

600V Low Cut-off Voltage N-Channel Depletion Mode Power MOSFET

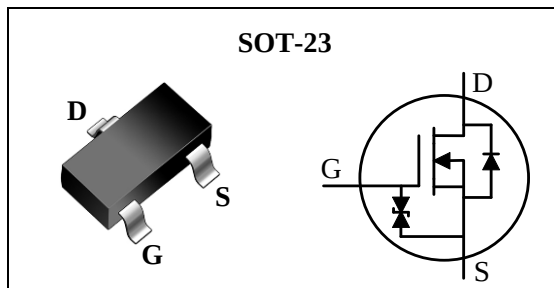
General Features

- Low Gate-to-Source Cut-off Voltage
- Depletion Mode (Normally-on)
- Proprietary Advanced Planar Technology
- Rugged Polysilicon Gate Cell Structure
- Fast Switching Speed
- RoHS Compliant
- Halogen-free available

Applications

- SMPS Start-up Circuit
- Linear Amplifier
- Constant Current Source
- Telecom

BV_{DSX}	$R_{DS(on)}(Typ.)$	$I_{DSS}(Min.)$
600V	110Ω	2mA



Ordering Information

Part Number	Package	Marking	Remark
DMZ6001E	SOT-23	601	Halogen Free

Absolute Maximum Ratings

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

Symbol	Parameter	DMZ6001E	Unit
V_{DSX}	Drain-to-Source Voltage ^[1]	600	V
V_{DGX}	Drain-to-Gate Voltage ^[1]	600	V
V_{GS}	Gate-to-Source Voltage	±20	V
I_D	Continuous Drain Current ^[2]	2	mA
I_{DM}	Pulsed Drain Current ^[3]	6	mA
P_D	Power Dissipation ^[4]	0.5	W
T_L	Soldering Temperature Distance of 1.6mm from case for 10 seconds	300	°C
T_J & T_{STG}	Operating and Storage Temperature Range	-55 to 150	°C

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

Thermal Characteristics

Symbol	Parameter	DMZ6001E	Unit
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	250	°C/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	600	--	--	V	$V_{GS} = -5V, I_D = 250\mu A$
$I_{D(off)}$	Drain-to-Source Leakage Current	--	--	1	μA	$V_{DS} = 600V, V_{GS} = -5V$
I_{GSS}	Gate-to-Source Leakage Current	--	--	5	μA	$V_{GS} = 20V, V_{DS} = 0V$
		--	--	-5		$V_{GS} = -20V, V_{DS} = 0V$

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	2	--	20	mA	$V_{GS} = 0V, V_{DS} = 25V$
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	--	110	200	Ω	$V_{GS} = 0V, I_D = 2mA^{[5]}$
$V_{GS(off)}$	Gate-to-Source Cut-off Voltage	-1.1	--	-0.5	V	$V_{DS} = 3V, I_D = 8\mu A$

Dynamic Characteristics

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

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
C_{iss}	Input Capacitance	--	34.5	--	pF	$V_{GS} = -5V,$ $V_{DS} = 25V,$ $f = 1.0MHz$
C_{oss}	Output Capacitance	--	9.2	--		
C_{rss}	Reverse Transfer Capacitance	--	2.6	--		
Q_g	Total Gate Charge	--	0.97	--	nC	$V_{GS} = -5V$ to $5V,$ $V_{DD} = 300V,$ $I_D = 1mA$
Q_{gs}	Gate-to-Source Charge	--	0.37	--		
Q_{gd}	Gate-to-Drain (Miller) Charge	--	0.23	--		

Resistive Switching Characteristics

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

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
$t_{d(on)}$	Turn-on Delay Time	--	0.89	--	ns	$V_{GS} = -5V$ to $5V,$ $V_{DD} = 10V,$ $I_D = 1mA,$ $R_G = 6\Omega$
t_r	Rise Time	--	8.7	--		
$t_{d(off)}$	Turn-off Delay Time	--	2.3	--		
t_f	Fall Time	--	57.7	--		

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	$I_{SD} = 2mA, V_{GS} = -5V$

NOTE:

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

[2] $T_C = +25^\circ\text{C}$.

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

[4] $T_C = +25^\circ\text{C}$.

[5] Pulse width $\leq 380\mu s$, duty cycle $\leq 2\%$.

Typical Characteristics

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

Figure 1. Maximum Power Dissipation vs. Ambient Temperature

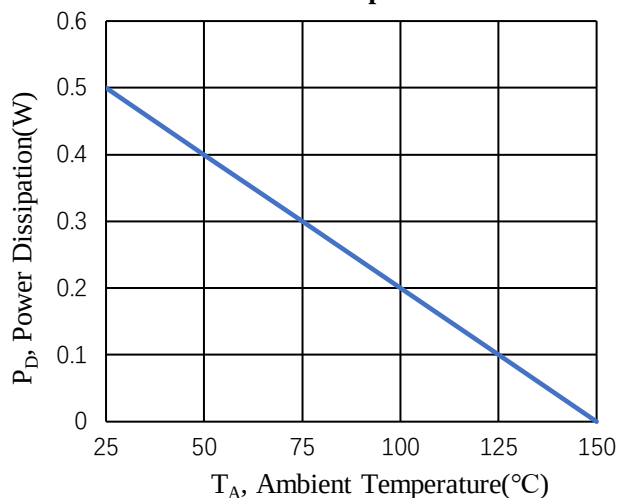


Figure 2. Maximum Continuous Drain Current vs. Ambient Temperature

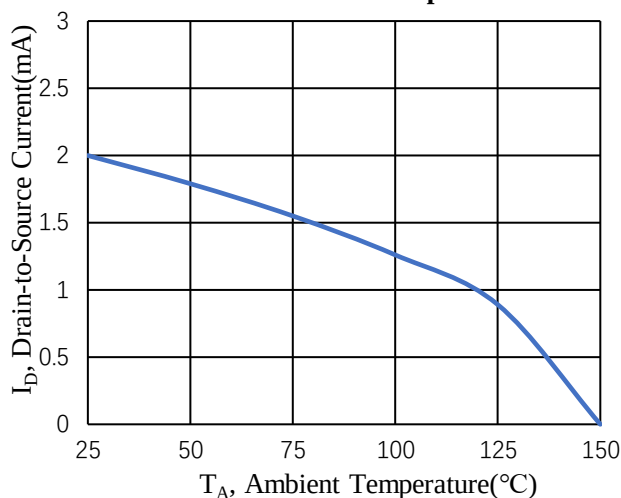


Figure 3. Typical Output Characteristics

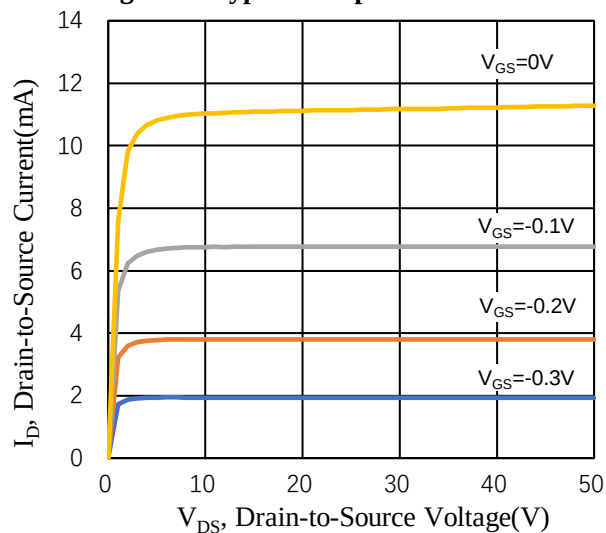


Figure 4. Typical Transfer Characteristics

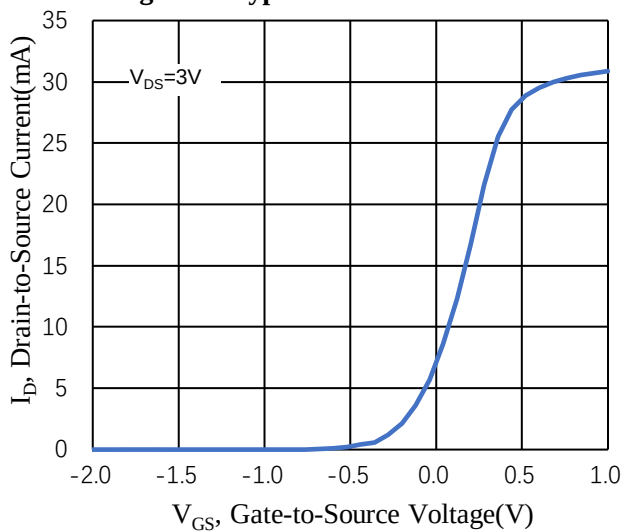


Figure 5. Typical Capacitance vs. Drain-to-Source Voltage

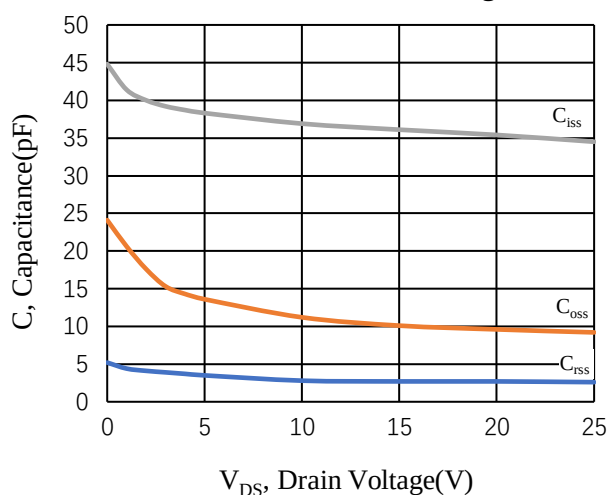
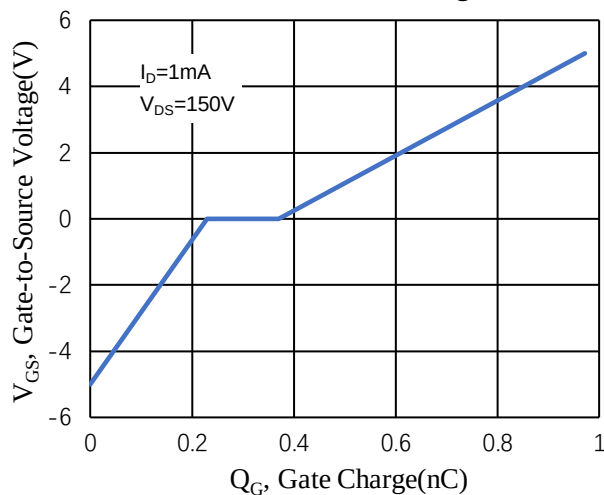
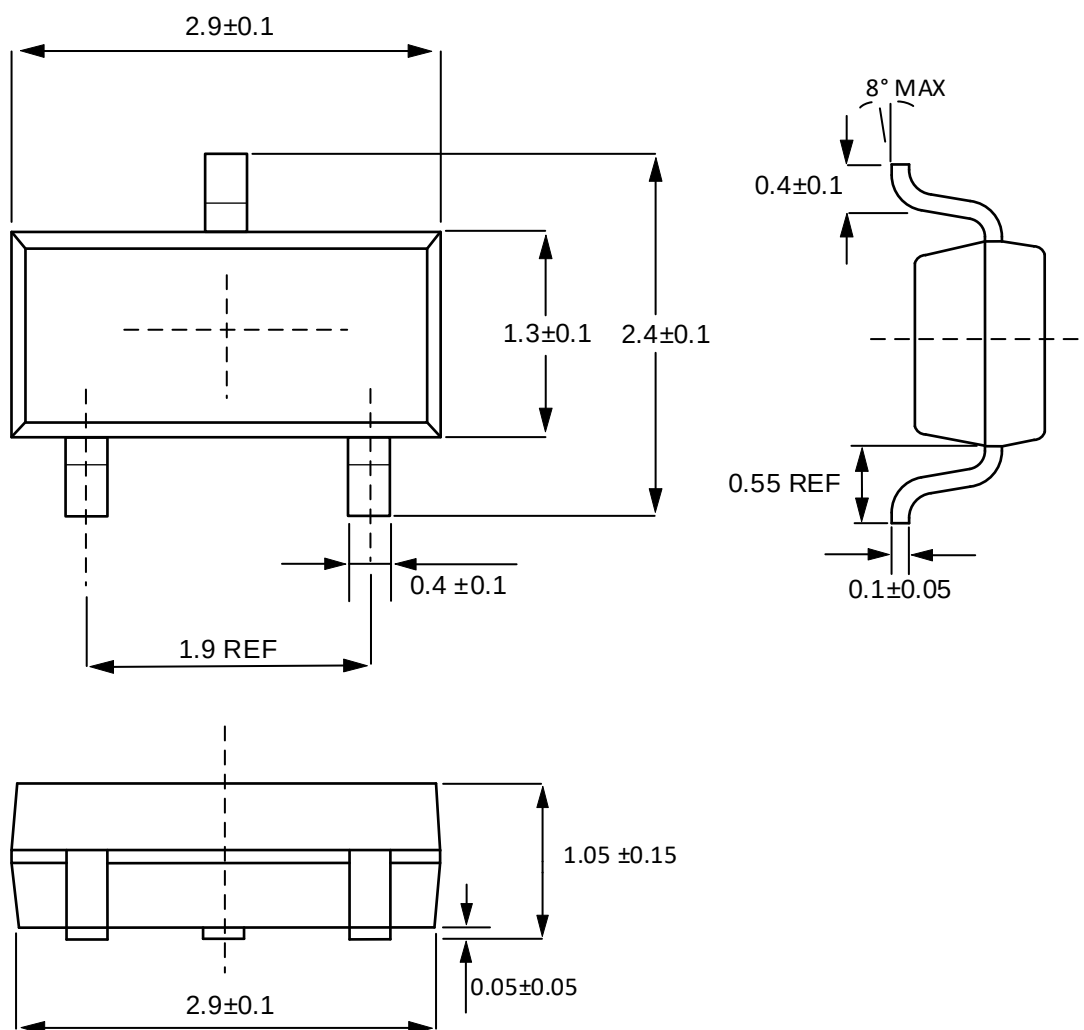


Figure 6. Typical Gate Charge vs. Gate-to-Source Voltage



Package Dimensions

SOT-23





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