

## 850V Depletion-Mode Power MOSFET

### General Features

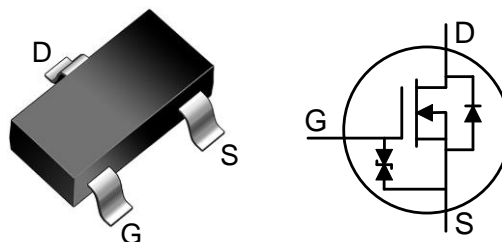
- Depletion Mode (Normally On)
- ESD Improved Capability
- Fast Switching Speed
- High Breakdown Voltage: 850V
- Small Package Size: SOT-23
- RoHS Compliant
- Halogen-free Available

$BV_{DSX}$	$R_{DS(ON)(TYP.)}$	$I_D$
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 <sup>[1]</sup>	850	V
$I_D$	Continuous Drain Current	10	mA
$I_{DM}$	Pulsed Drain Current <sup>[2]</sup>	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	$\mu\text{A}$	$V_{DS}=850\text{V}$ , $V_{GS}=-10\text{V}$
$I_{GSS}$	Gate-to-Source Leakage Current	--	--	20	$\mu\text{A}$	$V_{GS}=20\text{V}$ , $V_{DS}=0\text{V}$
		--	--	-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	--	$\Omega$	$V_{GS}=0\text{V}$ , $I_D=10\text{mA}$ [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:**

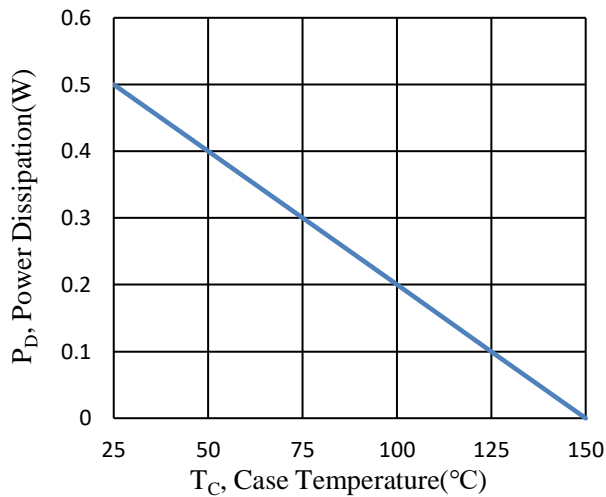
[1]  $T_J=+25^{\circ}\text{C}$  to  $+150^{\circ}\text{C}$

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

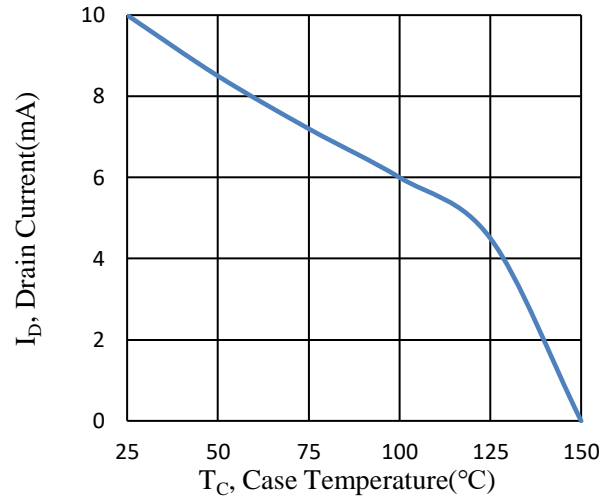
[3] Pulse width  $\leq 380\mu\text{s}$ ; duty cycle  $\leq 2\%$ .

## Typical Characteristics

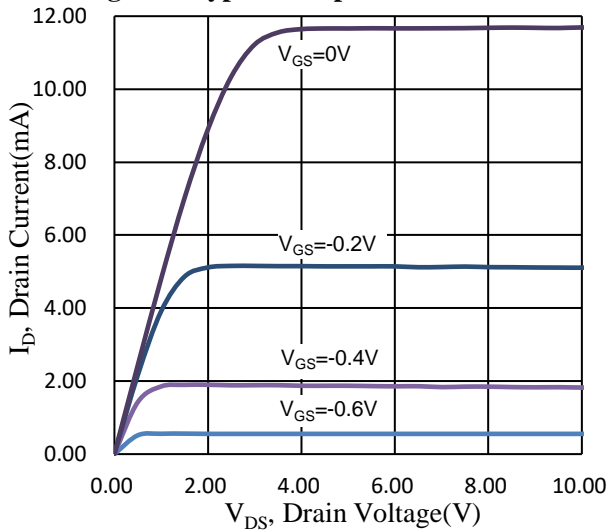
**Figure 1. Maximum Power Dissipation vs. Case Temperature**



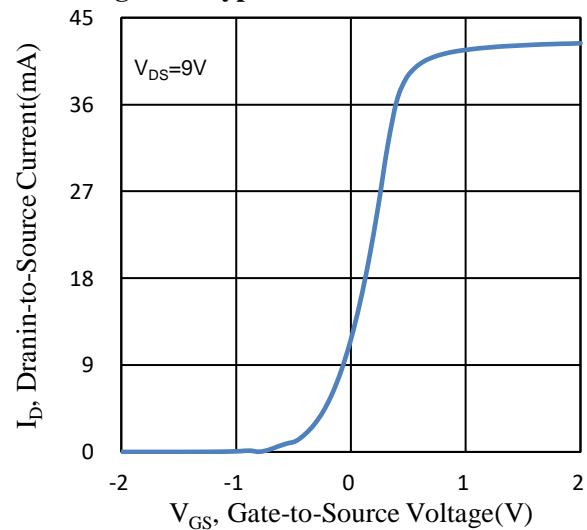
**Figure 2. Maximum Continuous Drain Current vs. Case Temperature**



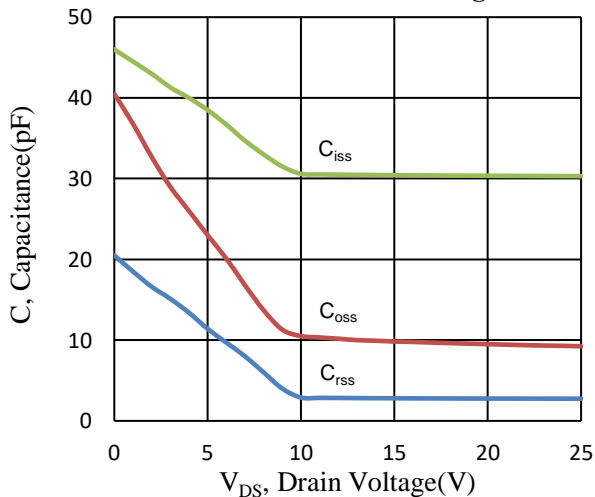
**Figure 3. Typical Output Characteristics**



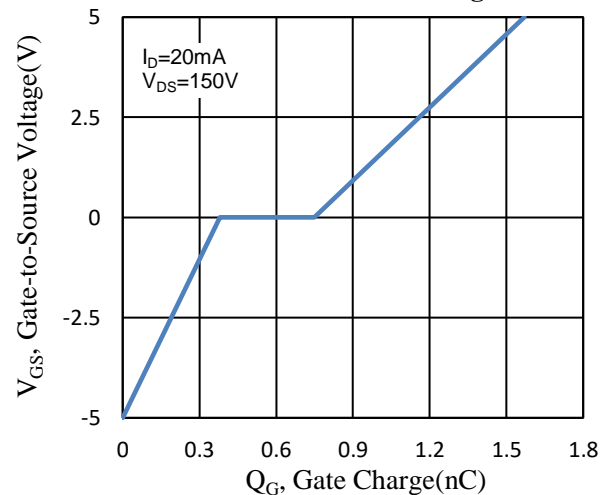
**Figure 4. Typical Transfer Characteristics**



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

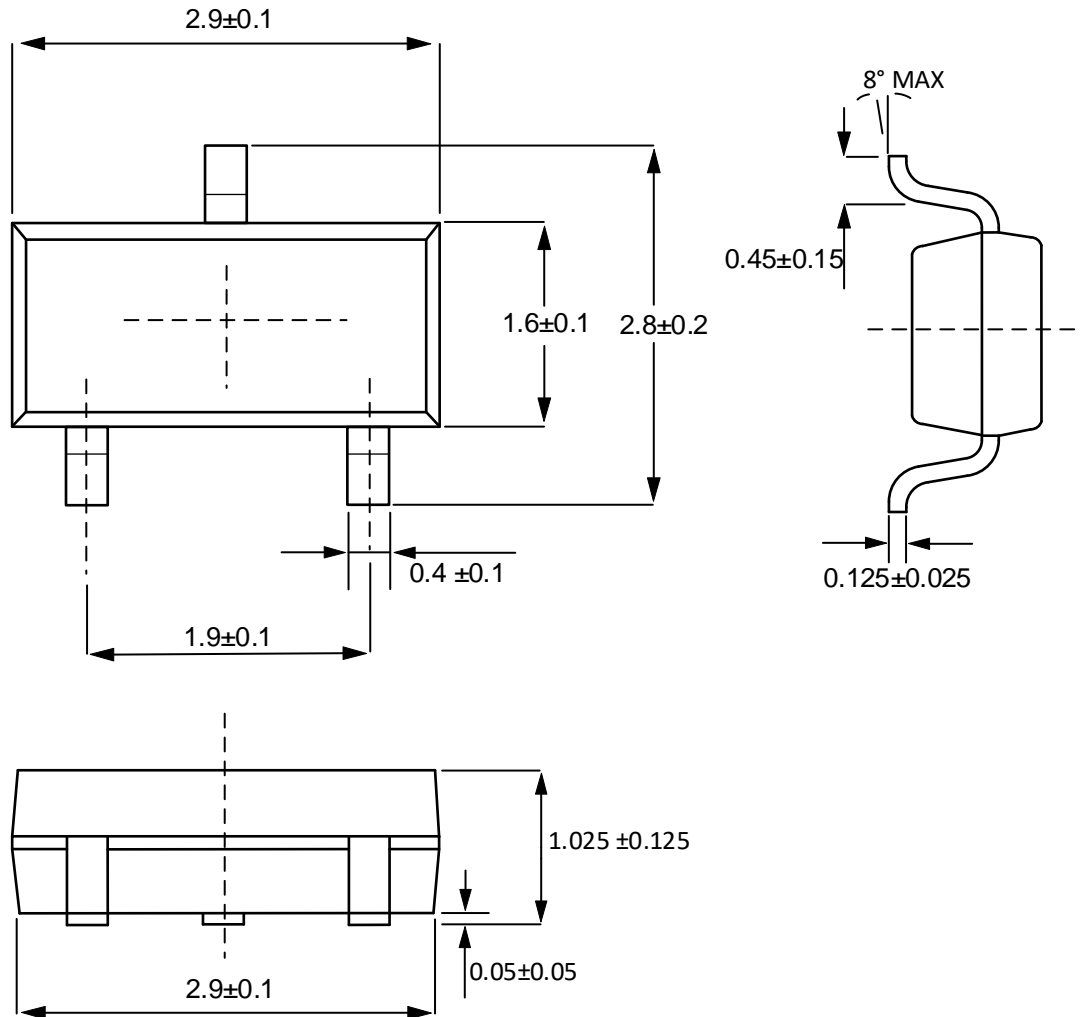


**Figure 6. Typical Gate Charge vs. Gate-to-Source Voltage**



## Package Dimensions

### SOT-23





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    - b. support or sustain life,
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