鑫沃科技
XIN WO TECHNOLOGY

产品规格手册

PRODUCT SPECIFICATION MANUAL

FQD3P50

P−Channel enhancement mode power MOSFET

TO-252/- 500 V, - 3 A, 3.5 Ω

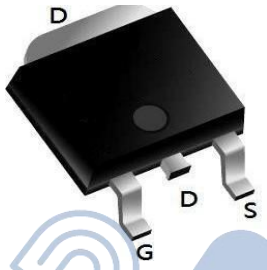
深圳东为电子科技有限公司
DONGWEI ELECTRONIC TECHNOLOGY CO.,LTD

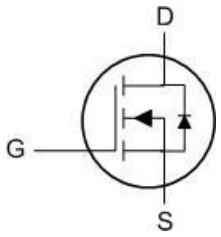
Description

This P−Channel enhancement mode power MOSFET is Produced using advanced MOSFET technology has been Especially tailored to reduce on−state resistance, and to provide superior switching performance and high avalanche energy strength.

Product Summary

BVDSS	RDSON	ID
-500V	3.5Ω	-3A





Applications

- switched mode power supplies
- active powerfactor correction (PFC)
- electronic lamp ballasts

Package Marking and Ordering Information

Product	Package	Marking	Packing	Min Unit Quantity
FQD3P50	TO-252	FDQ3P50/207	2500PCS/Reel	2500PCS

Absolute Maximum

Symbol	Parameter		FQD3P50	Unit
V_{DSS}	Drain-Source Voltage		-500	V
I_D	Drain Current - Continuous (T_C = 25°C)		-3	A
	- Continuous (T_C = 100°C)		-1.33	A
I_{DM}	Drain Current - Pulsed	(Note 1)	-8.4	A
V_{GSS}	Gate-Source Voltage		30	V
E_{AS}	Single Pulsed Avalanche Energy	(Note 2)	250	mJ
I_{AR}	Avalanche Current	(Note 1)	-3	A
E_{AR}	Repetitive Avalanche Energy	(Note 1)	5.0	mJ
dv/dt	Peak Diode Recovery dv/dt	(Note 3)	-4.5	V/ns
P_D	Power Dissipation (T_A = 25°C) *		2.5	W
	Power Dissipation (T_C = 25°C)		50	W
	- Derate above 25°C		0.4	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	FQD3P50	Unit
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case, Max.	2.5	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient, Max. *	50	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient, Max.	110	°C/W

* When mounted on the minimum pad size recommended (PCB Mount)

Elerical Characteristics

T_C = 25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
Off Characteristics						
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, Referenced to 25°C	--	0.42	--	V/°C
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = -500 V, V_{GS} = 0 V	--	--	-1	μA
		V_{DS} = -400 V, T_C = 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 μA	-3.0	--	-5.0	V
$R_{DS(on)}$	Static Drain-Source On-Resistance	V_{GS} = -10 V, I_D = -1.5 A	--	2.9	3.5	Ω
g_{FS}	Forward Transconductance	V_{DS} = -50 V, I_D = -1.5 A	--	2.1	--	S
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS} = -25 V, V_{GS} = 0 V, f = 1.0 MHz	--	510	660	pF
C_{oss}	Output Capacitance		--	70	90	pF
C_{rss}	Reverse Transfer Capacitance		--	9.5	12	pF
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	V_{DD} = -250 V, I_D = -2.7 A, R_G = 25 Ω (Note 4)	--	12	35	ns
t_r	Turn-On Rise Time		--	56	120	ns
$t_{d(off)}$	Turn-Off Delay Time		--	35	80	ns
t_f	Turn-Off Fall Time		--	45	100	ns
Q_g	Total Gate Charge	V_{DS} = -400 V, I_D = -2.7 A, V_{GS} = -10 V (Note 4)	--	18	23	nC
Q_{gs}	Gate-Source Charge		--	3.6	--	nC
Q_{gd}	Gate-Drain Charge		--	9.2	--	nC
Drain-Source Diode Characteristics and Maximum Ratings						
I_S	Maximum Continuous Drain-Source Diode Forward Current		--	--	-3	A
I_{SM}	Maximum Pulsed Drain-Source Diode Forward Current		--	--	-8.4	A
V_{SD}	Drain-Source Diode Forward Voltage	V_{GS} = 0 V, I_S = -2.1 A	--	--	-5.0	V
t_{rr}	Reverse Recovery Time	V_{GS} = 0 V, I_S = -2.7 A, dI_F / dt = 100 A/μs	--	270	--	ns
Q_{rr}	Reverse Recovery Charge		--	1.5	--	μC

Notes:
1. Repetitive Rating : Pulse width limited by maximum junction temperature
2. L = 102mH, I_{AS} = -2.1A, V_{DD} = -50V, R_G = 25 Ω, Starting T_J = 25°C
3. I_{SD} ≤ -2.7A, di/dt ≤ 200A/μs, V_{DD} ≤ BV_{DSS}, Starting T_J = 25°C
4. Essentially independent of operating temperature

Typical Characteristics

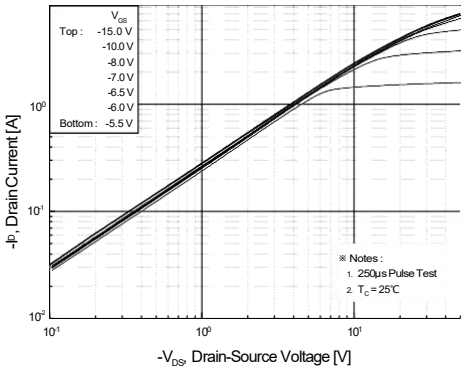


Figure 1. On-Region Characteristics

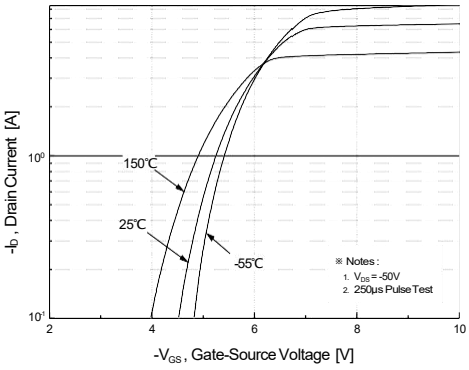


Figure 2. Transfer Characteristics

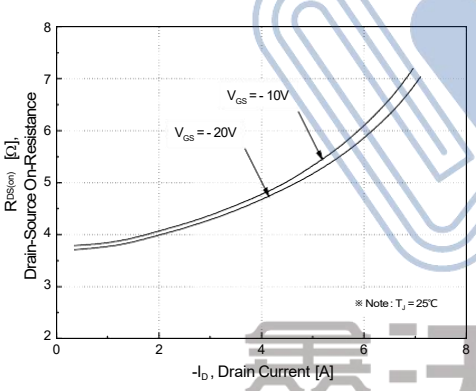


Figure 3. On-Resistance Variation vs. Drain Current and Gate Voltage

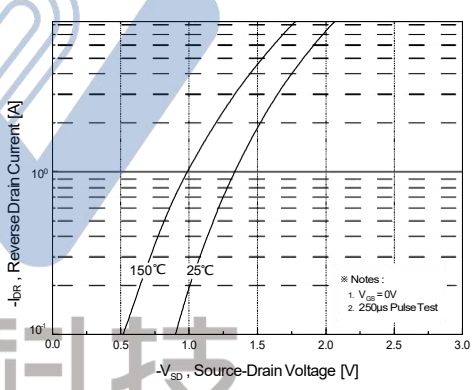


Figure 4. Body Diode Forward Voltage Variation vs. Source Current and Temperature

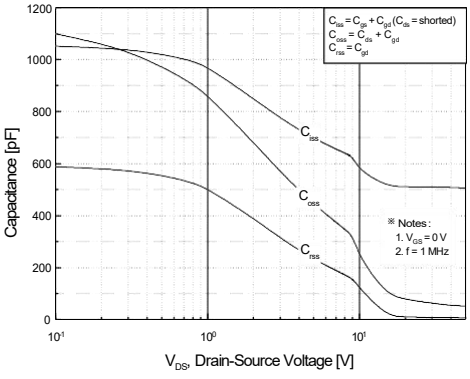


Figure 5. Capacitance Characteristics

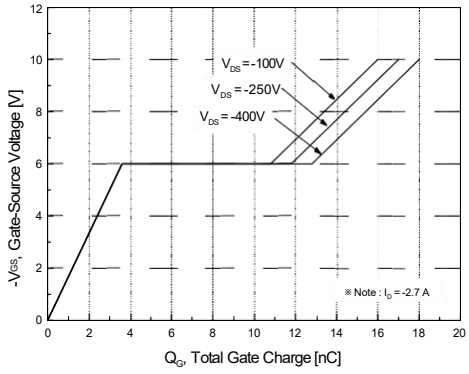


Figure 6. Gate Charge Characteristics

Typical Characteristics (Continued)

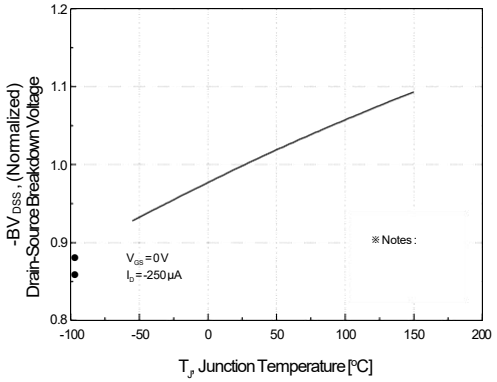


Figure 7. Breakdown Voltage Variation vs. Temperature

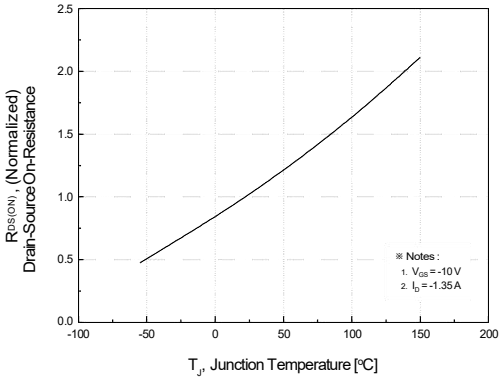


Figure 8. On-Resistance Variation vs. Temperature

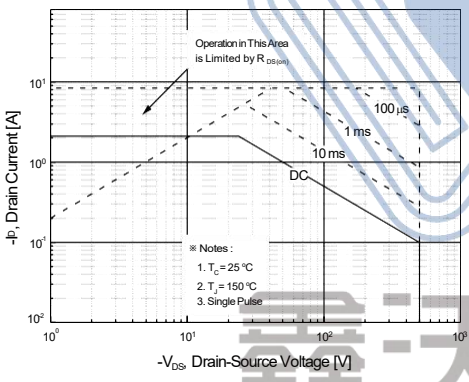


Figure 9. Maximum Safe Operating Area

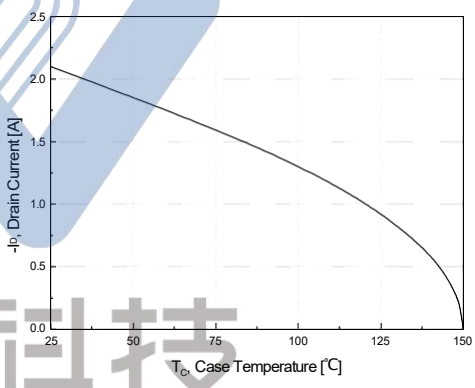


Figure 10. Maximum Drain Current vs. Case Temperature

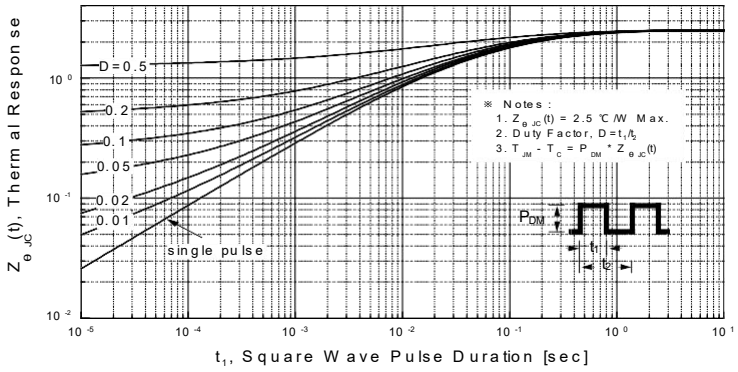
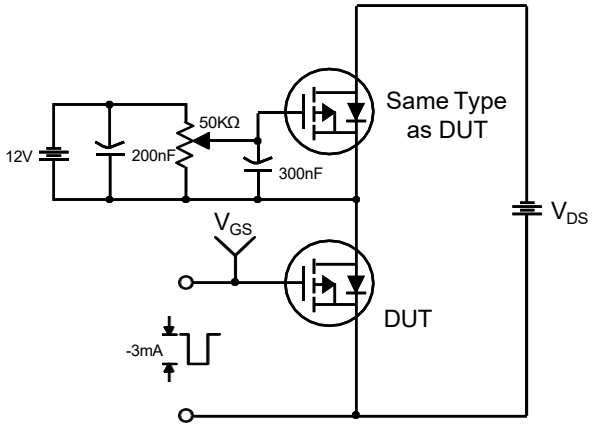
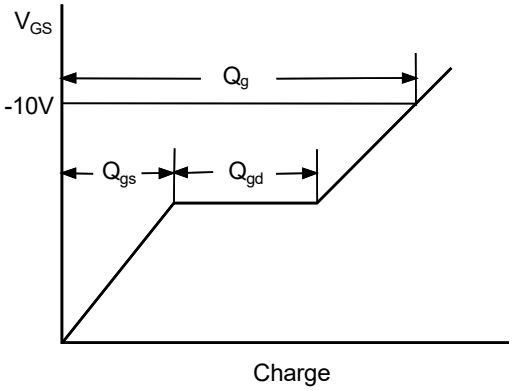


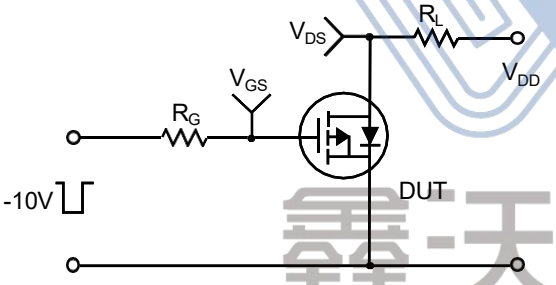
Figure 11. Transient Thermal Response Curve

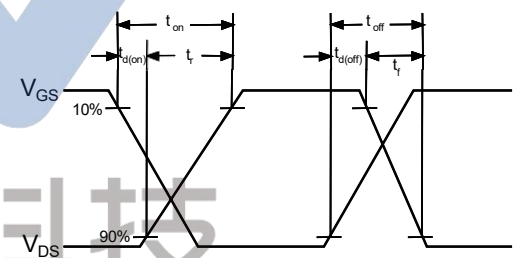
Gate Charge Test Circuit & Waveform



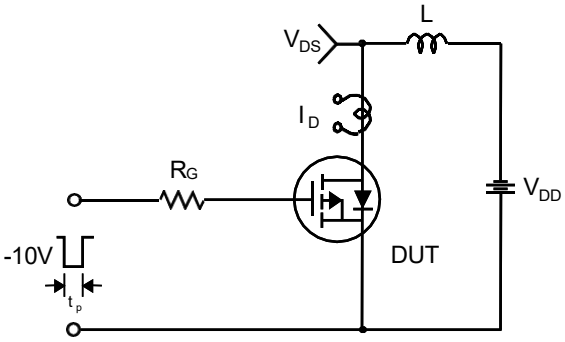


Resistive Switching Test Circuit & Waveforms

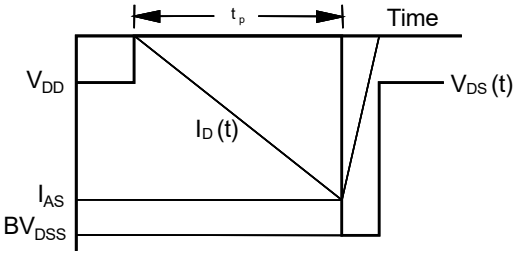




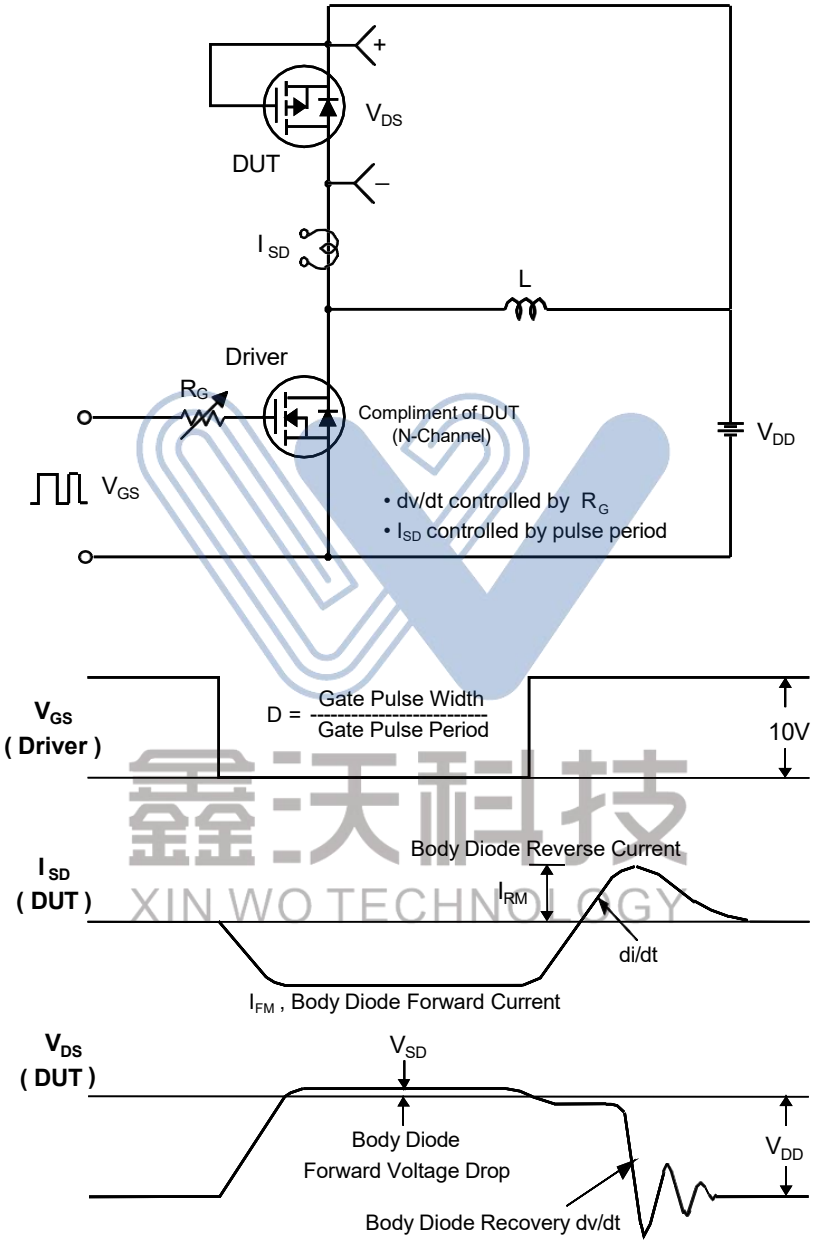
Unclamped Inductive Switching Test Circuit & Waveforms



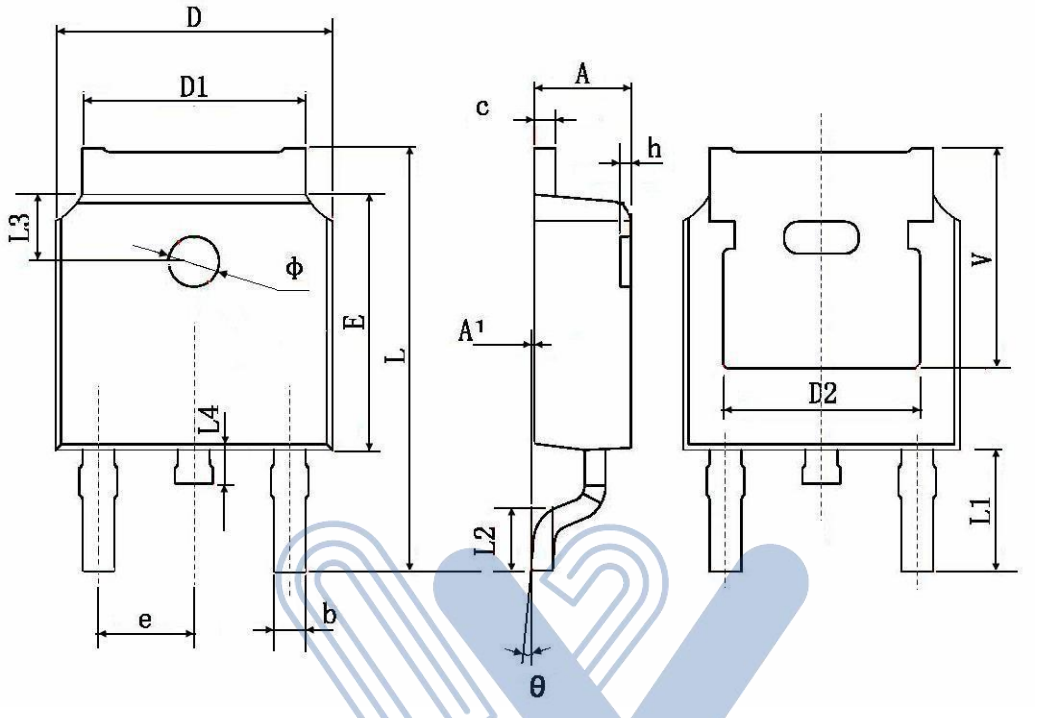
$$E_{AS} = \frac{1}{2} L I_{AS}^2 \frac{BV_{DSS}}{BV_{DSS} - V_{DD}}$$



Peak Diode Recovery dv/dt Test Circuit & Waveforms



TO252 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.	