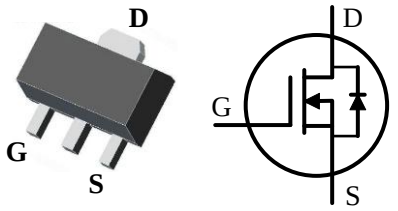
400V Depletion-Mode Power MOSFET

General Features

- Depletion Mode (Normally-on)
- Fast Switching Speed
- High Breakdown Voltage: 400V
- Small Package Size: SOT-89
- RoHS Compliant
- Halogen-free Available

BV_{DSX}	$R_{DS(ON)(Max.)}$	$I_{DSS(Min.)}$
400V	25Ω	200mA

SOT-89



Applications

- Solid State Relays
- Converters
- Linear Amplifiers
- Constant Current Sources
- Power Supply Circuits
- Telecom

Ordering Information

Part Number	Package	Marking	Remark
DMX22C40A	SOT-89	22C40	Halogen Free

Absolute Maximum Ratings

T_A=25℃ unless otherwise specified

Symbol	Parameter	DMX22C40A	Unit
V_{DSX}	Drain-to-Source Voltage [1]	400	V
I_D	Continuous Drain Current	0.12	A
I_{DM}	Pulsed Drain Current [2]	0.48	
P_D	Power Dissipation	1	W
V_{GS}	Gate-to-Source Voltage	±20	V
T_L	Soldering Temperature Distance of 1.6mm from case for 10 seconds	300	℃
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.

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	DMX22C40A	Unit
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	125	℃/W

Electrical Characteristics

OFF Characteristics

T_A=25℃ unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
BV_{DSX}	Drain-to-Source Breakdown Voltage	400	--	--	V	V_{GS}=-10V, I_D=250μA
$I_{D(OFF)}$	Drain-to-Source Leakage Current	--	--	1	μA	V_{DS}=400V, V_{GS}=-10V
I_{GSS}	Gate-to-Source Leakage Current	--	--	1	μA	V_{GS}=20V, V_{DS}=0V
		--	--	-1		V_{GS}=-20V, V_{DS}=0V

ON Characteristics

T_A=25℃ unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
I_{DSS}	Saturated Drain-to-Source Current	200	--	--	mA	V_{GS}=0V, V_{DS}=25V
$R_{DS(ON)}$	Static Drain-to-Source On-Resistance	--	12	25	Ω	V_{GS}=0V, I_D=100mA [3]
$V_{GS(OFF)}$	Gate-to-Source Cut-off Voltage	-4.5	--	-2.0	V	V_{DS}=3V, I_D=8μA
gfs	Forward Transconductance	--	300	--	mS	V_{DS}=20V, I_D=100mA

Dynamic Characteristics

Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
C_{iss}	Input Capacitance	--	84	--	pF	V_{GS}=-10V V_{DS}=25V f=1.0MHz
C_{oss}	Output Capacitance	--	15.1	--		
C_{rss}	Reverse Transfer Capacitance	--	3.4	--		
Q_g	Total Gate Charge	--	3.7	--	nC	V_{GS}=-10V~10V V_{DS}=150V I_D=100mA
Q_{gs}	Gate-to-Source Charge	--	0.9	--		
Q_{gd}	Gate-to-Drain (Miller) Charge	--	1.1	--		

Resistive Switching Characteristics

Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
$t_{d(on)}$	Turn-on Delay Time	--	7.2	--	ns	V_{GS}=-10V~0V V_{DD}=150V I_D=100mA R_G=10Ω
t_{rise}	Rise Time	--	4.8	--		
$t_{d(off)}$	Turn-off Delay Time	--	24.0	--		
t_{fall}	Fall Time	--	161	--		

Source-Drain Diode Characteristics

T_A=25℃ unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
V_{SD}	Diode Forward Voltage	--	--	1.5	V	I_{SD}=100mA, V_{GS}=-10V

NOTE：

[1] T_J=+25℃ to +150℃.
[2] Repetitive rating, pulse width limited by maximum junction temperature.
[3] Pulse width≤380μs, duty cycle≤2%.

Typical Characteristics

Figure 1. Maximum Power Dissipation vs. Case Temperature

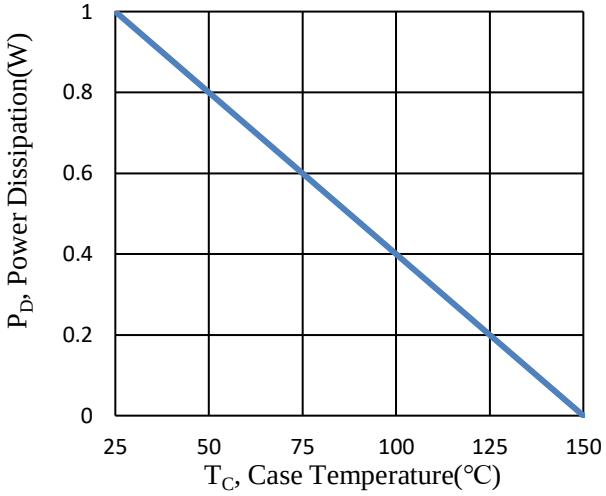


Figure 2. Maximum Continuous Drain Current vs. Case Temperature

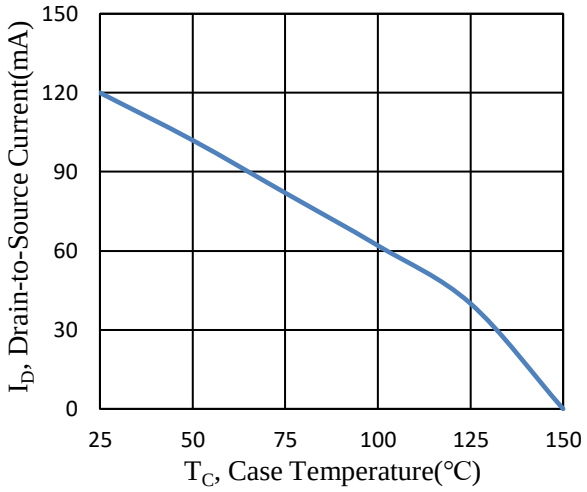


Figure 3. Typical Output Characteristics

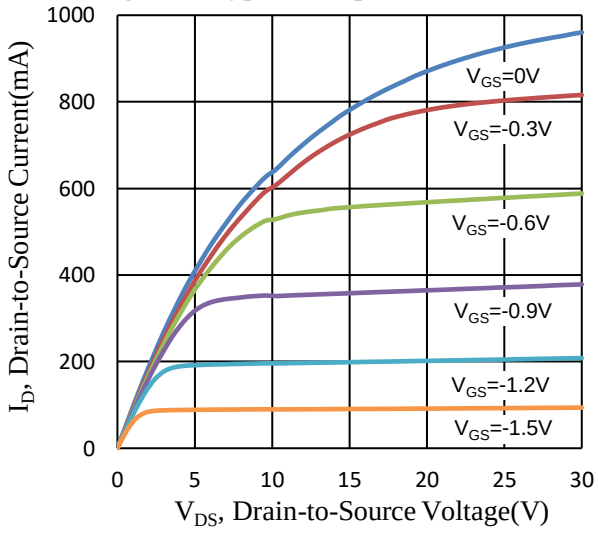


Figure 4. Typical Transfer Characteristics

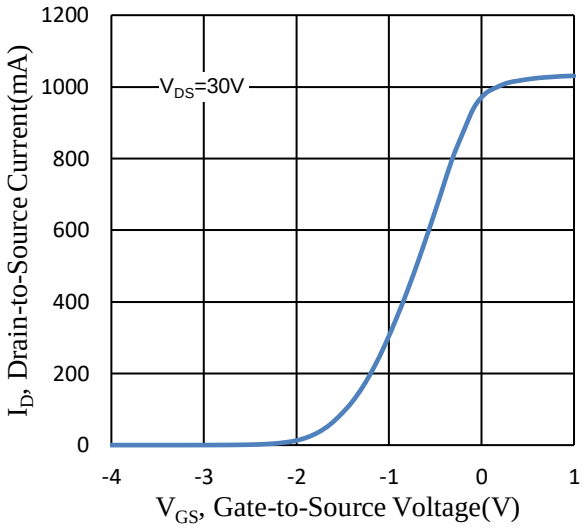


Figure 5. Typical Transfer Characteristics

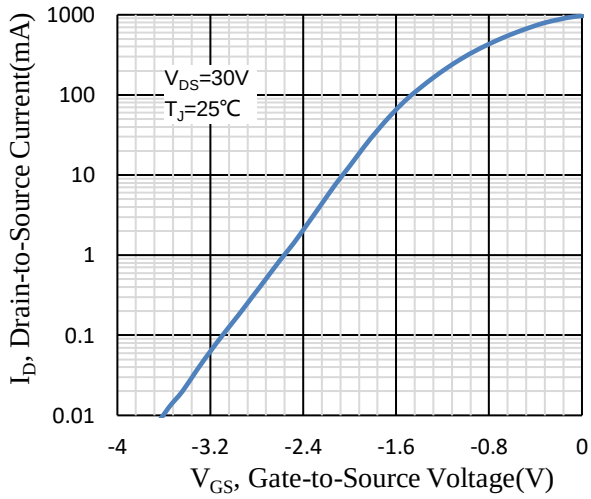


Figure 6. Typical Capacitance vs. Drain-to-Source Voltage

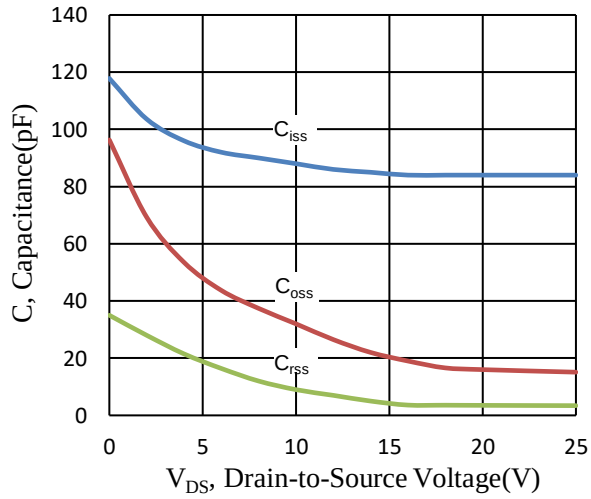


Figure 7. Typical Gate Charge vs. Gate-to-Source Voltage

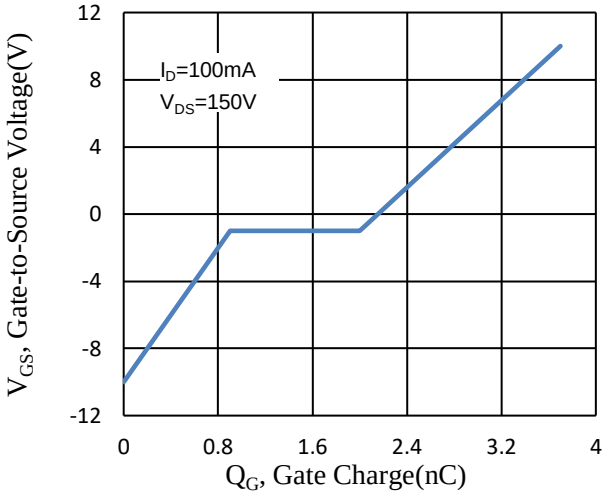


Figure 8. Normalized On-Resistance vs. Junction Temperature

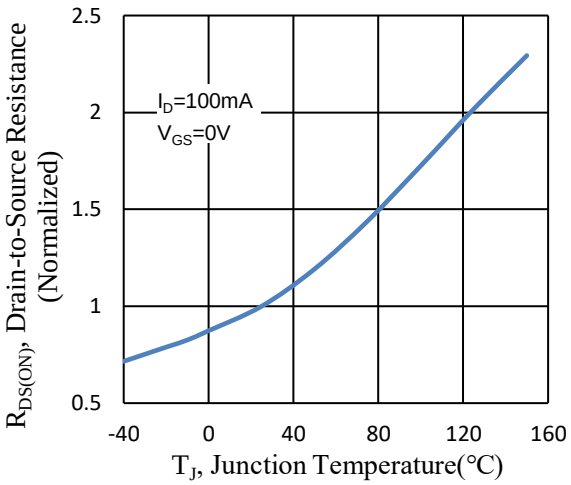


Figure 9. Gate-to-Source Cut-off Voltage vs. Junction Temperature

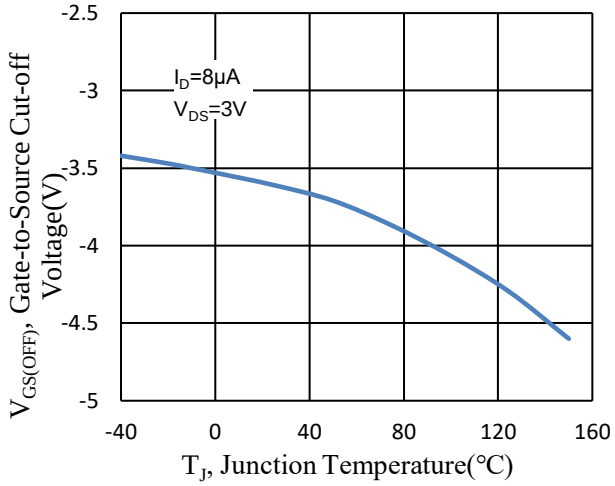


Figure 10. Drain-to-Source Breakdown Voltage vs. Junction Temperature

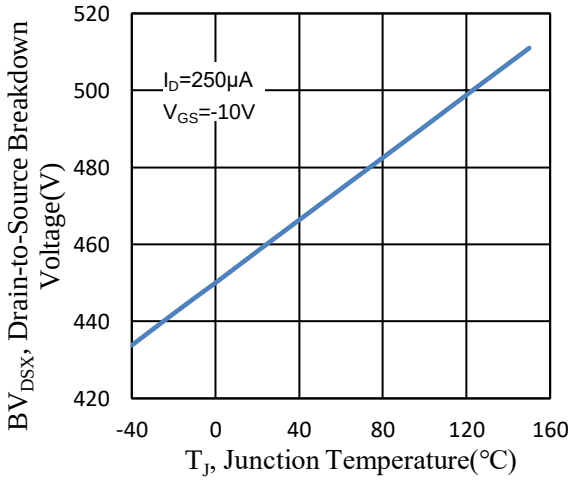
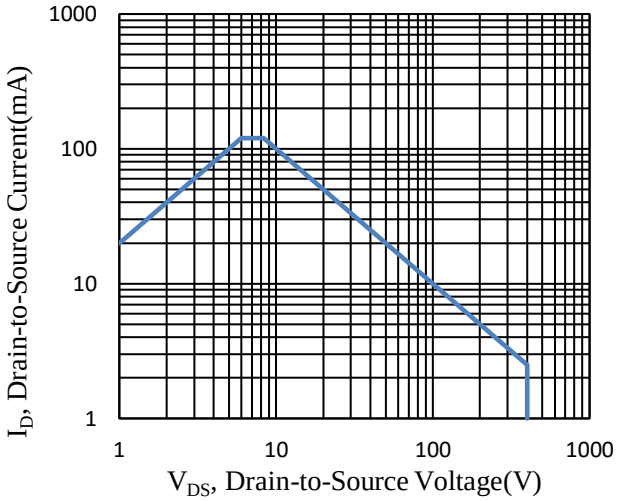
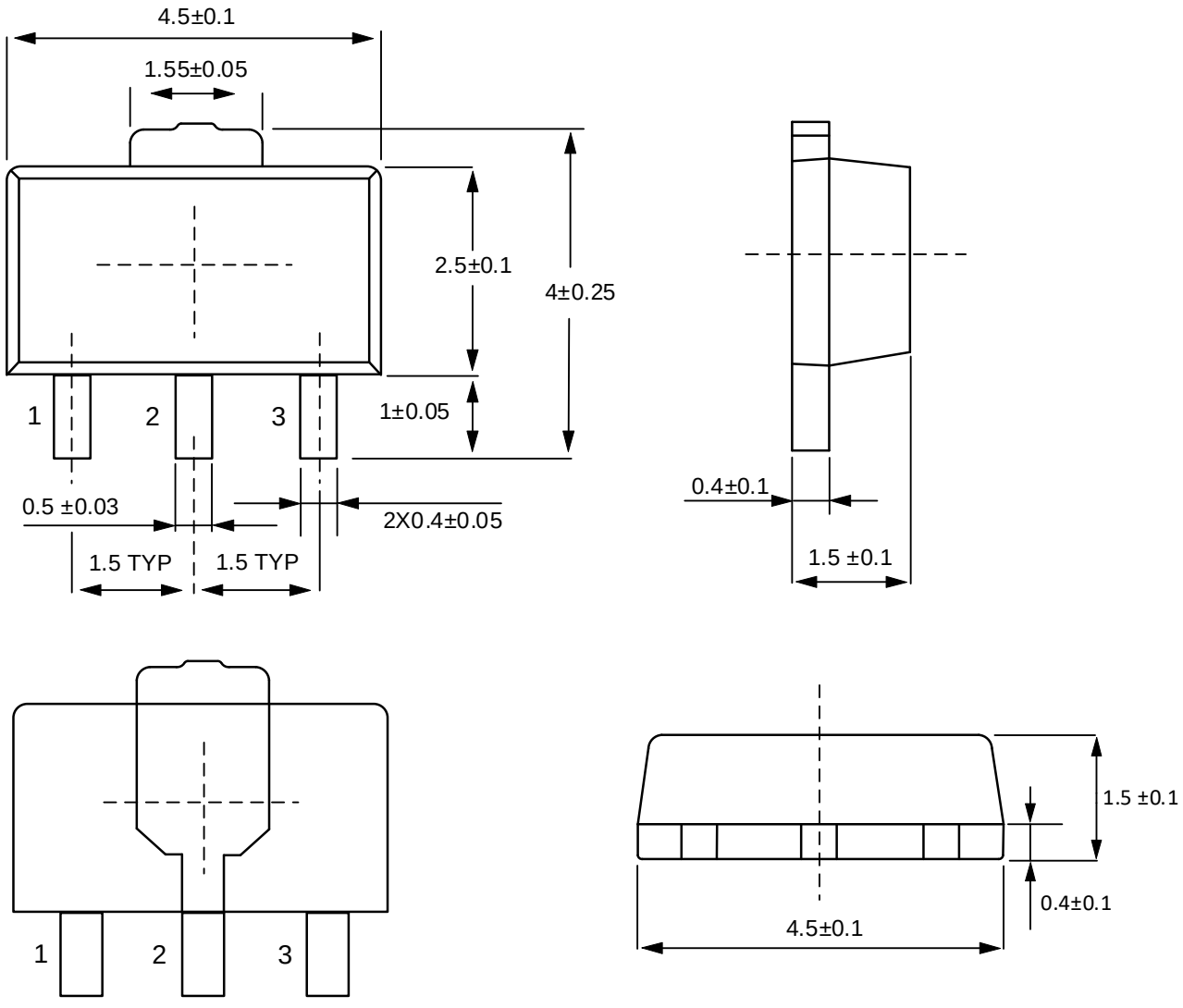


Figure 11. Maximum Forward Safe Operating Area



Package Dimensions

SOT-89



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