

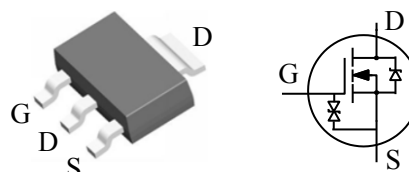
## 150V N-Channel Enhancement Mode MOSFET

### General Features

- ESD Improved Capability
- Proprietary Advanced Planar Technology
- Rugged Polysilicon Gate Cell Structure
- Fast Switching Speed
- RoHS Compliant
- Halogen-free Available

<b>BV<sub>DSX</sub></b>	<b>R<sub>DS(ON)</sub> (Typ.)</b>	<b>I<sub>D</sub></b>
<b>150V</b>	<b>5 Ω</b>	<b>0.35A</b>

SOT-223



### Applications

- Relay Driver
- High Speed Line Driver
- Logic Level Translator

### Ordering Information

Part Number	Package	Marking	Remark
FTS10N15G	SOT-223	10N15G	Halogen Free

### Absolute Maximum Ratings

T<sub>A</sub> = 25°C unless otherwise specified

Symbol	Parameter	FTS10N15G	Unit
V <sub>DSX</sub>	Drain-to-Source Voltage <sup>[1]</sup>	150	V
V <sub>DGX</sub>	Drain-to-Gate Voltage <sup>[1]</sup>	150	V
I <sub>D</sub>	Continuous Drain Current	0.35	A
I <sub>DM</sub>	Pulsed Drain Current <sup>[2]</sup>	1.4	
P <sub>D</sub>	Power Dissipation	1.5	W
	Derating Factor above 25°C	0.012	W/°C
V <sub>GS</sub>	Gate-to-Source Voltage	±20	V
V <sub>ESD(G-S)</sub>	Gate-to-Source ESD IEC, C=150pF, R=330Ω	2500	V
T <sub>L</sub>	Soldering Temperature Distance of 1.6mm from case for 10 seconds	300	°C
T <sub>J</sub> and T <sub>STG</sub>	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	FTS10N15G	Unit
R <sub>θJA</sub>	Thermal Resistance, Junction-to-Ambient	83.3	°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	150	--	--	V	$V_{GS}=0V, I_D=250\mu A$
$\Delta BV_{DSS}/\Delta T_J$	Breakdown Voltage Temperature Coefficient	--	0.15	--	V/°C	Reference to $25^\circ\text{C}$ , $I_D=250\mu A$
$I_{DSS}$	Drain-to-Source Leakage Current	--	--	1	$\mu A$	$V_{DS}=150V, V_{GS}=0V$
		--	--	100	$\mu A$	$V_{DS}=120V, V_{GS}=0V$ $T_J=125^\circ\text{C}$
$I_{GSS}$	Gate-to-Source Leakage Current	--	--	10	$\mu A$	$V_{GS}=+20V, V_{DS}=0V$
		--	--	-10		$V_{GS}=-20V, V_{DS}=0V$

### 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	--	5	10	$\Omega$	$V_{GS}=10V, I_D=250mA$ [3]
$V_{GS(th)}$	Gate Threshold Voltage	1.5	--	2.5	V	$V_{GD}=0V, I_D=250\mu A$
gfs	Forward Transconductance	--	360	--	mS	$V_{DS}=5V, I_D=175mA$ [3]

### Dynamic Characteristics

Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
$C_{ISS}$	Input Capacitance	--	32.8	--	pF	$V_{GS}=0V$ $V_{DS}=10V$ $f=1.0MHz$
$C_{OSS}$	Output Capacitance	--	17.2	--		
$C_{RSS}$	Reverse Transfer Capacitance	--	4.6	--		
$Q_G$	Total Gate Charge	--	1.2	--	nC	$V_{DS}=60V$ $I_D=250mA$ $V_{GS}=5V$
$Q_{GS}$	Gate-to-Source Charge	--	0.4	--		
$Q_{GD}$	Gate-to-Drain (Miller) Charge	--	0.7	--		

### Resistive Switching Characteristics

Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
$t_{d(on)}$	Turn-on Delay Time	--	3.6	--	ns	$V_{DD}=50V$ $R_D=250\Omega$ $R_G=50\Omega$ $V_{GS}=10V$
$t_{rise}$	Rise Time	--	7.2	--		
$t_{d(off)}$	Turn-off Delay Time	--	16.0	--		
$t_{fall}$	Fall Time	--	36.8	--		

**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	$I_{SD}=300\text{mA}$ , $V_{GS}=0\text{V}$
$I_{SD}$	Continuous Source Current (Body Diode)	--	--	0.5	A	Integral P-N diode in MOSFET
$I_{SM}$	Maximum Pulsed Current (Body Diode)	--	--	2.0	A	

**NOTE:**

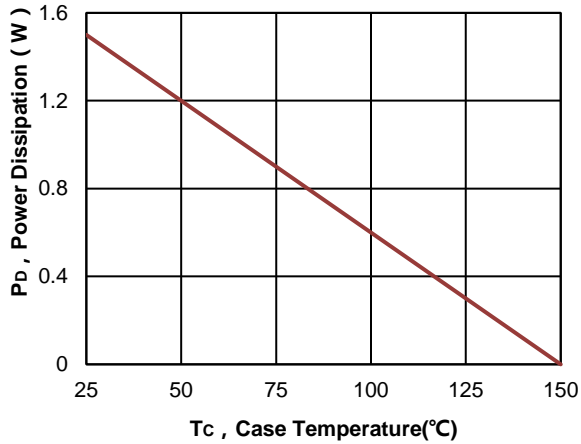
[1]  $T_J = +25^\circ\text{C}$  to  $+150^\circ\text{C}$

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

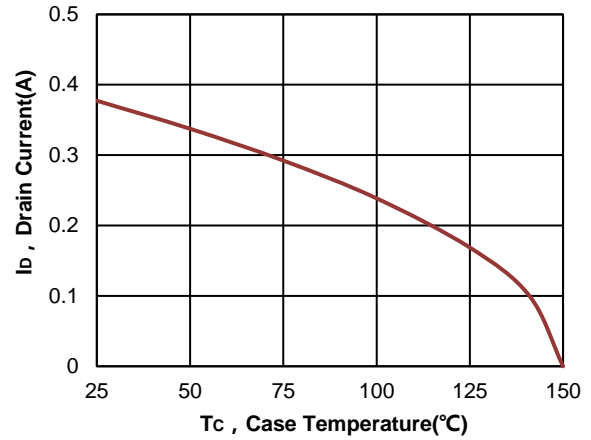
[3] Pulse width  $\leq 380\mu\text{s}$ ; duty cycle  $\leq 2\%$ .

## Typical Characteristics

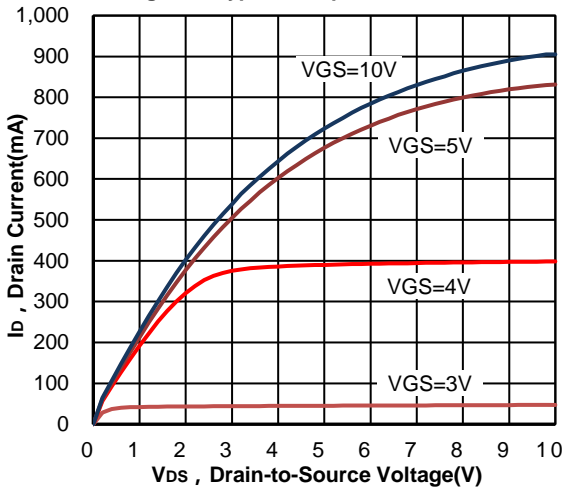
**Figure 1. Maximum Power Dissipation vs. Case Temperature**



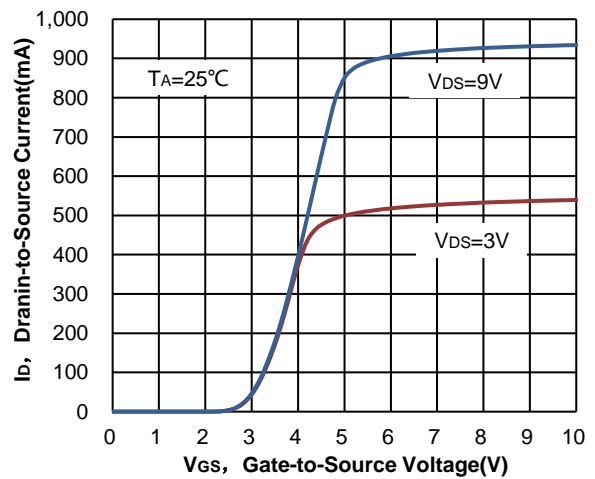
**Figure 2. Maximum Continuous Drain Current vs Case Temperature**



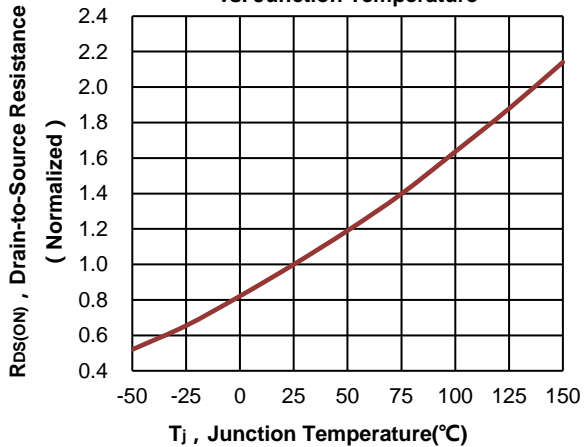
**Figure 3. Typical Output Characteristics**



**Figure 4. Typical Transfer Characteristics**



**Figure 5. Typical Drain-to-Source On-Resistance vs. Junction Temperature**



**Figure 6. Typical Breakdown Voltage vs. Junction Temperature**

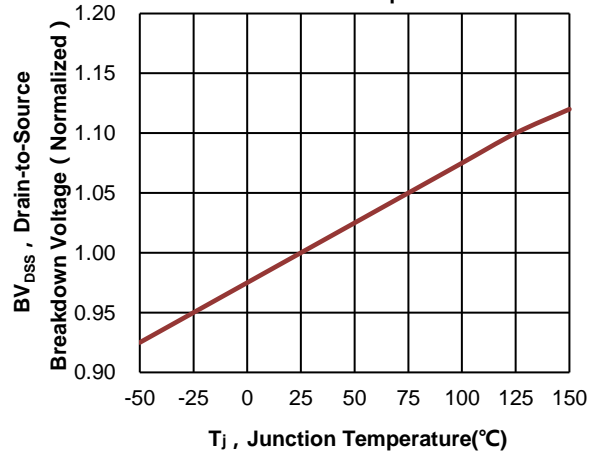


Figure 7. Typical Body Diode Transfer Characteristics

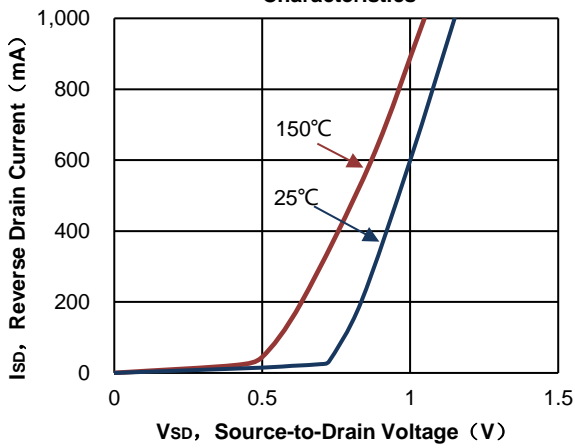


Figure 8. Typical Capacitance vs. Drain-to-Source Voltage

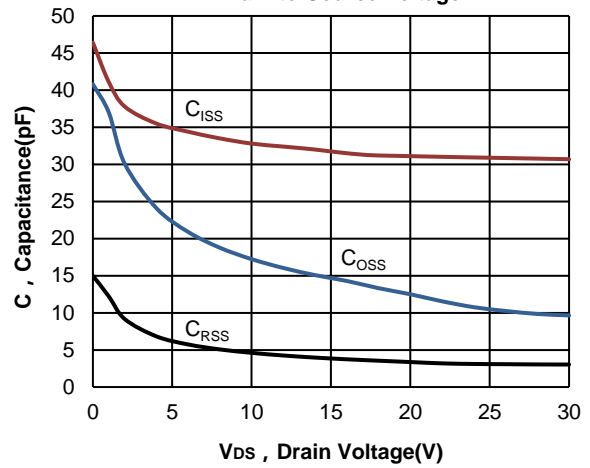
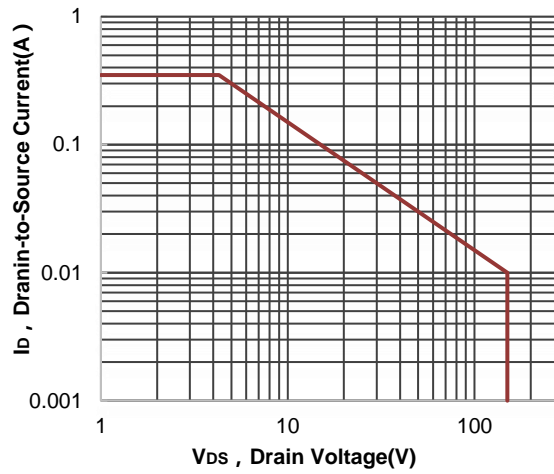
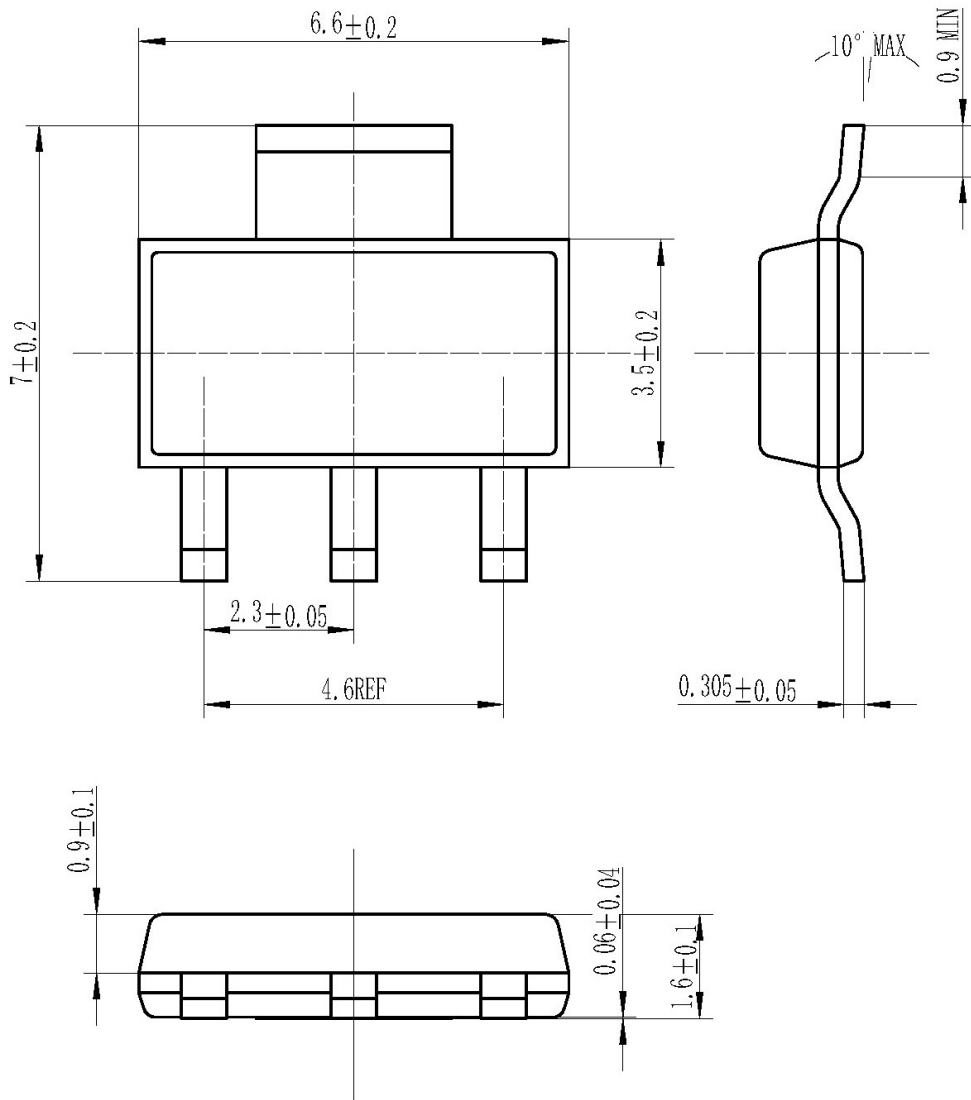


Figure 9. Maximum Forward Safe Operating Area



**Package Dimensions****SOT-223**

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