

250V N-Channel Depletion-Mode Power MOSFET

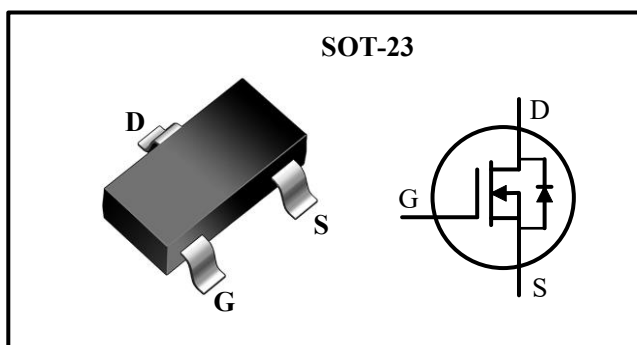
General Features

- Depletion Mode (Normally On)
- Fast Switching Speed
- High-input impedance
- RoHS Compliant
- Halogen-free Available

BV_{DSX}	$R_{DS(ON)(Max.)}$	$I_{DSS(Min.)}$
250V	30Ω	6mA

Applications

- Battery Operated Systems
- Normally-On Switches
- Solid State Relays
- Converters
- Security
- Linear amplifiers



Ordering Information

Part Number	Package	Marking	Remark
DMZ30R25AL	SOT-23	30R25L	Halogen Free

Absolute Maximum Ratings

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

Symbol	Parameter	DMZ30R25AL	Unit
V_{DSX}	Drain-to-Source Voltage ^[1]	250	V
I_D	Continuous Drain Current	0.1	mA
I_{DM}	Pulsed Drain Current ^[2]	0.4	
P_D	Power Dissipation	0.5	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 & T_{STG}	Operating and Storage Temperature Range	-55 to 150	

Caution: Stresses beyond those listed in the “Absolute Maximum Ratings” may cause permanent damage to the device.

Note: The MOSFET is sensitive to electrostatic discharge. When handling this device, the worktables, operators, soldering irons and other objects should be protected against anti-static discharge.

Thermal Characteristics

Symbol	Parameter	DMZ30R25AL	Unit
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	250	$^{\circ}\text{C}/\text{W}$

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	250	--	--	V	$V_{GS} = -5\text{V}$, $I_D = 250\mu\text{A}$
$I_{D(OFF)}$	Drain-to-Source Leakage Current	--	--	200	nA	$V_{DS} = 250\text{V}$, $V_{GS} = -5\text{V}$
I_{GSS}	Gate-to-Source Leakage Current	--	--	100	nA	$V_{GS} = 20\text{V}$, $V_{DS} = 0\text{V}$
		--	--	-100		$V_{GS} = -20\text{V}$, $V_{DS} = 0\text{V}$

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	5	--	22	mA	$V_{GS} = 0\text{V}$, $V_{DS} = 10\text{V}$
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	--	--	30	Ω	$V_{GS} = 0\text{V}$, $I_D = 3\text{mA}$ ^[3]
$V_{GS(off)}$	Gate-to-Source Cut-off Voltage	-1.0	--	-0.5	V	$V_{DS} = 3\text{V}$, $I_D = 56\mu\text{A}$
gfs	Forward Transconductance	--	--	--	mS	$V_{DS} = 10\text{V}$, $I_D = 5\text{mA}$

Dynamic Characteristics

Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
C_{iss}	Input Capacitance	--	--	--	pF	$V_{GS} = -5\text{V}$ $V_{DS} = 25\text{V}$ $f = 1.0\text{MHz}$
C_{oss}	Output Capacitance	--	--	--		
C_{rss}	Reverse Transfer Capacitance	--	--	--		
Q_g	Total Gate Charge	--	--	--	nC	$V_{GS} = -5\text{V} \sim 5\text{V}$ $V_{DS} = 125\text{V}$ $I_D = 3\text{mA}$
Q_{gs}	Gate-to-Source Charge	--	--	--		
Q_{gd}	Gate-to-Drain (Miller) Charge	--	--	--		

Resistive Switching Characteristics

Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
$t_{d(on)}$	Turn-on Delay Time	--	--	--	ns	$V_{GS} = -5\text{V} \sim 5\text{V}$ $V_{DD} = 125\text{V}$ $I_D = 3\text{mA}$ $R_G = 10\Omega$
t_r	Rise Time	--	--	--		
$t_{d(off)}$	Turn-off Delay Time	--	--	--		
t_f	Fall Time	--	--	--		

Source-Drain Diode Characteristics

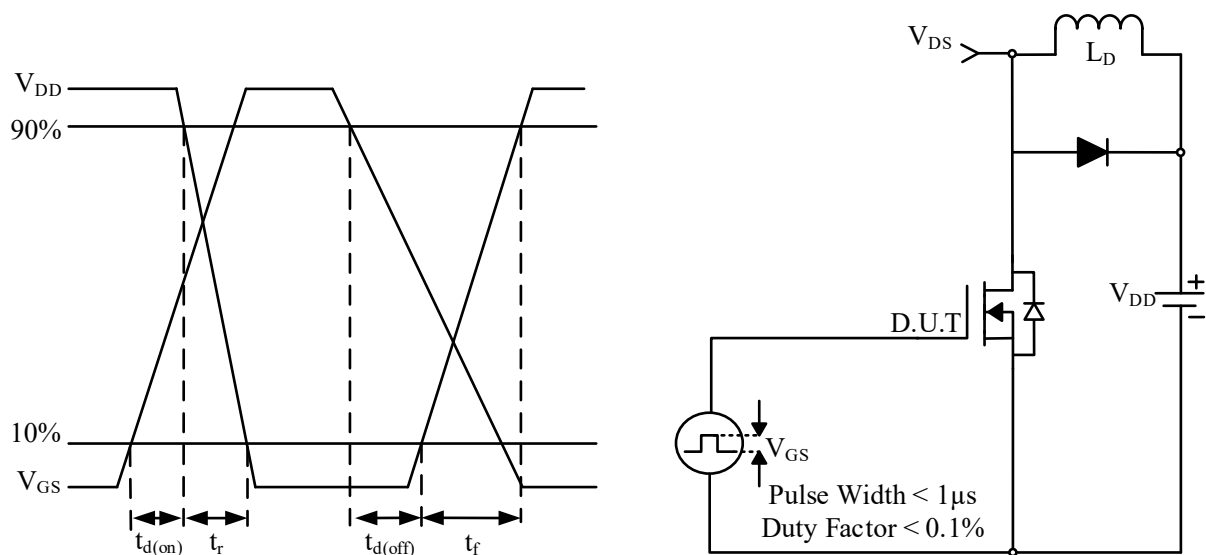
$T_A=25^\circ\text{C}$ unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
V_{SD}	Diode Forward Voltage	--	--	1.2	V	$I_{SD}=6\text{mA}$, $V_{GS}=-5\text{V}$

NOTE:

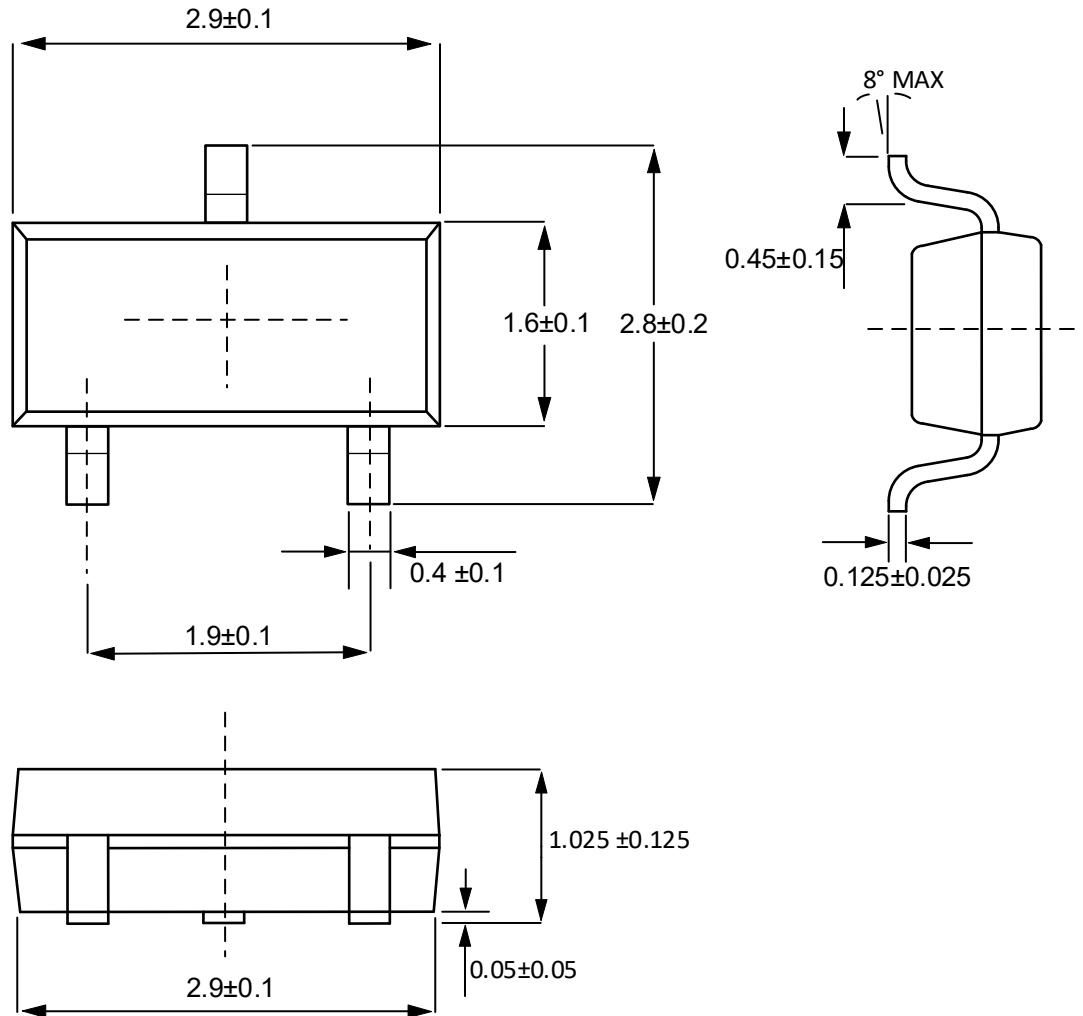
- [1] $T_J=+25^\circ\text{C}$ to $+150^\circ\text{C}$.
- [2] Repetitive rating, pulse width limited by maximum junction temperature.
- [3] Pulse width $\leq 380\mu\text{s}$, duty cycle $\leq 2\%$.

Switching Waveform & Test Circuit



Package Dimensions

SOT-23





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