

High-threshold Voltage Depletion-Mode Power MOSFET

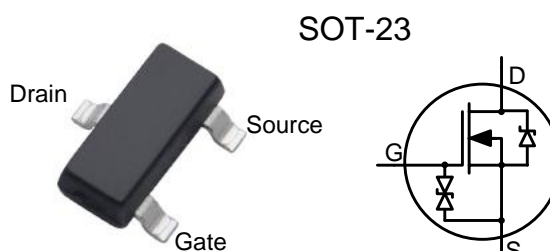
General Features

- High-threshold voltage, its typical value as high as -6V
- ESD improved Capability
- Depletion Mode (Normally On)
- Proprietary Advanced Planar Technology
- Rugged Polysilicon Gate Cell Structure
- Fast Switching Speed
- RoHS Compliant
- Halogen-free available

BV_{DSX}	$R_{DS(ON)}$ (Max.)	$I_{DSS,min}$
150V	15 Ω	200mA

Applications

- Synchronous Rectification
- Normally-on Switches
- Linear Amplifier
- Converters
- Current Source
- Telecom



Ordering Information

Part Number	Package	Marking	Remark
DMZ1521E	SOT-23	1521	Halogen Free

Absolute Maximum Ratings

$T_A=25^{\circ}\text{C}$ unless otherwise specified

Symbol	Parameter	DMZ1521E	Unit
V_{DSX}	Drain-to-Source Voltage ^[1]	150	V
V_{DGX}	Drain-to-Gate Voltage ^[1]	150	V
I_D	Continuous Drain Current	0.2	A
I_{DM}	Pulsed Drain Current ^[2]	0.6	
P_D	Power Dissipation	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	$^{\circ}\text{C}$
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	DMZ1521E	Unit
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	250	K/W

Electrical Characteristics

OFF Characteristics

 $T_A = 25^\circ\text{C}$ unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
BV_{DSX}	Drain-to-Source Breakdown Voltage	150	--	--	V	$V_{GS} = -15\text{V}$, $I_D = 250\mu\text{A}$
$I_{D(OFF)}$	Drain-to-Source Leakage Current	--	--	10	μA	$V_{DS} = 150\text{V}$, $V_{GS} = -15\text{V}$
		--	--	1.0	mA	$V_{DS} = 150\text{V}$, $V_{GS} = -15\text{V}$ $T_J = 125^\circ\text{C}$
I_{GSS}	Gate-to-Source Leakage Current	--	--	20	μA	$V_{GS} = +20\text{V}$, $V_{DS} = 0\text{V}$
		--	--	20		$V_{GS} = -20\text{V}$, $V_{DS} = 0\text{V}$

ON Characteristics

 $T_A = 25^\circ\text{C}$ unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
I_{DSS}	Saturated Drain-to-Source Current	200	--	--	mA	$V_{GS} = 0\text{V}$, $V_{DS} = 25\text{V}$
$R_{DS(ON)}$	Static Drain-to-Source On-Resistance	--	10	15	Ω	$V_{GS} = 0\text{V}$, $I_D = 200\text{mA}$ ^[3]
$V_{GS(OFF)}$	Gate-to-Source Cut-off Voltage	-7	--	-5	V	$V_{DS} = 3\text{V}$, $I_D = 8\mu\text{A}$
gfs	Forward Transconductance	--	0.24	--	S	$V_{DS} = 10\text{V}$, $I_D = 100\text{mA}$

Dynamic Characteristics

Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
C_{ISS}	Input Capacitance	--	12.8	--	pF	$V_{GS} = -10\text{V}$ $V_{DS} = 25\text{V}$ $f = 1.0\text{MHz}$
C_{OSS}	Output Capacitance	--	5.4	--		
C_{RSS}	Reverse Transfer Capacitance	--	3.3	--		
Q_G	Total Gate Charge	--	3	--	nC	$V_{GS} = -10\text{V} \sim 0\text{V}$ $V_{DS} = 75\text{V}$, $I_D = 200\text{mA}$
Q_{GS}	Gate-to-Source Charge	--	0.23	--		
Q_{GD}	Gate-to-Drain (Miller) Charge	--	1.1	--		

Resistive Switching Characteristics

Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
$t_{d(ON)}$	Turn-on Delay Time	--	7	--	ns	$V_{GS} = -10\text{V} \sim 0\text{V}$ $V_{DD} = 75\text{V}$, $I_D = 200\text{mA}$ $R_G = 20\Omega$
t_{rise}	Rise Time	--	16	--		
$t_{d(OFF)}$	Turn-off Delay Time	--	25	--		
t_{fall}	Fall Time	--	120	--		

Source-Drain Diode Characteristics $T_A=25^{\circ}\text{C}$ unless otherwise specified

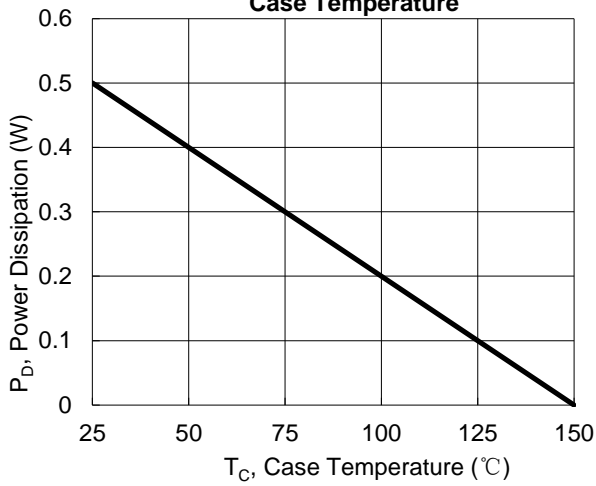
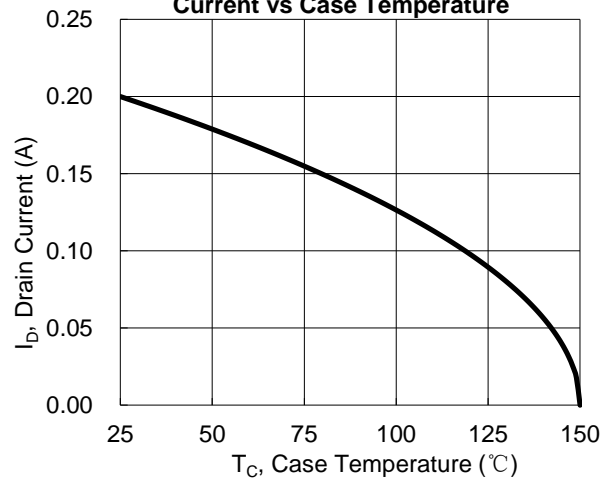
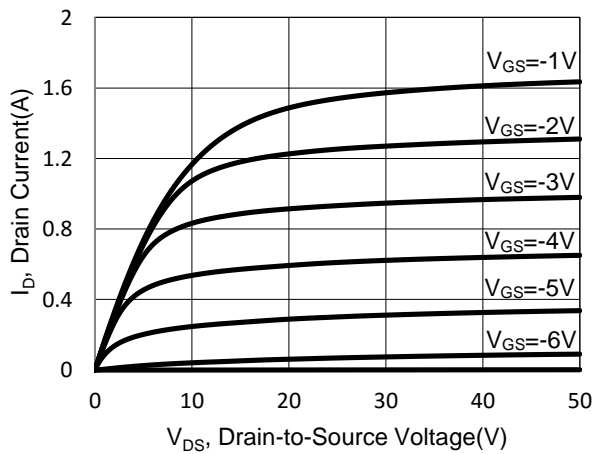
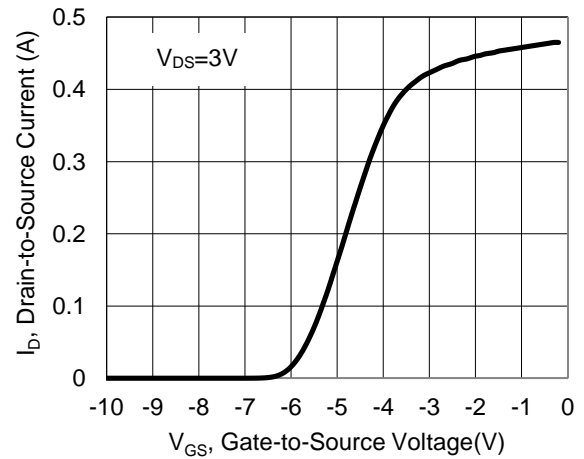
Symbol	Parameter	Min	Typ.	Max.	Units	Test Conditions
V_{SD}	Diode Forward Voltage	--	--	1.2	V	$I_{SD}=200\text{ mA}$, $V_{GS} = -15\text{ V}$

NOTE:

[1] $T_J=+25^{\circ}\text{C}$ to $+150^{\circ}\text{C}$

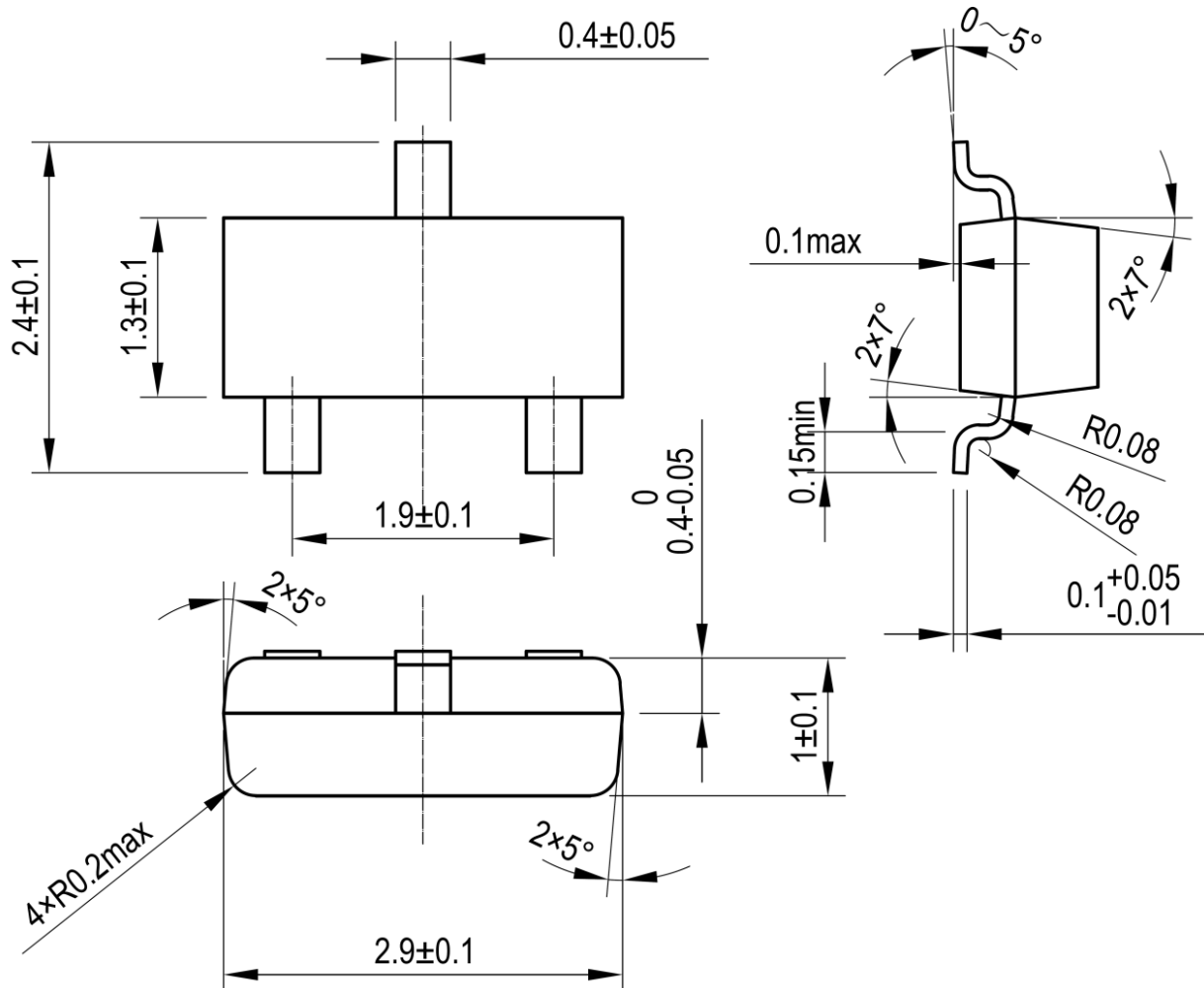
[2] Repetitive rating, pulse width limited by maximum junction temperature.

[3] Pulse width $\leq 380\text{ }\mu\text{s}$; duty cycle $\leq 2\%$.

Figure 1. Maximum Power Dissipation vs. Case Temperature

Figure 2. Maximum Continuous Drain Current vs Case Temperature

Figure 3. Typical Output Characteristics

Figure 4. Typical Transfer Characteristics


Package Dimensions

SOT-23



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