

100V N-Channel Depletion-Mode Power MOSFET

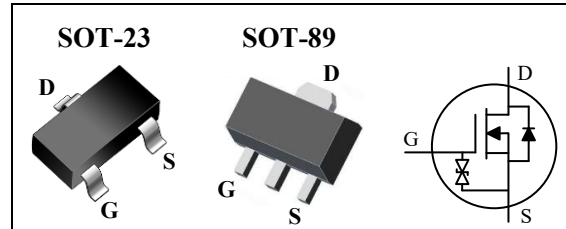
General Features

- ESD Improved Capability
- Depletion Mode (Normally On)
- Proprietary Advanced Planar Technology
- Proprietary Advanced Ultrahigh V_{th} Technology
- RoHS Compliant
- Halogen-free Available

BV_{DSX}	$R_{DS(on)(Max.)}$	$I_{DSS(Min.)}$
100V	30Ω	100mA

Applications

- Quick Charger
- Current Source
- Voltage Source
- Type-C/PD charger



General Description

This novel depletion mode MOSFET, developed and manufactured by ARK proprietary UltraVt[®] technology. It has a high threshold voltage. By using the sub threshold characteristics, the depletion mode MOSFET can provide stably power to the load, and the voltage can be clamped to protect the load without Zener diode, and the circuit consumption is reduced.

Ordering Information

Part Number	Package	Marking	Remark
DMZ1015EL	SOT-23	1015L	Halogen Free
DMX1015EL	SOT-89	1015L	Halogen Free

Absolute Maximum Ratings

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

Symbol	Parameter	DMZ1015EL	DMX1015EL	Unit
V_{DSX}	Drain-to-Source Voltage ^[1]	100		V
V_{DGX}	Drain-to-Gate Voltage ^[1]	100		V
V_{GS}	Gate-to-Source Voltage	±30		V
I_D	Continuous Drain Current ^[2]	0.1		A
I_{DM}	Pulsed Drain Current ^[3]	0.4		A
P_D	Power Dissipation ^[4]	0.5	1.0	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	DMZ1015EL	DMX1015EL	Unit
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	250	125	°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	100	--	--	V	$V_{GS} = -30\text{V}$, $I_D = 8\mu\text{A}$
$I_{D(off)}$	Drain-to-Source Leakage Current	--	--	10	μA	$V_{DS} = 100\text{V}$, $V_{GS} = -30\text{V}$
I_{GSS}	Gate-to-Source Leakage Current	--	--	20	μA	$V_{GS} = 30\text{V}$, $V_{DS} = 0\text{V}$
		--	--	-20		$V_{GS} = -30\text{V}$, $V_{DS} = 0\text{V}$

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	100	--	--	mA	$V_{DS} = 25\text{V}$, $V_{GS} = 0\text{V}$
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	--	--	30	Ω	$V_{GS} = 0\text{V}$, $I_D = 50\text{mA}$ [5]
$V_{GS(off)}$	Gate-to-Source Cut-off Voltage	-22	--	-13	V	$V_{DS} = 35\text{V}$, $I_D = 8\mu\text{A}$

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	$I_{SD} = 100\text{mA}$, $V_{GS} = -30\text{V}$

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 $\leq 380\mu\text{s}$, duty cycle $\leq 2\%$.

Typical Characteristics

Figure 1. Maximum Power Dissipation vs. Case Temperature

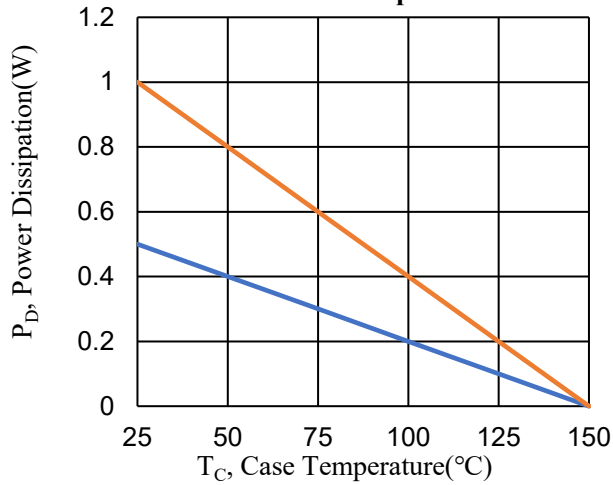
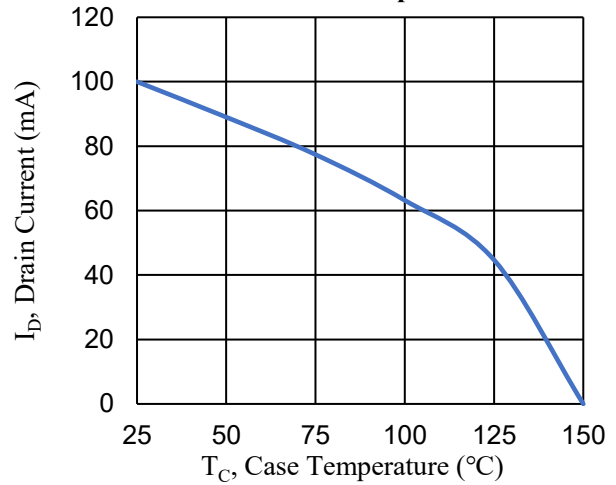


Figure 2. Maximum Continuous Drain Current vs. Case Temperature



DMZ1015EL/DMX1015EL is an UltraVt® depletion mode MOS device. A stable output voltage source or current source is implemented by using the sub-threshold characteristics of the device. Its basic application is shown as Figure 3:

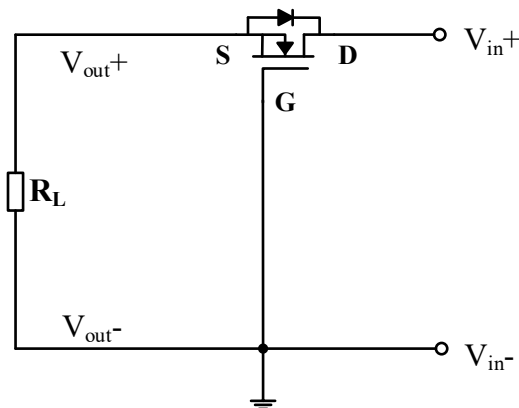


Figure 3. Drain Current I_D is decided by Load Resistance

Figure 4. Clamp Voltage vs. Drain Current

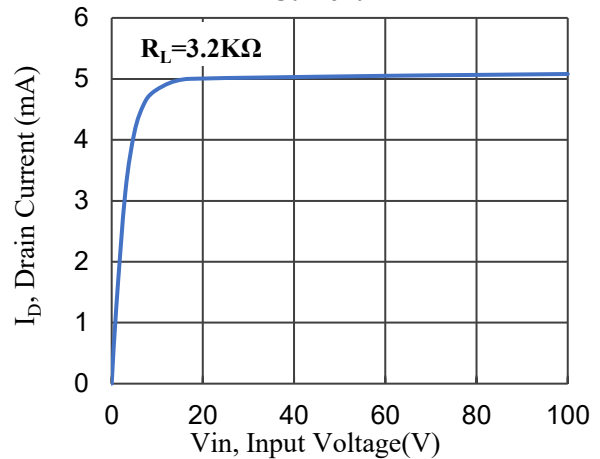
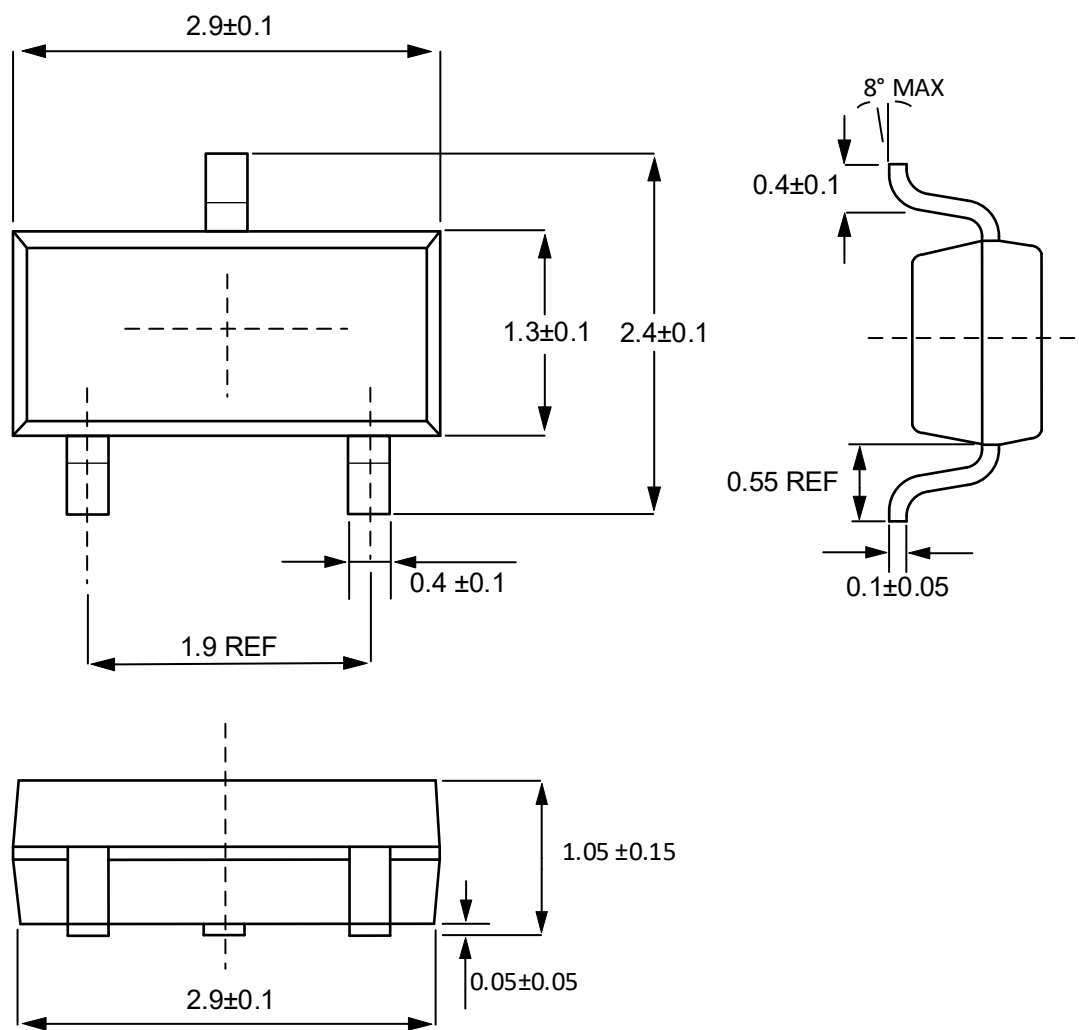


Figure 4. Clamp Voltage vs. Drain Current

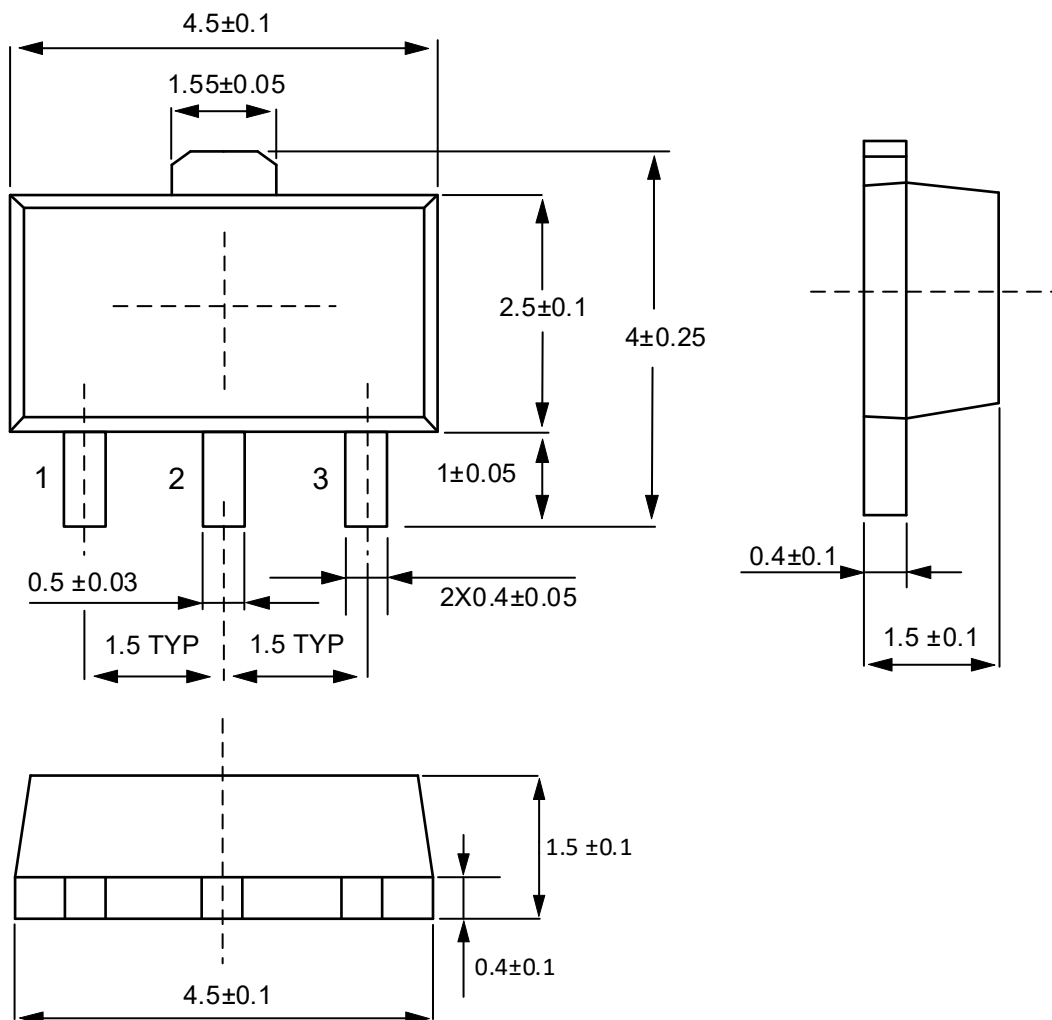
Package Dimensions

SOT-23



Unit: mm

SOT-89





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