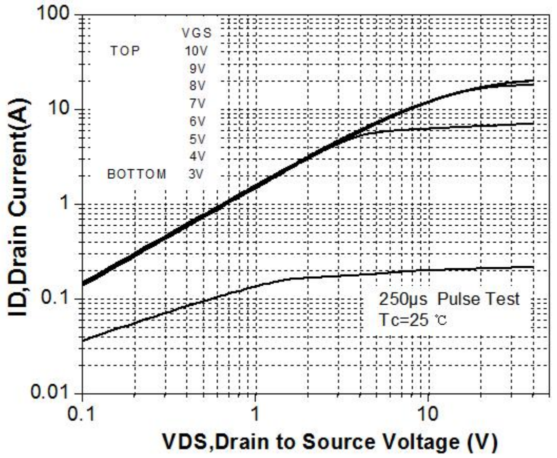


Figure 1. On-Region Characteristics

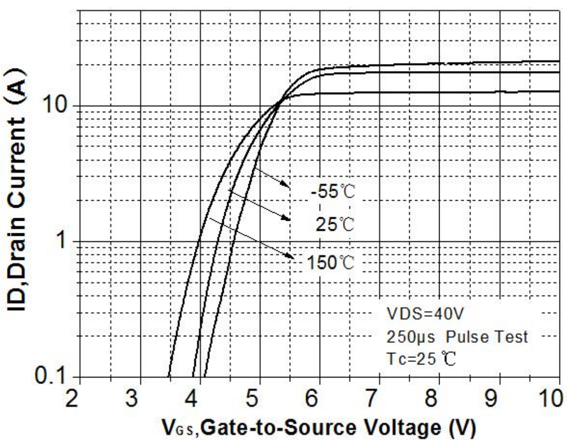


Figure 2. Transfer Characteristics

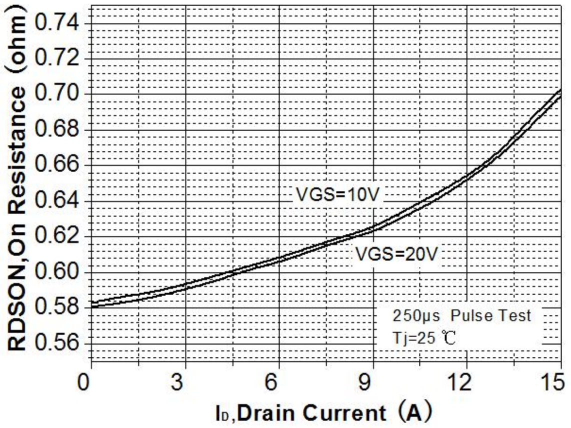


Figure 3. On-Resistance Variation vs Drain Current and Gate Voltage

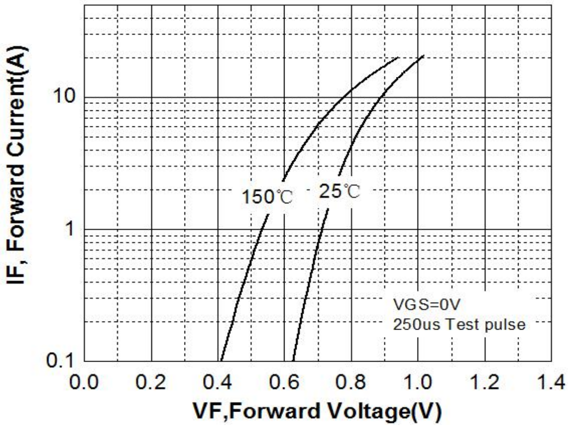


Figure 4. Body Diode Forward Voltage Variation with Source Current and Temperature

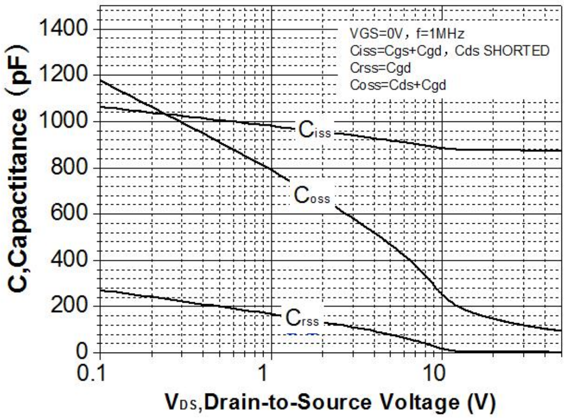


Figure 5. Capacitance Characteristics

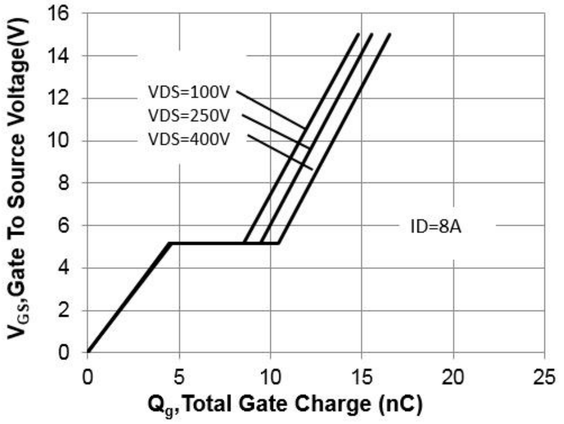


Figure 6. Gate Charge Characteristics

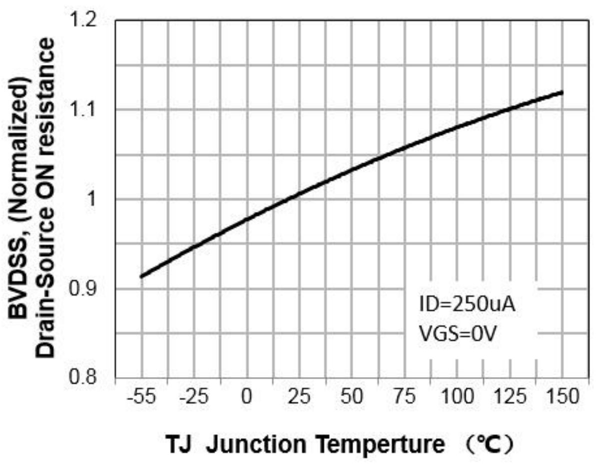


Figure 7. Breakdown Voltage Variation vs Temperature

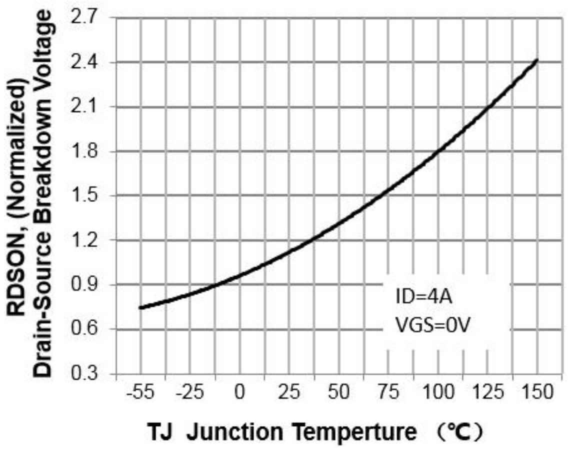


Figure 8. On-Resistance Variation vs Temperature

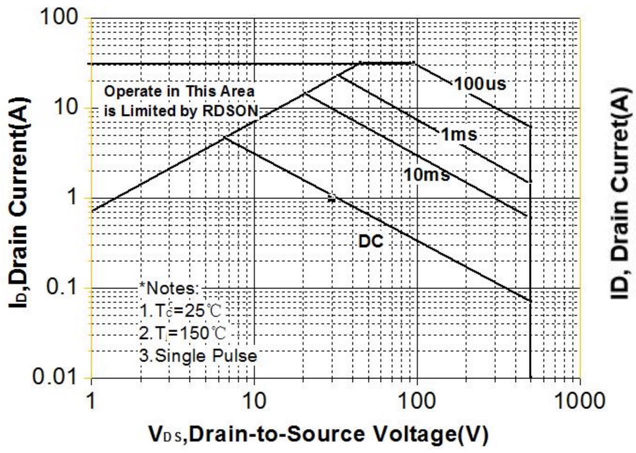


Figure 9. Maximum Safe Operating Area

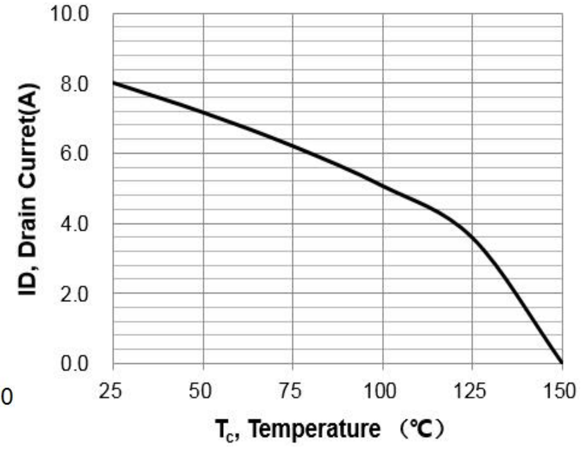


Figure 10. Maximum Drain Current vs Case Temperature

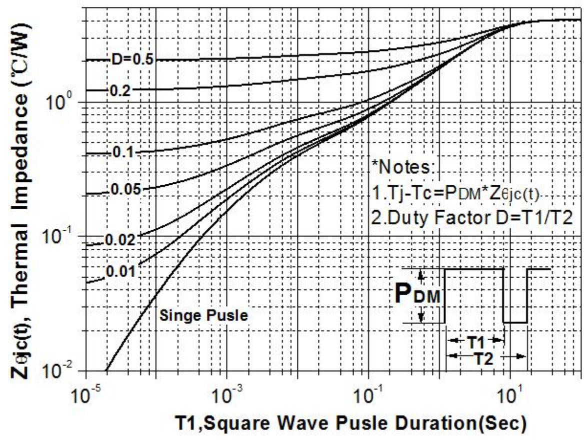
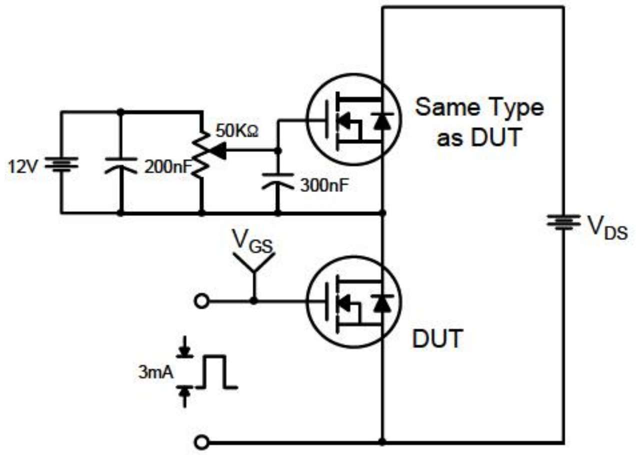
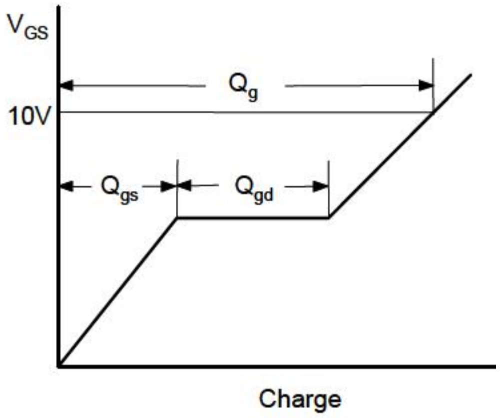


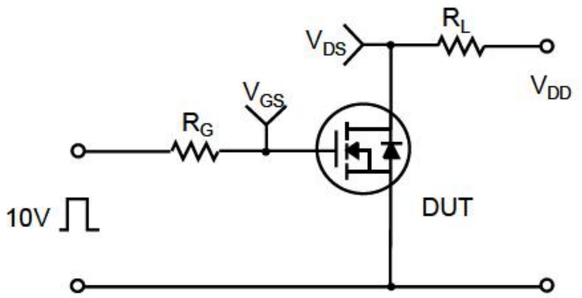
Figure 11. Transient Thermal Response Curve

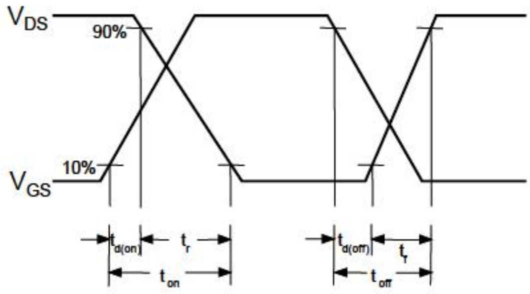
Gate Charge Test Circuit & Waveform



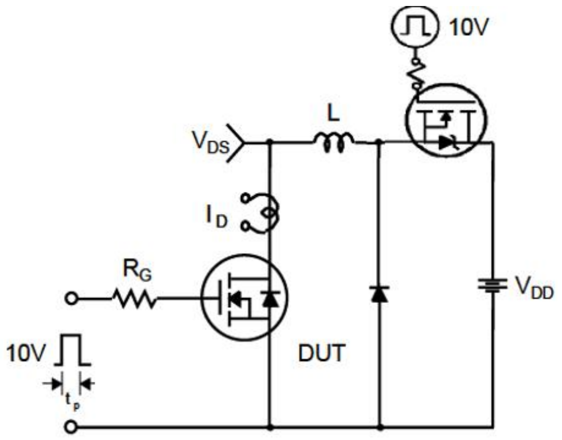


Resistive Switching Test Circuit & Waveforms

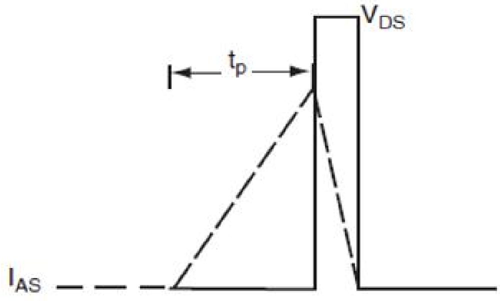




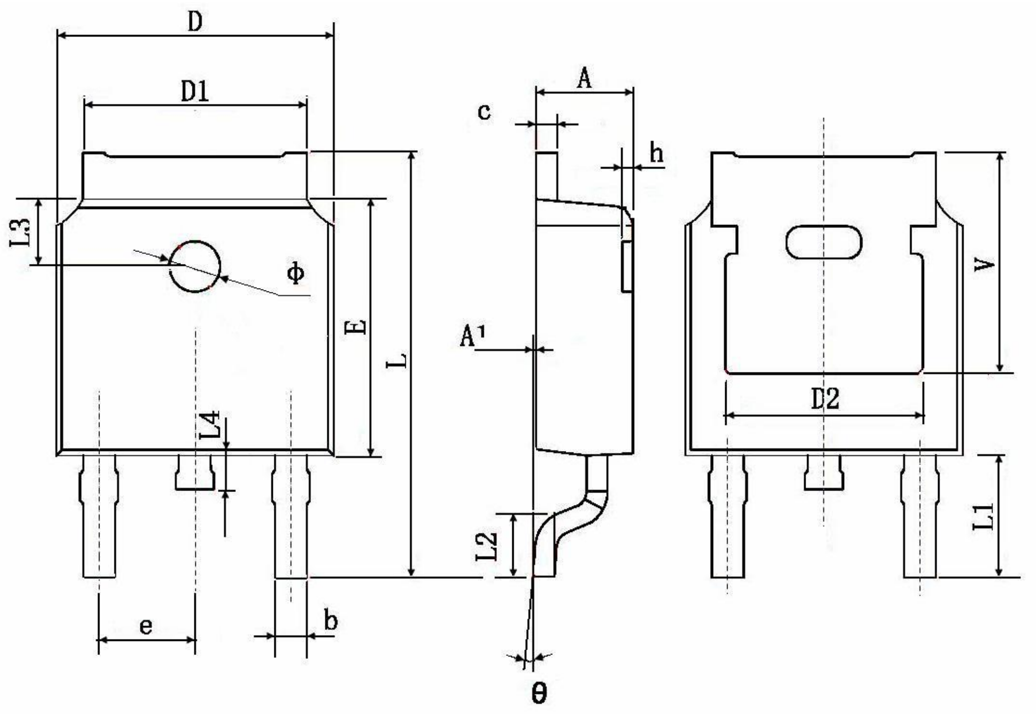
Unclamped Inductive Switching Test Circuit & Waveforms



$$E_{AS} = \frac{1}{2} L I_{AS}^2$$



TO-252-2L 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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