

## N-Channel 600-V (D-S) MOSFET

### PRODUCT SUMMARY

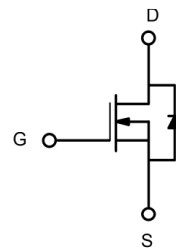
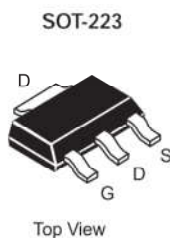
V <sub>DS</sub> (V)	R <sub>DS(on)</sub> (Ω)(Typ.)	I <sub>D</sub> (A) <sup>a</sup>	Q <sub>g</sub> (Typ.)
600	25 at V <sub>GS</sub> = 10 V	0.12	3.6 nC

### FEATURES

- Depletion mode MOSFET
- 100 % R<sub>g</sub> Tested
- Low Gate Charge

### APPLICATIONS

- Load Switch


**RoHS**  
 COMPLIANT


N-Channel MOSFET

### ABSOLUTE MAXIMUM RATINGS T<sub>A</sub> = 25 °C, unless otherwise noted

Parameter		Symbol	Limit	Unit
Drain-Source Voltage		V <sub>DS</sub>	600	V
Gate-Source Voltage		V <sub>GS</sub>	± 30	
Continuous Drain Current (T <sub>J</sub> = 150 °C)	T <sub>A</sub> = 25 °C	I <sub>D</sub>	0.12 <sup>b, c</sup>	A
	T <sub>A</sub> = 70 °C		0.10 <sup>b, c</sup>	
Pulsed Drain Current	T <sub>A</sub> = 25 °C	I <sub>DM</sub>	0.48	
Continuous Source-Drain Diode Current	T <sub>A</sub> = 25 °C	I <sub>S</sub>	0.12 <sup>b, c</sup>	
Avalanche Current	L = 0.1 mH	I <sub>AS</sub>	0.1	mJ
Single-Pulse Avalanche Energy		E <sub>AS</sub>	0.1	
Maximum Power Dissipation	T <sub>C</sub> = 25 °C	P <sub>D</sub>	2.5	W
	T <sub>C</sub> = 70 °C		1.9	
	T <sub>A</sub> = 25 °C		1.86 <sup>b, c</sup>	
	T <sub>A</sub> = 70 °C		0.7 <sup>b, c</sup>	
Operating Junction and Storage Temperature Range		T <sub>J</sub> , T <sub>stg</sub>	- 55 to 150	°C

### THERMAL RESISTANCE RATINGS

Parameter		Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient <sup>b, d</sup>	≤ 5 s	R <sub>thJA</sub>	90	115	°C/W
Maximum Junction-to-Foot (Drain)	Steady State	R <sub>thJF</sub>	60	75	

Notes:

 a. Based on T<sub>C</sub> = 25 °C.

b. Surface Mounted on 1" x 1" FR4 board.

c. t = 5 s.

d. Maximum under Steady State conditions is 120 °C/W.

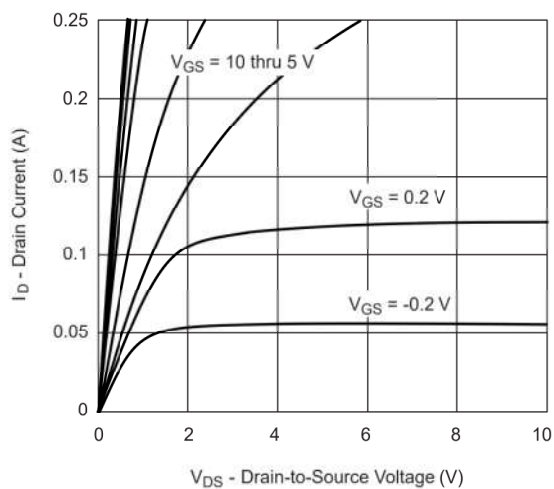
MOSFET SPECIFICATIONS $T_J = 25\text{ }^{\circ}\text{C}$ , unless otherwise noted						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
Drain-Source Breakdown Voltage	$V_{DS}$	$V_{DS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$	600			V
$V_{DS}$ Temperature Coefficient	$\Delta V_{DS}/T_J$	$I_D = 250\text{ }\mu\text{A}$		0.6		mV/ $^{\circ}\text{C}$
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}/T_J$			- 1.5		
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 100\text{ }\mu\text{A}$	-2.5		-1	V
Gate-Source Leakage	$I_{GSS}$	$V_{DS} = 0\text{ V}, V_{GS} = 20\text{ V}$			100	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 10\text{ V}, V_{GS} = 0\text{ V}$	20			mA
On-State Drain Current <sup>a</sup>	$I_{D(on)}$	$V_{DS} \geq 5\text{ V}, V_{GS} = 10\text{ V}$	0.1			A
Drain-Source On-State Resistance <sup>a</sup>	$R_{DS(on)}$	$V_{GS} = 0\text{ V}, I_D = 0.01\text{ A}$		30	60	$\Omega$
		$V_{GS} = 10\text{ V}, I_D = 0.1\text{ A}$		25	45	
Forward Transconductance <sup>a</sup>	$g_{fs}$	$V_{DS} = 5\text{ V}, I_D = 0.1\text{ A}$		0.15		S
Dynamic <sup>b</sup>						
Input Capacitance	$C_{iss}$	$V_{DS} = 25\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$		96		pF
Output Capacitance	$C_{oss}$			7.5		
Reverse Transfer Capacitance	$C_{rss}$			3.3		
Total Gate Charge	$Q_g$	$V_{DS} = 300\text{ V}, V_{GS} = -3\text{ to }5\text{ V}, I_D = 0.1\text{ A}$		3.6		nC
Gate-Source Charge	$Q_{gs}$			0.2		
Gate-Drain Charge	$Q_{gd}$			2		
Gate Resistance	$R_g$	$f = 1\text{ MHz}$		4.5		$\Omega$
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 300\text{ V}, I_D = 0.1\text{ A}, V_{GEN} = -3\text{ to }5\text{ V}, R_G = 15\text{ }\Omega$		6		ns
Rise Time	$t_r$			20		
Turn-Off Delay Time	$t_{d(off)}$			10		
Fall Time	$t_f$			25		
Drain-Source Body Diode Characteristics						
Continuous Source-Drain Diode Current	$I_S$	$T_C = 25\text{ }^{\circ}\text{C}$			0.12	A
Pulse Diode Forward Current <sup>a</sup>	$I_{SM}$				0.48	
Body Diode Voltage	$V_{SD}$	$I_S = 0.2\text{ A}$			1.5	V
Body Diode Reverse Recovery Time	$t_{rr}$	$I_F = 0.2\text{ A}, dI/dt = 100\text{ A}/\mu\text{s}, T_J = 25\text{ }^{\circ}\text{C}$		195		ns
Body Diode Reverse Recovery Charge	$Q_{rr}$			610		nC
Reverse Recovery Fall Time	$t_a$			8		ns
Reverse Recovery Rise Time	$t_b$			9		

Notes:

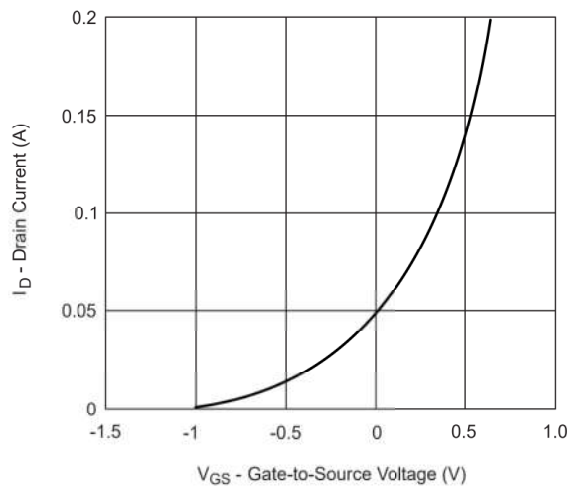
- a. Pulse test; pulse width  $\leq 300\text{ }\mu\text{s}$ , duty cycle  $\leq 2\%$ .  
b. Guaranteed by design, not subject to production testing.

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

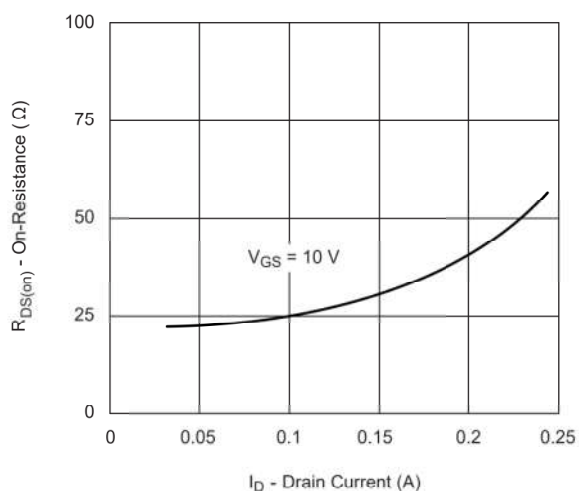
**TYPICAL CHARACTERISTICS** 25 °C, unless otherwise noted



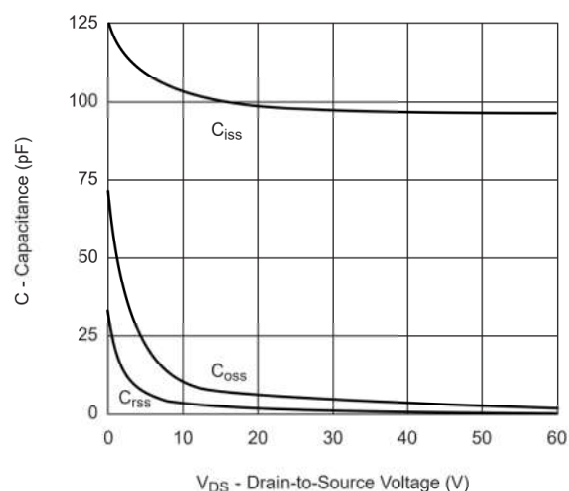
**Output Characteristics**



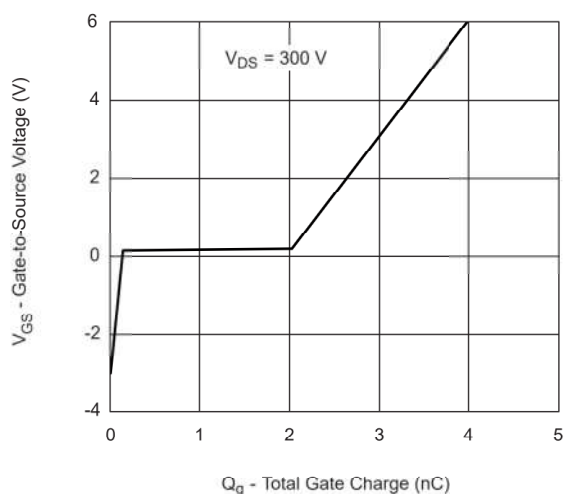
**Transfer Characteristics**



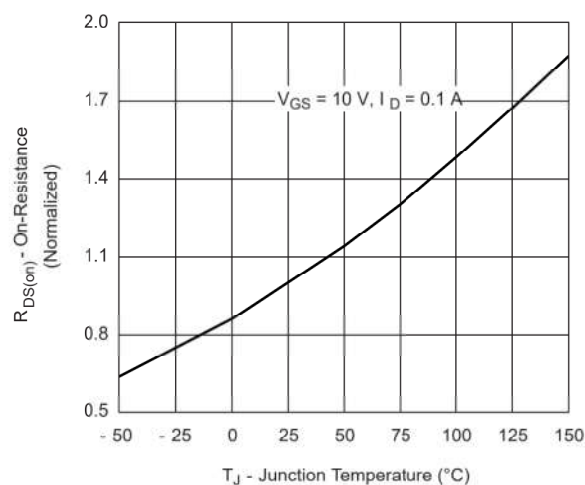
**On-Resistance vs. Drain Current and Gate Voltage**



**Capacitance**

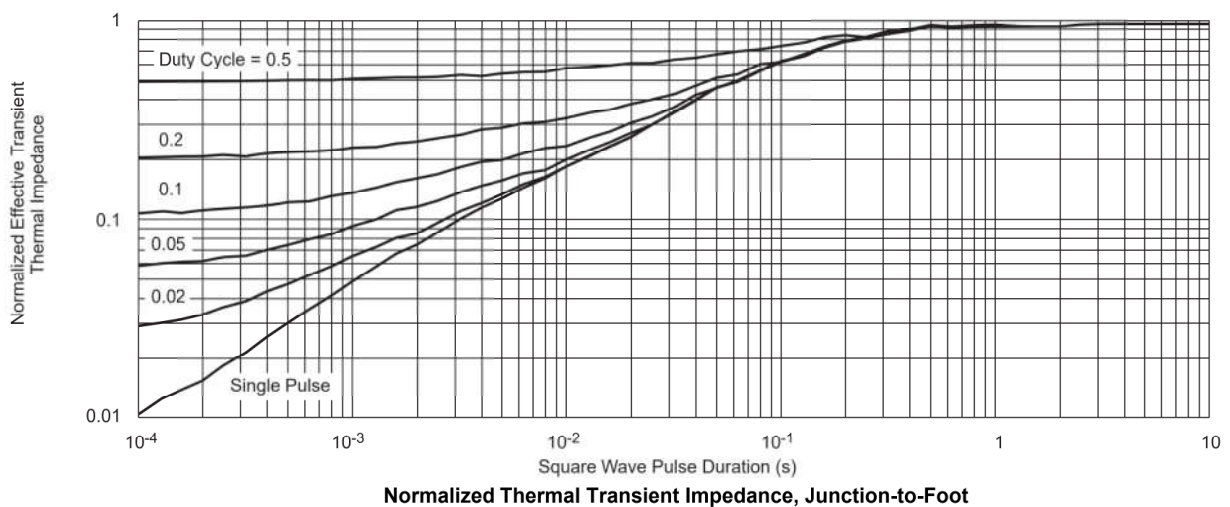
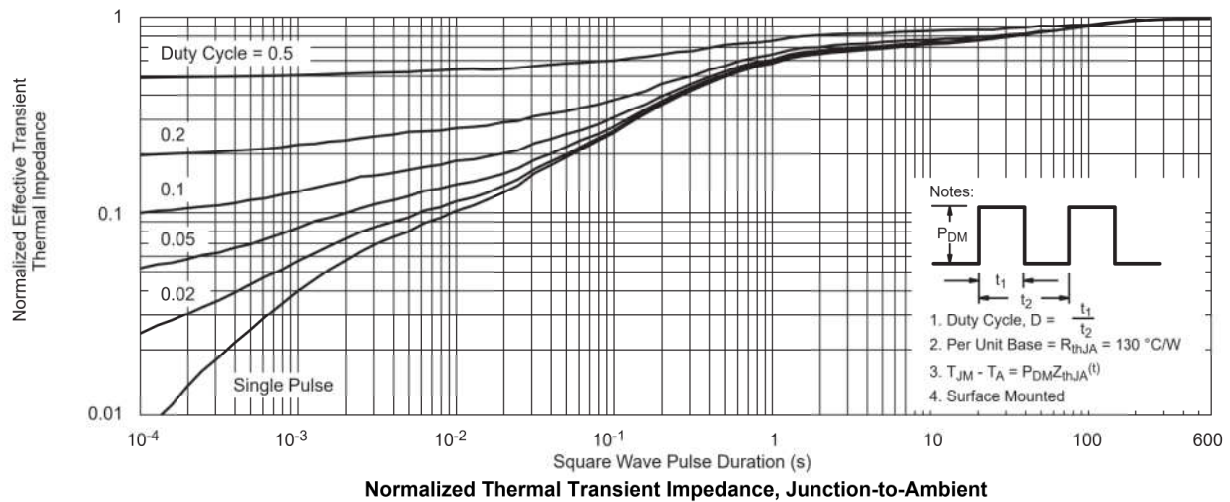
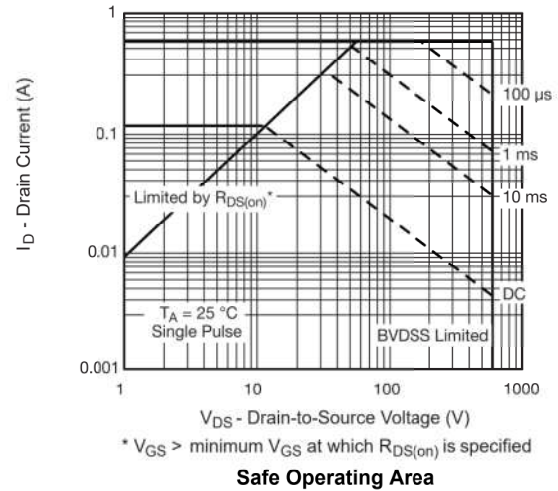
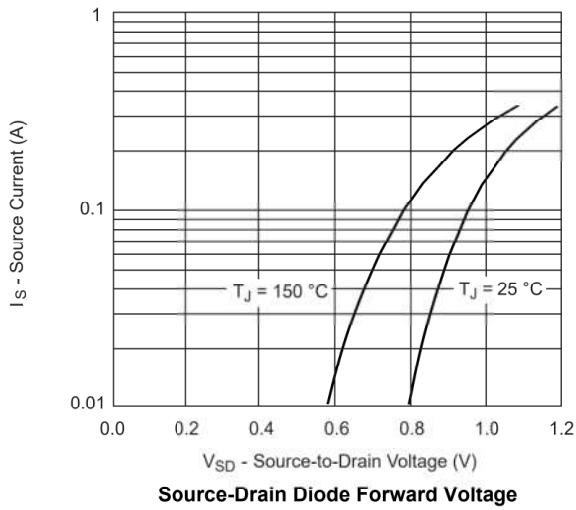


**Gate Charge**



**On-Resistance vs. Junction Temperature**

**TYPICAL CHARACTERISTICS** 25 °C, unless otherwise noted



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