

Depletion-Mode Power MOSFET

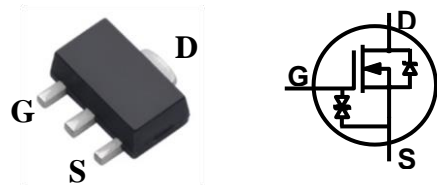
General Features

- Depletion Mode (Normally On)
- Proprietary Advanced Planar Technology
- Rugged Polysilicon Gate Cell Structure
- RoHS Compliant
- Halogen-free Available

BV_{DSX}	$R_{DS(ON)}$ (Max.)	I_D
550V	70Ω	0.09A

Applications

- Transient Protect
- Start-up
- Converters
- Normally On Switches
- LED Drive Circuits
- Power Supplies
- Current Source
- Voltage Source

SOT-89


Ordering Information

Part Number	Package	Marking	Remark
DMX5530E	SOT-89	5530	Halogen Free

Absolute Maximum Ratings

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

Symbol	Parameter	DMX5530E	Unit
V_{DSX}	Drain-to-Source Voltage ^[1]	550	V
V_{DGX}	Drain-to-Gate Voltage ^[1]	550	V
I_D	Continuous Drain Current	0.09	A
I_{DM}	Pulsed Drain Current ^[2]	0.36	
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	°C
T_J and 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	DMX5530E	Unit
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	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	550	--	--	V	$V_{GS} = -10\text{V}$, $I_D = 250\mu\text{A}$
$I_{D(OFF)}$	Drain-to-Source Leakage Current	--	--	2	μA	$V_{DS} = 550\text{V}$, $V_{GS} = -10\text{V}$
I_{GSS}	Gate-to-Source Leakage Current	--	--	10	μA	$V_{GS} = +20\text{V}$, $V_{DS} = 0\text{V}$
		--	--	-10		$V_{GS} = -20\text{V}$, $V_{DS} = 0\text{V}$

ON Characteristics

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

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
$R_{DS(ON)}$	Static Drain-to-Source On-Resistance	--	--	70	Ω	$V_{GS} = 0\text{V}$, $I_D = 50\text{mA}^{[3]}$
$V_{GS(OFF)}$	Gate-to-Source Cut-off Voltage	-1.5	--	-3.8	V	$V_{DS} = 3\text{V}$, $I_D = 8\mu\text{A}$
gfs	Forward Transconductance	--	60.3	--	mS	$V_{DS} = 10\text{V}$, $I_D = 50\text{mA}^{[3]}$

Dynamic Characteristics

Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
C_{iss}	Input Capacitance	--	58.5	--	pF	$V_{GS} = -10\text{V}$ $V_{DS} = 25\text{V}$ $f = 1.0\text{MHz}$
C_{oss}	Output Capacitance	--	13.8	--		
C_{rss}	Reverse Transfer Capacitance	--	3.9	--		
Q_g	Total Gate Charge	--	215.4	--	nC	$V_{GS} = -10\text{V} \sim 0\text{V}$ $V_{DD} = 25\text{V}$ $I_D = 50\text{mA}$
Q_{gs}	Gate-to-Source Charge	--	35.8	--		
Q_{gd}	Gate-to-Drain (Miller) Charge	--	112	--		

Resistive Switching Characteristics

Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
$t_{d(on)}$	Turn-on Delay Time	--	5.9	--	ns	$V_{GS} = -10\text{V} \sim 0\text{V}$ $V_{DD} = 25\text{V}$ $I_D = 50\text{mA}$ $R_G = 10\Omega$
t_{rise}	Rise Time	--	8.8	--		
$t_{d(off)}$	Turn-off Delay Time	--	16.5	--		
t_{fall}	Fall Time	--	305	--		

Source-Drain Diode Characteristics

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

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
V_{SD}	Diode Forward Voltage	--	0.8	1.5	V	$I_{SD} = 50\text{mA}^{[3]}$, $V_{GS} = -10\text{V}$

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

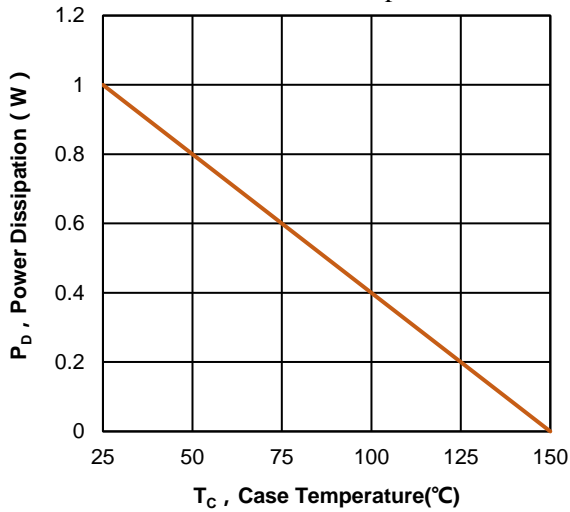


Figure 2. Maximum Continuous Drain Current vs. Case Temperature

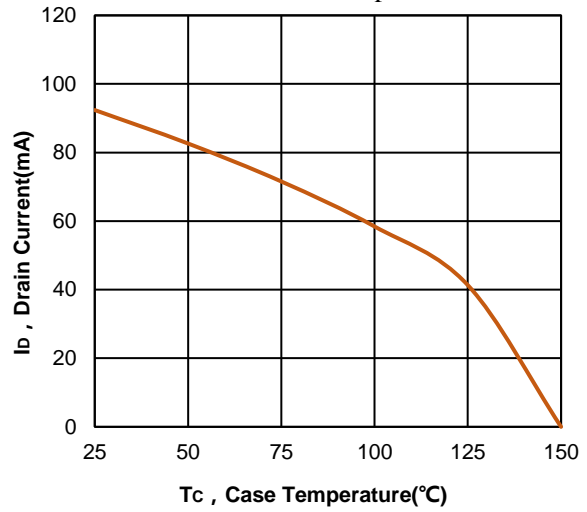


Figure 3. Typical Output Characteristics

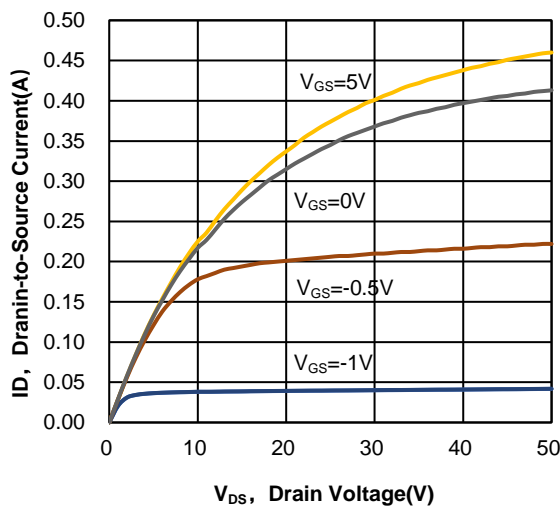


Figure 4. Typical Transfer Characteristics

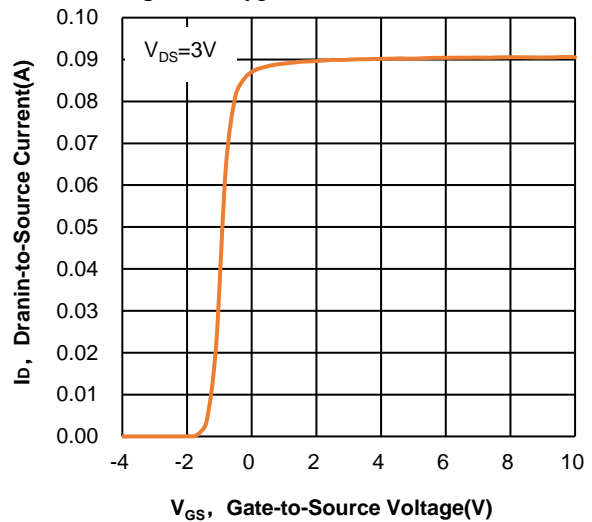


Figure 5. Typical Capacitance vs. Drain-to-Source Voltage

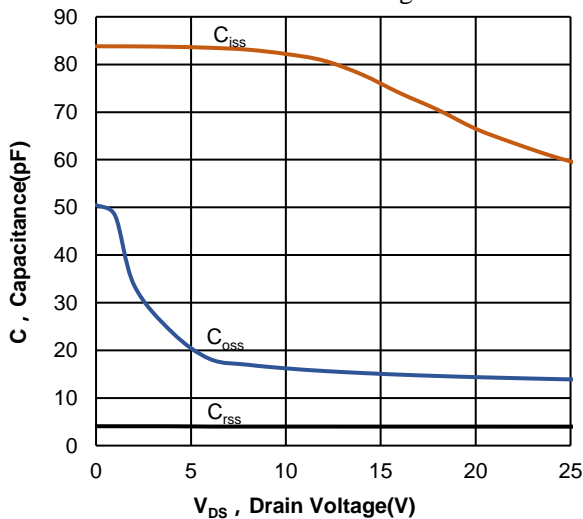
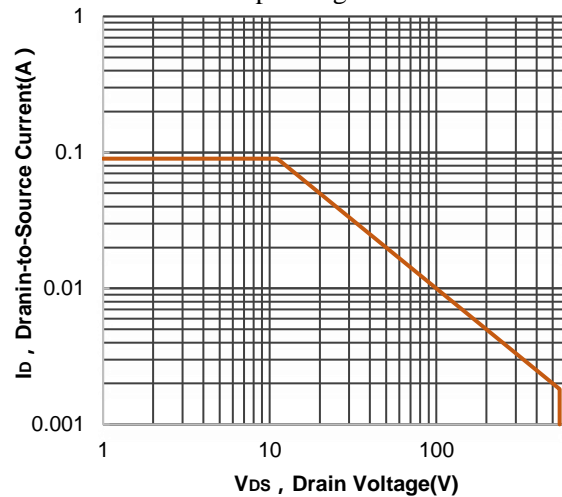
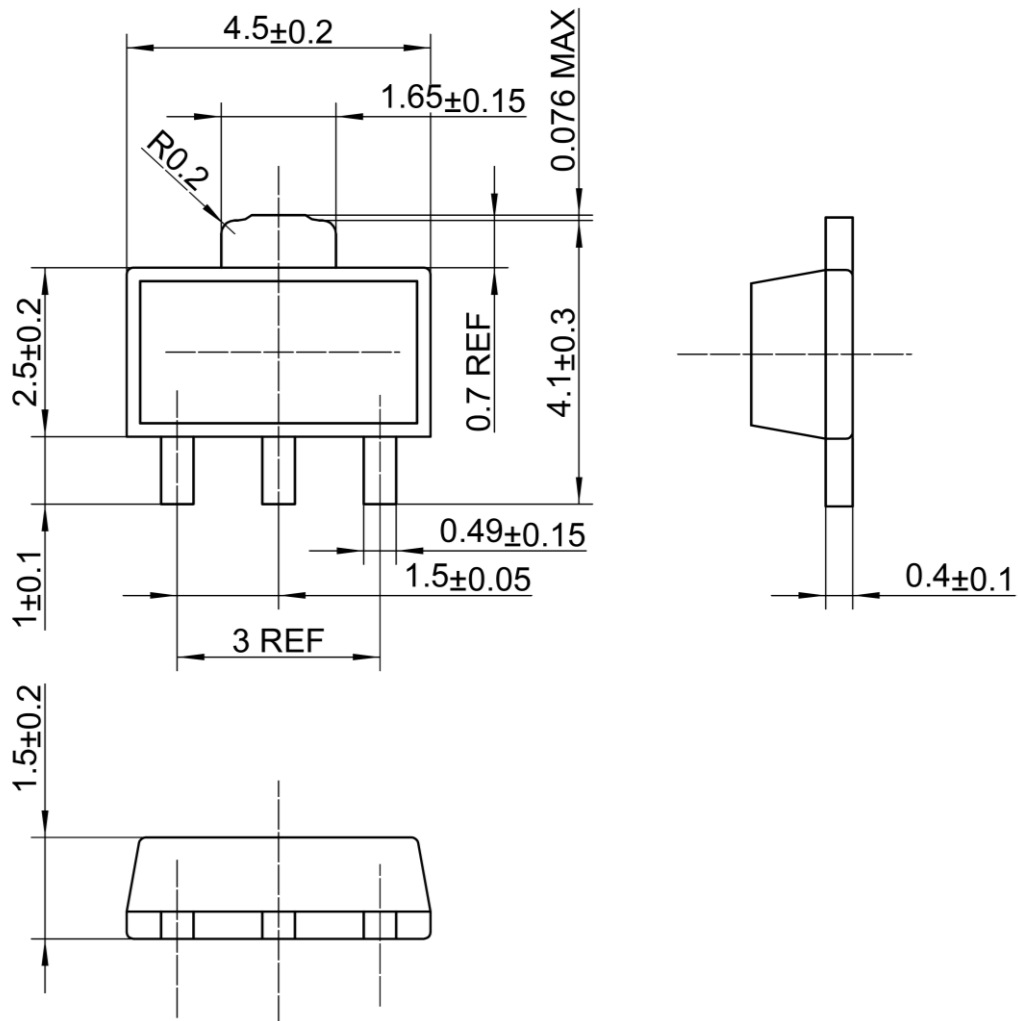


Figure 6. Maximum Rated Safe Operating Area



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