

850V Depletion-Mode Power MOSFET

General Features

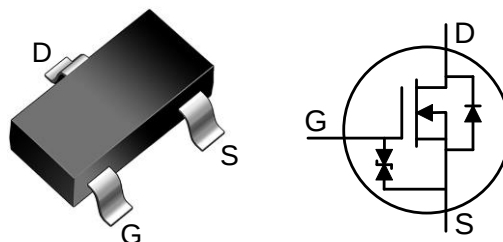
- Depletion Mode (Normally On)
- ESD Improved Capability
- Fast Switching Speed
- High Breakdown Voltage: 850V
- Small Package Size: SOT-23
- RoHS Compliant
- Halogen-free Available

BV_{DSX}	$R_{DS(ON)(TYP.)}$	I_D
850V	200Ω	10mA

SOT-23

Applications

- Normally-On Switches
- Start-up Circuits
- Solid State Relays
- Telecommunications
- Power Supply
- Current Regulators
- Ignition Modules



Ordering Information

Part Number	Package	Marking	Remark
DMZ85200E	SOT-23	85200	Halogen Free

Absolute Maximum Ratings

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

Symbol	Parameter	DMZ85200E	Unit
V_{DSX}	Drain-to-Source Voltage ^[1]	850	V
I_D	Continuous Drain Current	10	mA
I_{DM}	Pulsed Drain Current ^[2]	40	
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 greater than those listed in the "Absolute Maximum Ratings" may cause permanent damage to the device.

Thermal Characteristics

Symbol	Parameter	DMZ85200E	Unit
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	250	$^{\circ}\text{C/W}$

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	850	--	--	V	$V_{GS} = -10\text{V}$, $I_D = 250\mu\text{A}$
$I_{D(OFF)}$	Drain-to-Source Leakage Current	--	--	10	μA	$V_{DS} = 850\text{V}$, $V_{GS} = -10\text{V}$
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	10	--	--	mA	$V_{GS} = 0\text{V}$, $V_{DS} = 50\text{V}$
$R_{DS(ON)}$	Static Drain-to-Source On-Resistance	--	200	--	Ω	$V_{GS} = 0\text{V}$, $I_D = 10\text{mA}$ [3]
$V_{GS(OFF)}$	Gate-to-Source Cut-off Voltage	-1.2	--	-3.5	V	$V_{DS} = 3\text{V}$, $I_D = 8\mu\text{A}$
gfs	Forward Transconductance	--	32	--	mS	$V_{DS} = 20\text{V}$, $I_D = 10\text{mA}$

Dynamic Characteristics

Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
C_{iss}	Input Capacitance	--	30.3	--	pF	$V_{GS} = -5\text{V}$ $V_{DS} = 25\text{V}$ $f = 1.0\text{MHz}$
C_{oss}	Output Capacitance	--	9.2	--		
C_{rss}	Reverse Transfer Capacitance	--	2.8	--		
Q_g	Total Gate Charge	--	1.57	--	nC	$V_{GS} = -5\text{V} \sim 5\text{V}$ $V_{DS} = 150\text{V}$ $I_D = 20\text{mA}$
Q_{gs}	Gate-to-Source Charge	--	0.75	--		
Q_{gd}	Gate-to-Drain (Miller) Charge	--	0.38	--		

Resistive Switching Characteristics

Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
$t_{d(on)}$	Turn-on Delay Time	--	8.2	--	ns	$V_{GS} = -5\text{V} \sim 0\text{V}$ $V_{DD} = 150\text{V}$ $I_D = 20\text{mA}$ $R_G = 10\Omega$
t_{rise}	Rise Time	--	40	--		
$t_{d(off)}$	Turn-off Delay Time	--	48	--		
t_{fall}	Fall Time	--	752	--		



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	--	--	1.5	V	$I_{SD}=10\text{mA}$, $V_{GS}=-10\text{V}$

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 $\leq 2\%$.

Typical Characteristics

Figure 1. Maximum Power Dissipation vs. Case Temperature

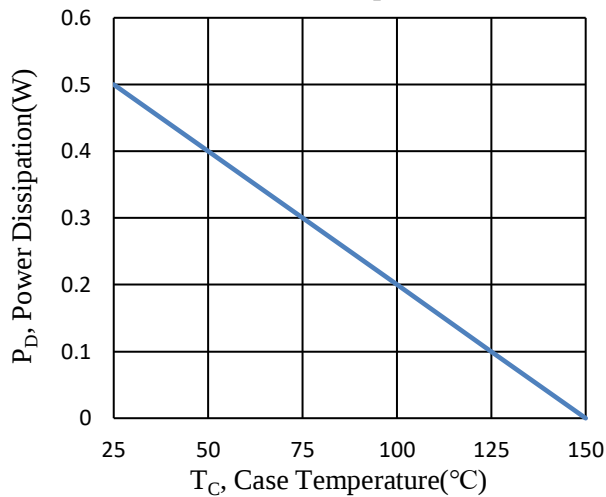


Figure 2. Maximum Continuous Drain Current vs. Case Temperature

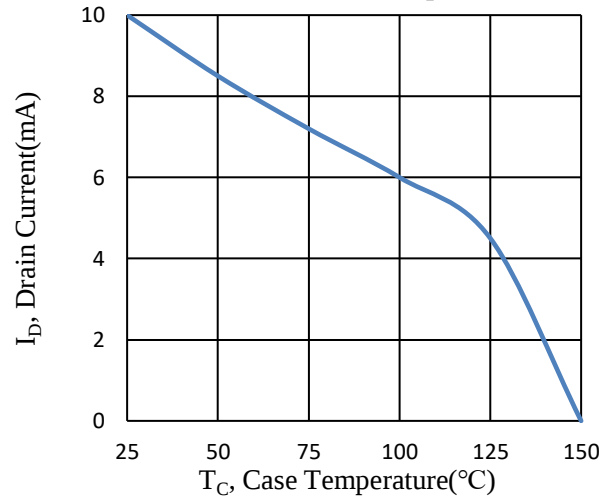


Figure 3. Typical Output Characteristics

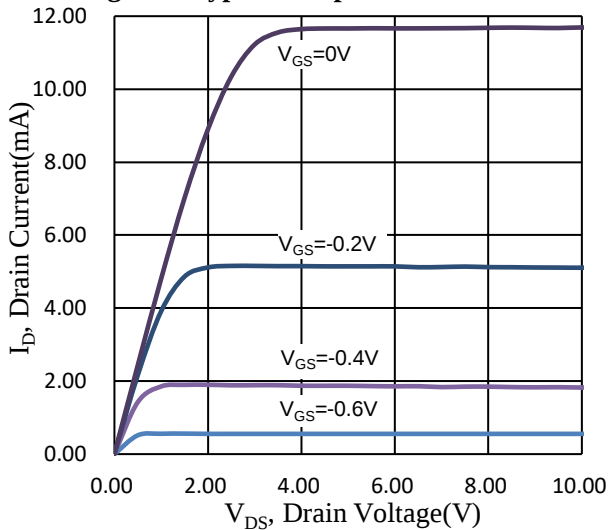


Figure 4. Typical Transfer Characteristics

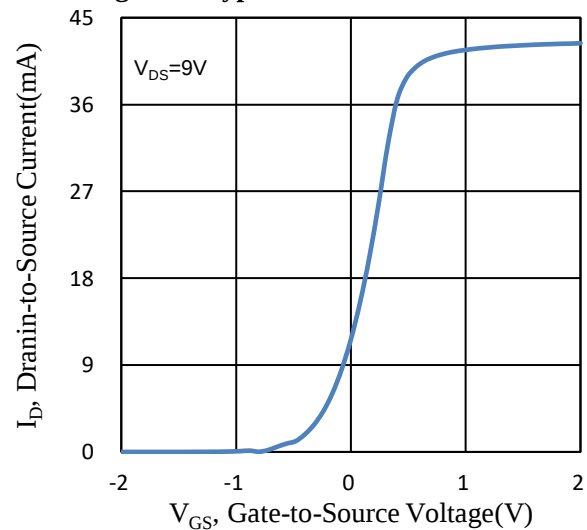


Figure 5. Typical Capacitance vs. Drain-to-Source Voltage

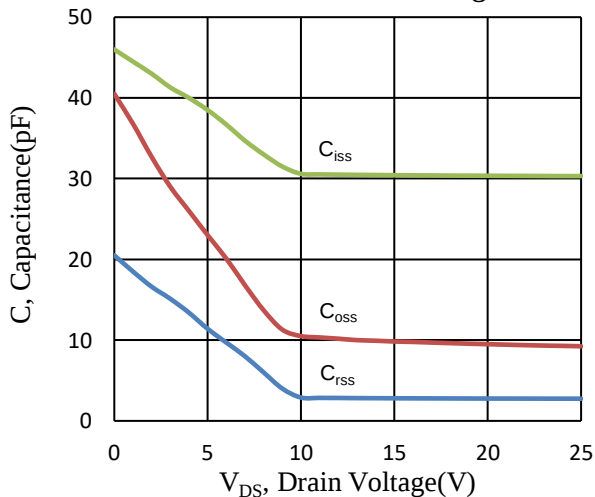
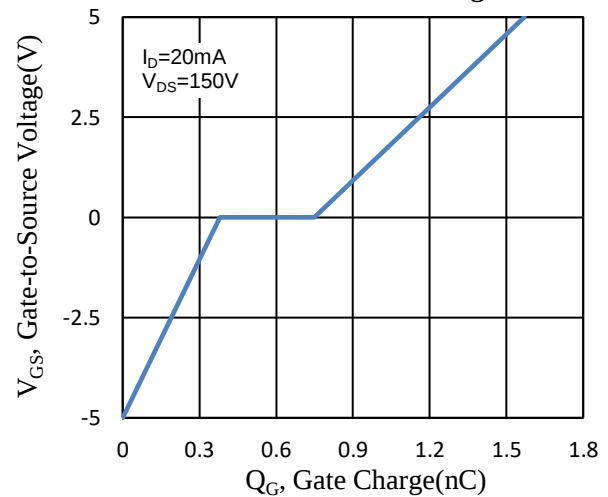
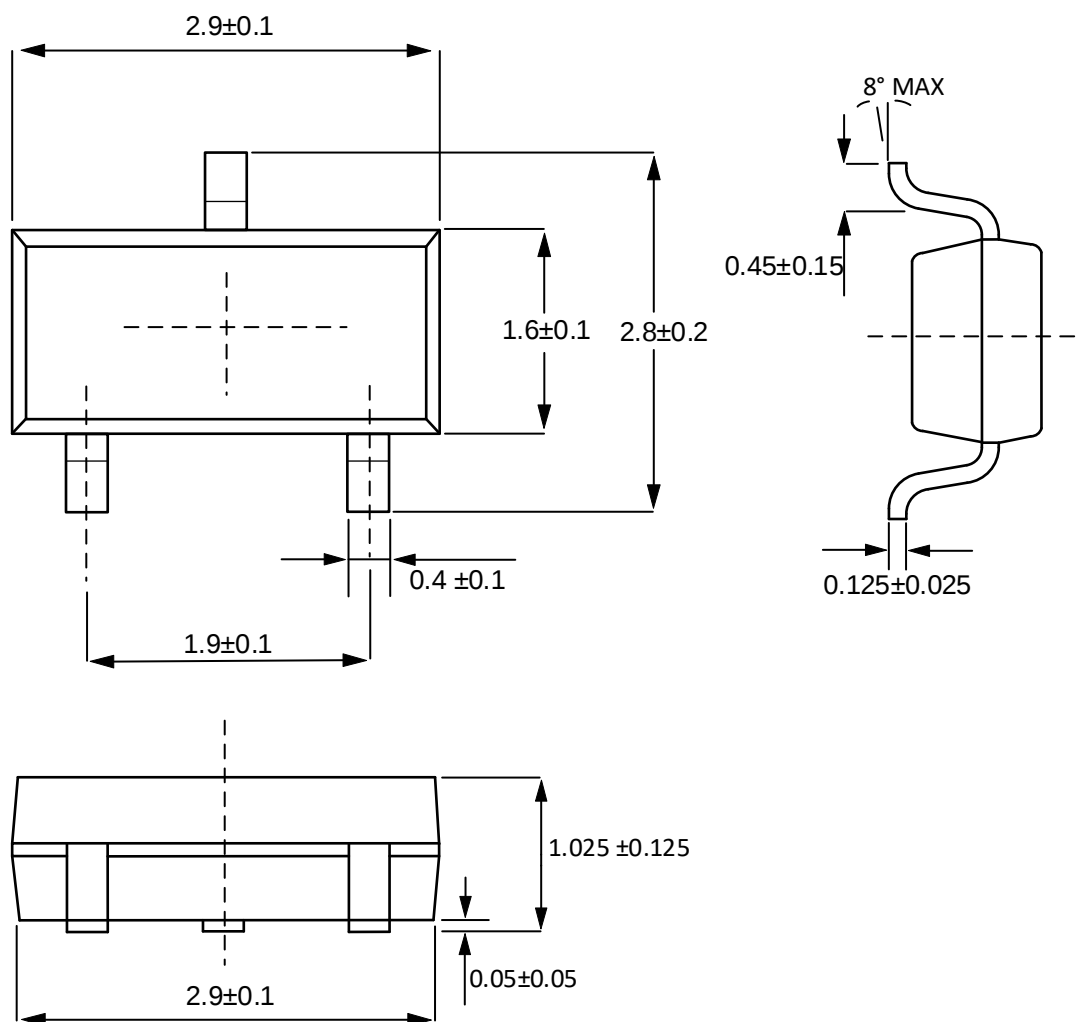


Figure 6. Typical Gate Charge vs. Gate-to-Source Voltage



Package Dimensions

SOT-23





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