Depletion-Mode Power MOSFET

## General Features

- Depletion Mode (Normally On)
- Proprietary Advanced Planar Technology
- Rugged Polysilicon Gate Cell Structure
- Low $R_{DS(ON)}$ Minimizes Conduction Loss
- Fast Switching Speed
- RoHS Compliant/Lead Free

BV_{DSX}	$R_{DS(ON)}$ (Max.)	$I_{DSS,min}$
550V	60 Ω	200mA

Applications

- Normally-on Switches
- Solid State Relay
- Linear Amplifier
- Converters
- Constant Current Source
- Power Supply Circuit
- Telecom
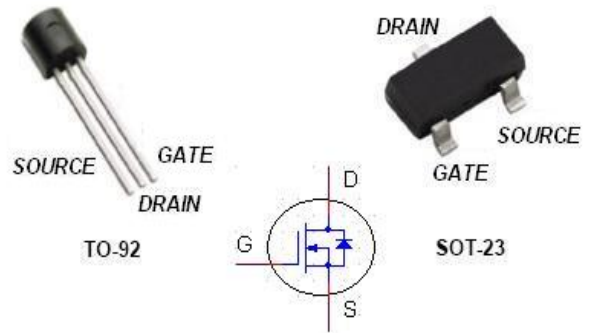
Ordering Information

Part Number	Package	Marking
DMN5501	TO-92	DMN5501
DMZ5501	SOT-23	5501

Absolute Maximum Ratings

T_A=25℃ unless otherwise specified

Symbol	Parameter	DMN5501	DMZ5501	Unit
V_{DSX}	Drain-to-Source Voltage[1]	550		V
V_{DGX}	Drain-to-Gate Voltage[1]	550		V
I_D	Continuous Drain Current	72[1]	59[1]	mA
I_{DM}	Pulsed Drain Current	290	240	mA
P_D	Power Dissipation	0.74	0.50	W
V_{GS}	Gate-to-Source Voltage	±20		V
T_L	Soldering Temperature Distance of 1.6mm from case for 10 seconds	300		℃
T_J and T_{STG}	Operating and Storage Temperature Range	-55 to 150		℃

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

Thermal Characteristics

Symbol	Parameter	DMN5501	DMZ5501	Unit
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	170	250	K/W

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Electrical Characteristics

OFF Characteristics

T_A =25℃ unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
BV_{DSX}	Drain-to-Source Breakdown Voltage	550	--	--	V	V_{GS}=-10V, I_D=100μA
$I_{D(OFF)}$	Drain-to-Source Leakage Current	--	--	10	μA	V_{DS}=550V, V_{GS}= -10V
		--	--	1.0	mA	V_{DS}=440V, V_{GS}= -10V T_J=125℃
I_{GSS}	Gate-to-Source Leakage Current	--	--	100	nA	V_{GS}=+20V, V_{DS}=0V
		--	--	-100		V_{GS}=-20V, V_{DS}=0V

ON Characteristics

T_A =25℃ unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
I_{DSS}	Saturated Drain-to-Source Current	200	--	--	mA	V_{GS}=0V, V_{DS}=25V
$R_{DS(ON)}$	Static Drain-to-Source On-Resistance	--	50	60	Ω	V_{GS}=0V, I_D=10mA [4]
$\triangle R_{DS(ON)}$	Change in $R_{DS(ON)}$ with Temperature	--	--	1.0	%/℃	V_{GS}=0V, I_D=10mA
$V_{GS(OFF)}$	Gate-to-Source Cut-off Voltage	-4.0	--	-2.0	V	V_{DS} =25V, I_D=10μA
$\triangle V_{GS(OFF)}$	Change in $V_{GS(OFF)}$ with Temperature	--	--	-6.0	mV/℃	V_{DS} =25V, I_D=10μA
gfs	Forward Transconductance	100	150	--	mS	V_{DS} =10V, I_D=100mA

Dynamic Characteristics

Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
C_{ISS}	Input Capacitance	--	--	450	pF	V_{GS}=-10V V_{DS}=25V f=1.0MH$_Z$
C_{OSS}	Oput Capacitance	--	--	20		
C_{RSS}	Reverse Transfer Capacitance	--	--	13		
Q_G	Total Gate Charge	--	0.33	0.40	nC	V_{GS}=-5V~5V V_{DS}=275V, I_D=10mA
Q_{GS}	Gate-to-Source Charge	--	1.8	2.0		
Q_{GD}	Gate-to-Drain (Miller) Charge	--	3.0	3.4		

Resistive Switching Characteristics

Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
$t_{d(ON)}$	Turn-on Delay Time	--	--	--	ns	V_{GS} = -10V / 0V V_{DD} = 275V, I_D=10mA R_G = 25Ohm
t_{rise}	Rise Time	--	--	--		
$t_{d(OFF)}$	Turn-off Delay Time	--	--	--		
t_{fall}	Fall Time	--	--	--		

Source-Drain Diode Characteristics

T_A=25℃ unless otherwise specified

Symbol	Parameter	Min	Typ.	Max.	Units	Test Conditions
V_{SD}	Diode Forward Voltage	--	--	1.2	V	I_{SD} =10 mA, V_{GS} = -10 V
t_{rr}	Reverse Recovery Time	--	5.0	6.0	ns	V_R=275V I_F=10mA, dI_F/dt=100A/us
Q_{rr}	Reverse Recovery Charge	--	48	55	nC	

NOTE：

[1] I_D is limited by the maximum junction temperature.

[2] T_J=+25℃ to +150℃

[3] Repetitive rating, pulse width limited by maximum junction temperature.

[4] Pulse width≤380μs; duty cycle≤2%.

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Typical Performance Curves

Output Characteristics
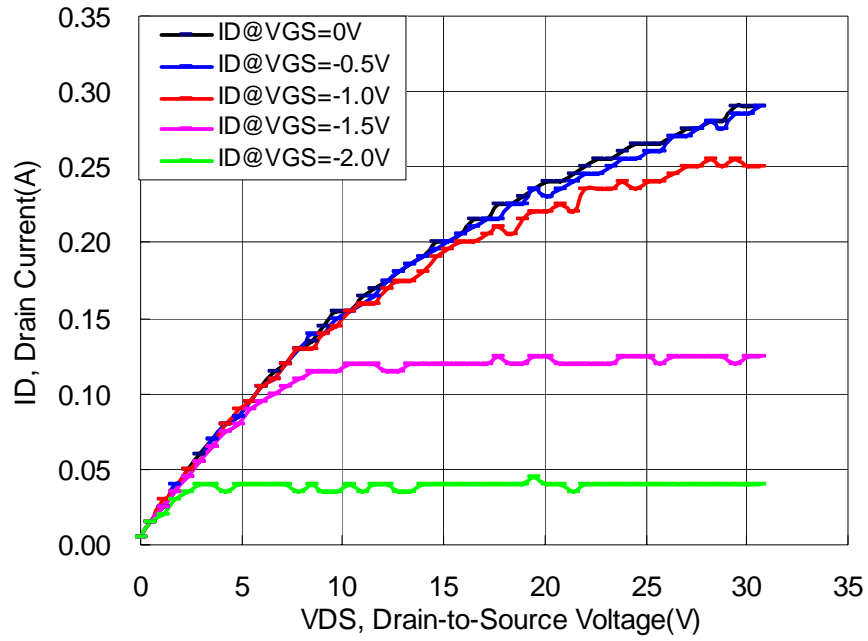
Transfer Characteristics
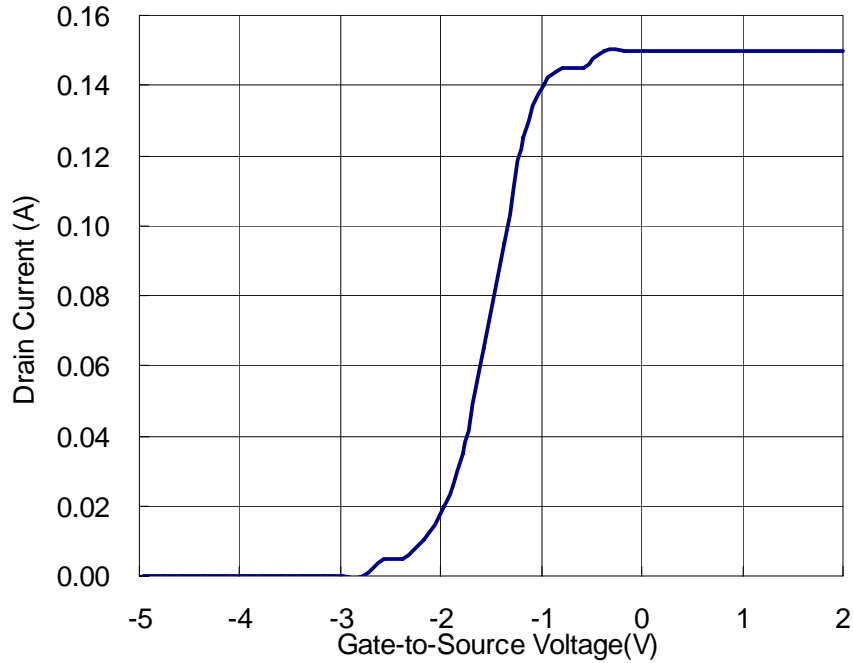
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