FDZ501D

N-Channel MOSFET (Depletion Mode)

Pb Lead Free Package and Finish

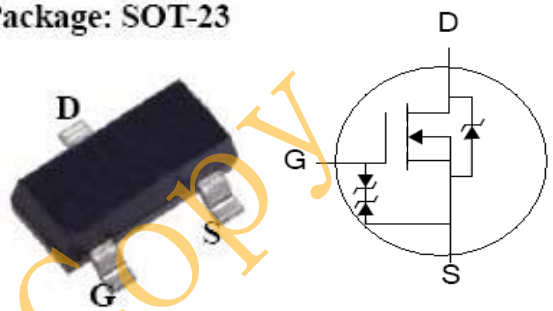
Features:

- RoHS Compliant
- Depletion Mode
- Low Gate Charge
- ESD improved Capability
- Available with Vgs(th) indicator on reel.

Product Summary

V_{DSS}	$R_{DS(on)}$(Max)	I_{DSS}(Min)
600V	700Ω	0.012A

Package: SOT-23



Ordering Information

Part Number	Package Type	Marking	Tape and Reel Information
FDZ501D	SOT-23	F501D	3000 pcs / reel

Absolute Maximum Ratings Tc= 25℃ unless otherwise specified

Symbol	Parameter	Maximum	Units
V_{DSS}	Drain-to-Source Voltage (NOTE *1)	600	V
I_D	Continuous Drain Current	0.030	A
I_D@ 70 ℃	Continuous Drain Current	0.024	
I_{DM}	Pulsed Drain Current, V_{GS}@ 10V (NOTE *2)	0.120	
P_D	Power Dissipation	0.50	W
V_{GS}	Gate-to-Source Voltage	±20	V
dv/dt	Peak Diode Recovery dv/dt (NOTE *3)	5	V/ns
$V_{ESD(G-S)}$	Gate source ESD (HBM-C= 100pF, R=1.5kΩ)	300	V
T_L T_{PKG}	Maximum Temperature for Soldering Leads at 0.063in(1.6mm) from Case for 10 seconds Package Body for 10 seconds	300 260	℃
T_J and T_{STG}	Operation Junction and Storage Temperature Range	150, -55 to 150	℃

Caution: *Stresses greater than those listed in "Absolute Maximum Ratings" Table may cause permanent damage to the device.*

Thermal Resistance

Symbol	Parameter	Maximum	Units	Test Condition
$R_{\theta JA}$	Junction-to-Ambient	250	℃/W	1 cubic foot chamber, free air.

Electrical Characteristics TJ= 25℃ unless otherwise specified:

OFF Characteristics						
Symbol	Parameter	Rating			Units	Test Conditions
		Min.	Typ.	Max.		
V_{DSS}	Drain-to-Source Breakdown Voltage	600	--	--	V	V_{GS}=-5V, I_D=250μA
$\Delta BV_{DSS}/\Delta T_J$	Bvdss Temperature Coefficient	--	0.69	--	V/℃	Reference to 25℃, ID=250uA
$I_{DS(off)}$	Off-State Drain-to-Source Current	--	--	0.1	uA	V_{DS} = 600V, V_{GS}= -5V, T_a = 25℃
		--	--	10		V_{DS} =480V, V_{GS}= -5 V, T_a = 125℃
$I_{GSS(F)}$	Gate-to-Source Forward Leakage	--	--	+10	uA	V_{GS} =+20V
$I_{GSS(R)}$	Gate-to-Source Reverse Leakage	--	--	-10		V_{GS} =-20V

ON Characteristics						
Symbol	Parameter	Rating			Units	Test Conditions
		Min.	Typ.	Max.		
$R_{DS(ON)}$	Drain-to-Source On-Resistance	--	350	700	Ω	V_{GS}=0V,I_D=3mA (NOTE*4)
		--	400	800	Ω	V_{GS}=10V,I_D=16mA (NOTE*4)
$I_{DS(on)}$	On-State Drain Current	12	--	--	mA	V_{GS}=0V, V_{DS}=25V
g_{fs}	Forward Transconductance	0.008	0.017	--	S	$\|V_{DS}\|$>2I_D*$R_{DS(on)max}$ I_D =0.01A (NOTE*4)
$V_{GS(TH)}$	Gate Threshold Voltage	-2.7	-1.8	-1.0	V	V_{DS} = 3V, I_D = 8.0μA

Dynamic Characteristics						
Symbol	Parameter	Rating			Units	Test Conditions
		Min.	Typ.	Max.		
C_{iss}	Input Capacitance	--	50.0	--	pF	V_{GS} = -5V V_{DS} = 25V f = 1.0MHz
C_{oss}	Output Capacitance	--	4.53	--		
C_{rss}	Reverse Transfer Capacitance	--	1.08	--		
Q_g	Total Gate Charge	--	1.14	--	nC	V_{DD} =400V I_D =0.01A V_{GS} = -5 to 5V
Q_{gs}	Gate-to-Source Charge	--	0.50	--		
Q_{gd}	Gate-to-Drain (“Miller”)Charge	--	0.37	--		

Resistive Switching Characteristics						
Symbol	Parameter	Rating			Units	Test Conditions
		Min.	Typ.	Max.		
$t_{d(ON)}$	Turn-on Delay Time	--	9.90	--	ns	V_{DD} = 300V I_D =0.01A V_{GS} = -5 to 7V R_G = 6.0Ω
trise	Rise Time	--	55.8	--		
$t_{d(OFF)}$	Turn-Off Delay Time	--	56.4	--		
t_{fall}	Fall Time	--	136	--		

Source-Drain Diode Characteristics						
Symbol	Parameter	Rating			Units	Test Conditions
		Min.	Typ.	Max.		
I_S	Continuous Source Current (Body Diode)	--	--	0.025	A	Integral pn-diode in MOSFET
I_{SM}	Maximum Pulsed Current (Body Diode)	--	--	0.100	A	
V_{SD}	Diode Forward Voltage	--	--	1.20	V	I_S=16.0mA,V_{GS}=-5V
trr	Reverse Recovery Time	--	243	--	ns	V_{GS}=-10V V_R=30V I_F=0.01A, T_j = 25°C di/dt=100A/us
Qrr	Reverse Recovery Charge	--	636	--	nC	

Gate-source Zener diode						
Symbol	Parameter	Rating			Units	Test Conditions
		Min.	Typ.	Max.		
V_{GSO}	Gate-source breakdown voltage	20	--	--	V	IGS= ±1mA (Open Drain)
The built-in back-to-back Zener diodes have specifically been designed to enhance not only the device's ESD capability, but also to make them safely absorb possible voltage transients that may occasionally be applied from gate to source. In this respect the Zener voltage is appropriate to achieve an efficient and cost-effective intervention to protect the device's integrity. These integrated Zener diodes thus avoid the usage of external components.						

Notes:

***1.** T_J=+25℃ to +150℃.

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

***3.** I_{SD}=0.01A di/dt≤100A/us, V_{DD}≤BV_{DSS}, T_J=+150℃.

***4.** Pulse width≤380us; duty cycle≤2%.

Characteristics Curve:

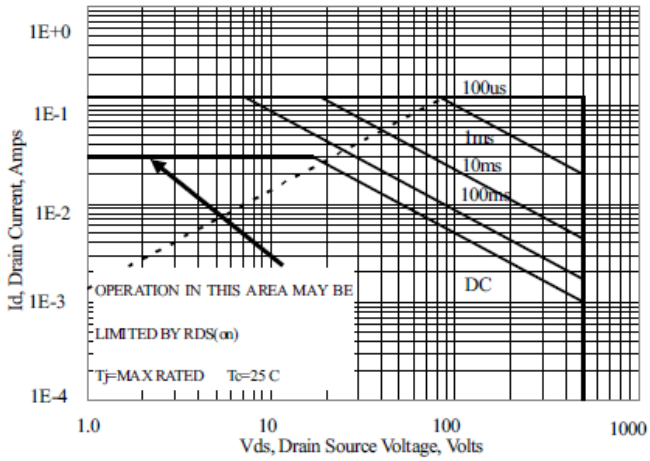


Figure 1 Maximum Forward Bias Safe Operating Area

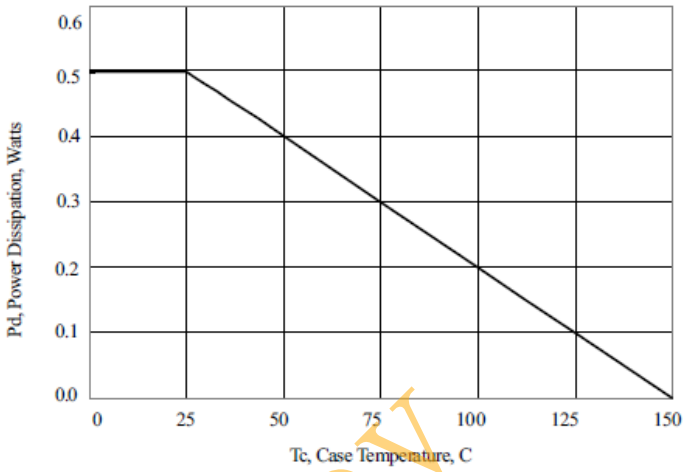


Figure 2 Maximum Power Dissipation vs Case Temperature

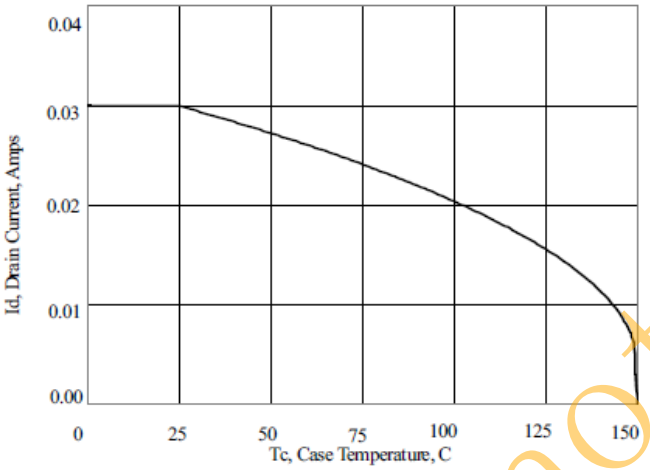


Figure 3 Maximum Continuous Drain Current vs Case Temperature

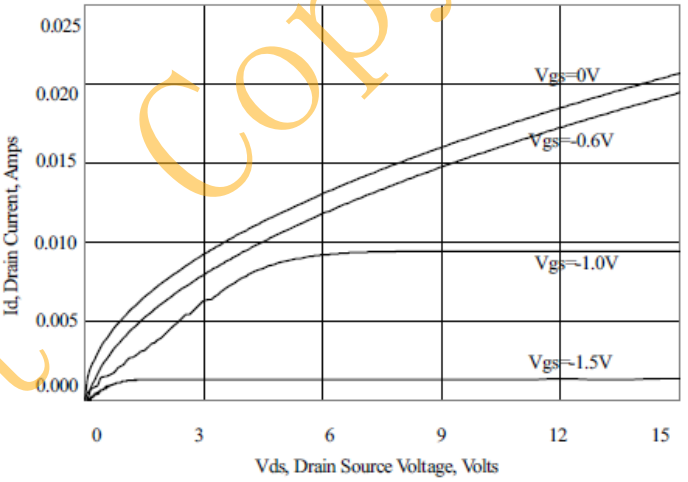


Figure 4 Typical Output Characteristics

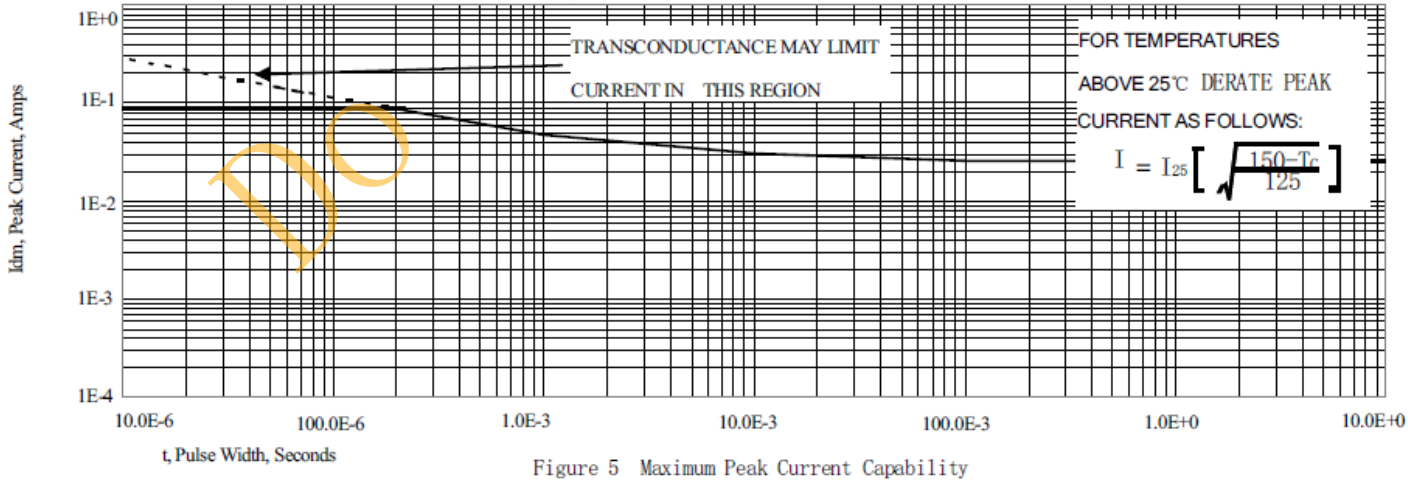


Figure 5 Maximum Peak Current Capability

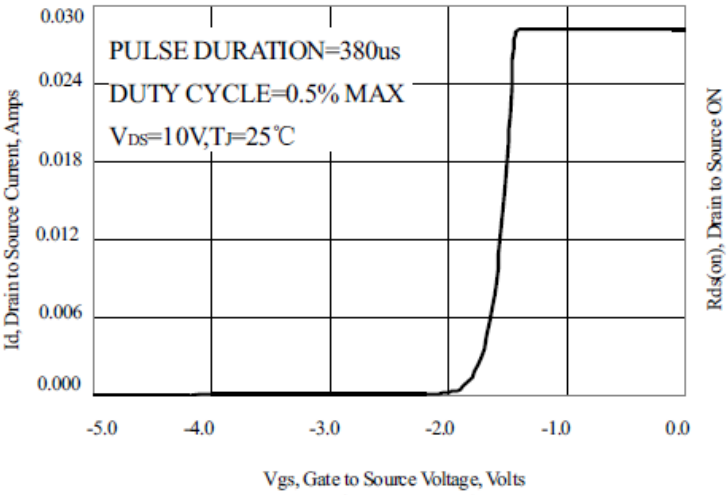


Figure 6 Typical Transfer Characteristics

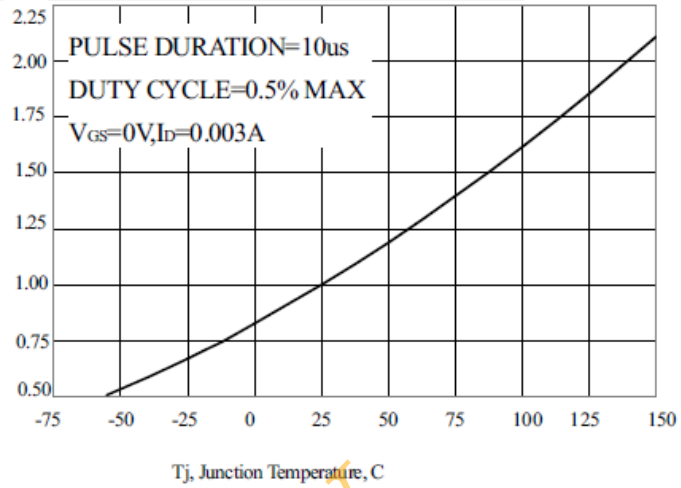


Figure 7 Typical Drain to Source ON Resistance vs Junction Temperature

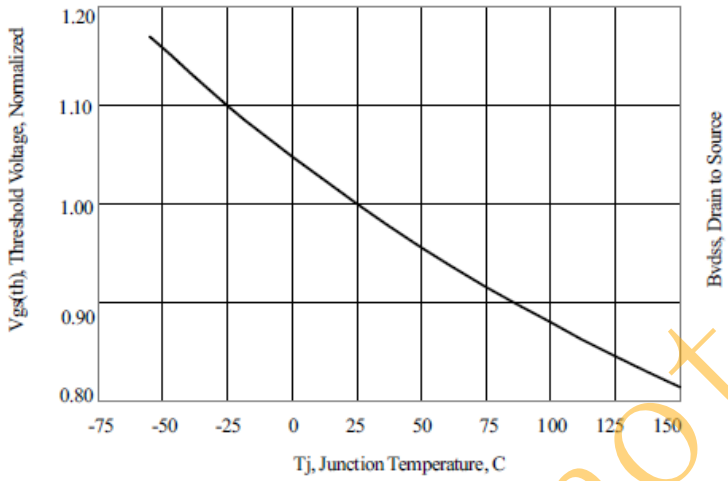


Figure 8 Typical Threshold Voltage vs Junction Temperature

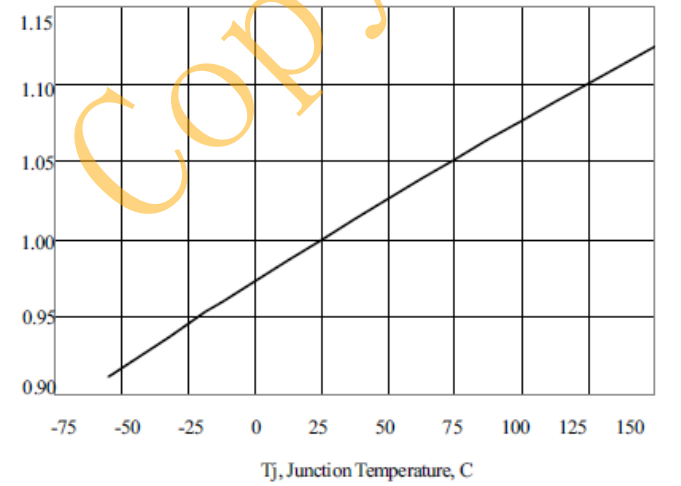


Figure 9 Typical Breakdown Voltage vs Junction Temperature

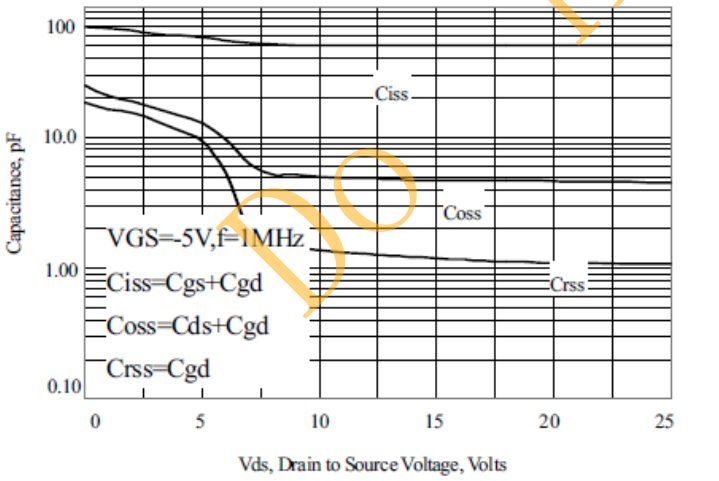


Figure 10 Typical Capacitance vs Drain to Source Voltage

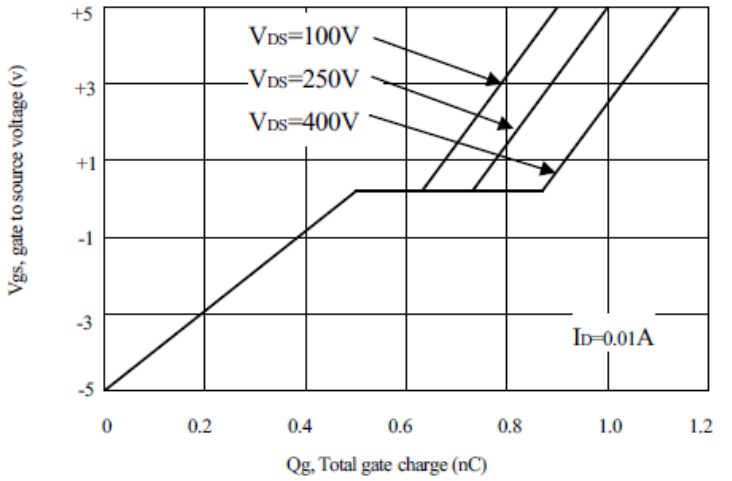


Figure 11 Typical Gate Charge vs Gate to Source Voltage

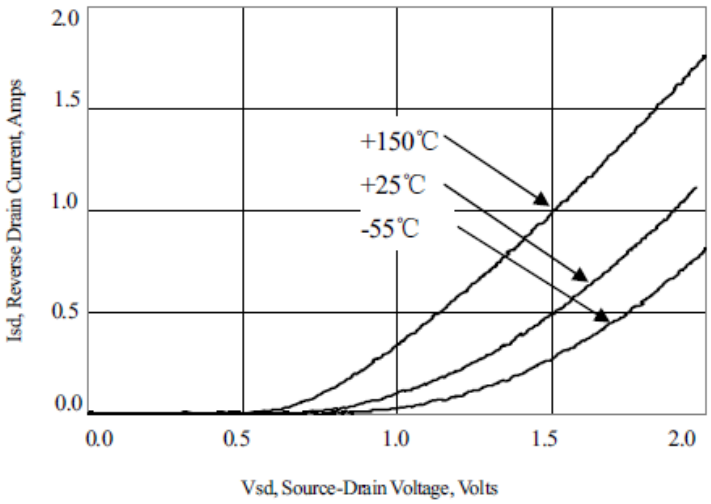


Figure 12 Typical Body Diode Transfer Characteristics

SOT-23 Package

Part's Name	Hazardous Substance					
	Pb	Hg	Cd	Cr(VI)	PBB	PBDE
Limit	≤0.1%	≤0.1%	≤0.01%	≤0.1%	≤0.1%	≤0.1%
Lead Frame	○	○	○	○	○	○
Molding Compound	○	○	○	○	○	○
Chip	○	○	○	○	○	○
Wire Bonding	○	○	○	○	○	○
Solder	×	○	○	○	○	○
Note	○: Means the hazardous material is under the criterion of SJ/T11363-2006. ×: Means the hazardous material exceeds the criterion of SJ/T11363-2006. The plumbum element of solder exist in products presently, but within the allowed range of Eurogroup's RoHS.					

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