

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

PRODUCT SUMMARY

V _{DS} (V)	R _{DS(on)} (Ω)(Typ.)	I _D (A) ^a	Q _g (Typ.)
600	25 at V _{GS} = 10 V	0.12	3.6 nC

FEATURES

- Depletion mode MOSFET
- 100 % R_g Tested
- Low Gate Charge

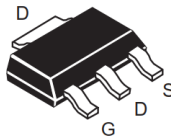
APPLICATIONS

- Load Switch

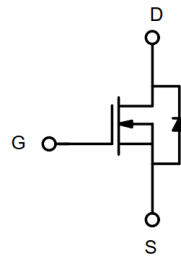


RoHS
COMPLIANT

SOT-223



Top View



N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS T_A = 25 °C, unless otherwise noted

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V _{DS}	600	V
Gate-Source Voltage	V _{GS}	± 30	
Continuous Drain Current (T _J = 150 °C)	I _D	T _A = 25 °C 0.12 ^{b, c}	A
		T _A = 70 °C 0.10 ^{b, c}	
Pulsed Drain Current	I _{DM}	T _A = 25 °C 0.48	
Continuous Source-Drain Diode Current	I _S	T _A = 25 °C 0.12 ^{b, c}	
Avalanche Current	I _{AS}	0.1	
Single-Pulse Avalanche Energy	E _{AS}	0.1	mJ
Maximum Power Dissipation	P _D	T _C = 25 °C 2.5	W
		T _C = 70 °C 1.9	
		T _A = 25 °C 1.86 ^{b, c}	
		T _A = 70 °C 0.7 ^{b, c}	
Operating Junction and Storage Temperature Range	T _J , T _{stg}	- 55 to 150	°C

THERMAL RESISTANCE RATINGS

Parameter	Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient ^{b, d}	R _{thJA}	90	115	°C/W
Maximum Junction-to-Foot (Drain)	R _{thJF}	60	75	

Notes:

- Based on T_C = 25 °C.
- Surface Mounted on 1" x 1" FR4 board.
- t = 5 s.
- Maximum under Steady State conditions is 120 °C/W.

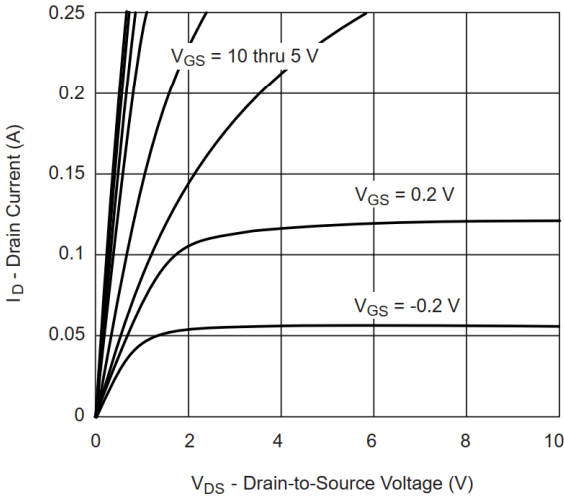
MOSFET SPECIFICATIONS $T_J = 25\text{ }^\circ\text{C}$, unless otherwise noted						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
Drain-Source Breakdown Voltage	V_{DS}	$V_{DS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$	600			V
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T_J$	$I_D = 250\text{ }\mu\text{A}$		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 ^a	$I_{D(on)}$	$V_{DS} \geq 5\text{ V}, V_{GS} = 10\text{ V}$	0.1			A
Drain-Source On-State Resistance ^a	$R_{DS(on)}$	$V_{GS} = 0\text{ V}, I_D = 0.01\text{ A}$		30	60	Ω
		$V_{GS} = 10\text{ V}, I_D = 0.1\text{ A}$		25	45	
Forward Transconductance ^a	g_{fs}	$V_{DS} = 5\text{ V}, I_D = 0.1\text{ A}$		0.15		S
Dynamic^b						
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		Ω
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 ^a	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:

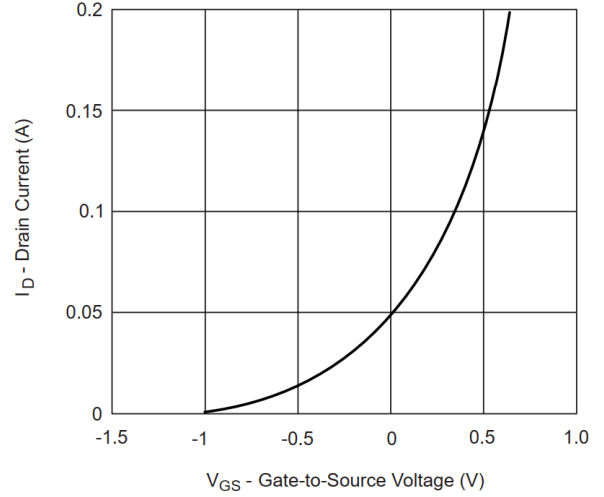
- a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.
b. Guaranteed by design, not subject to production testing.

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.

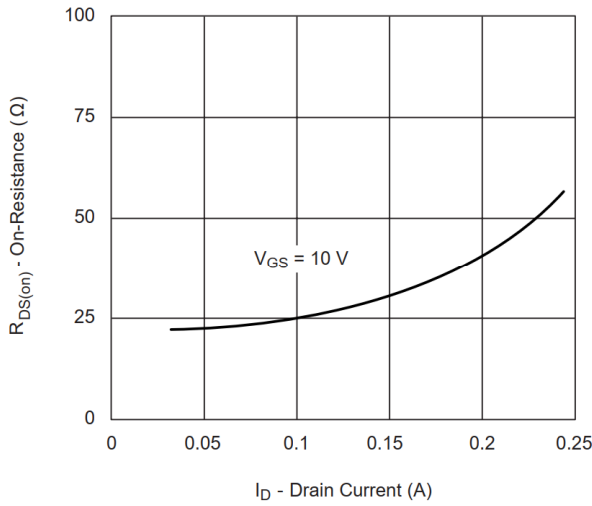
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



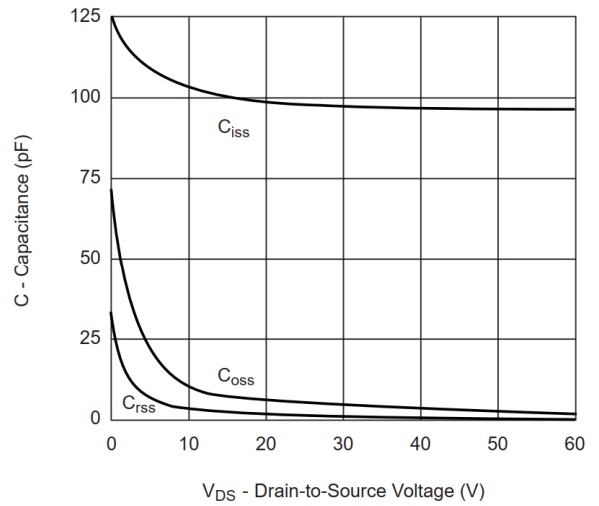
Output Characteristics



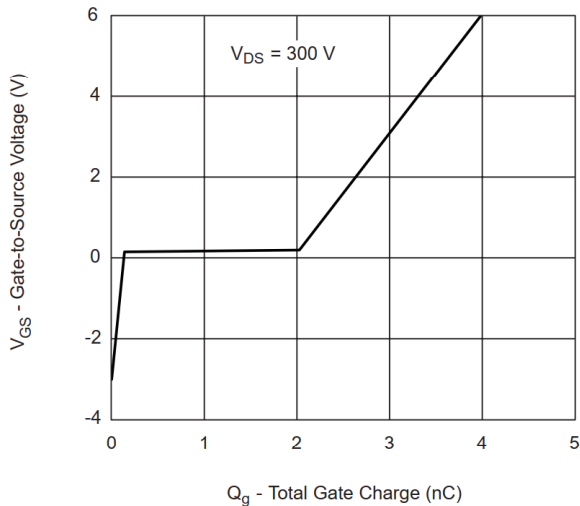
Transfer Characteristics



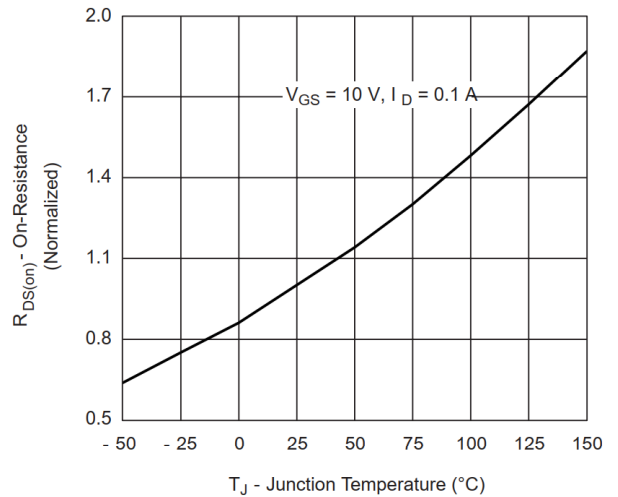
On-Resistance vs. Drain Current and Gate Voltage



Capacitance

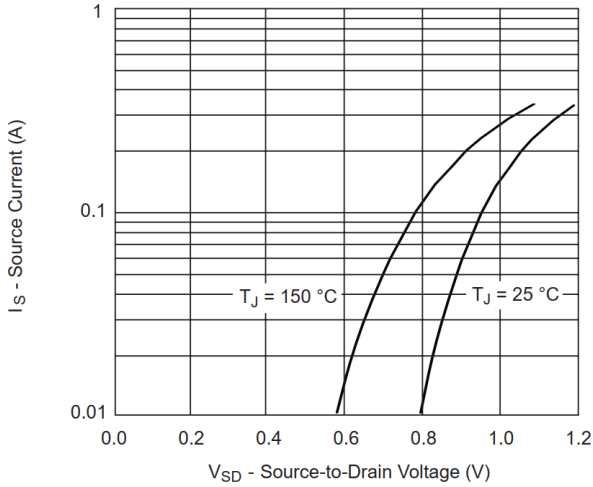


Gate Charge

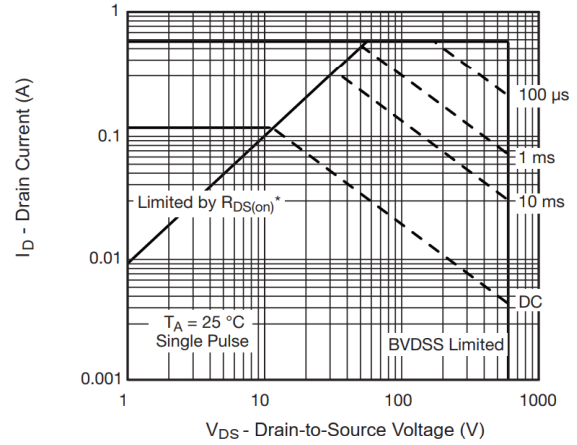


On-Resistance vs. Junction Temperature

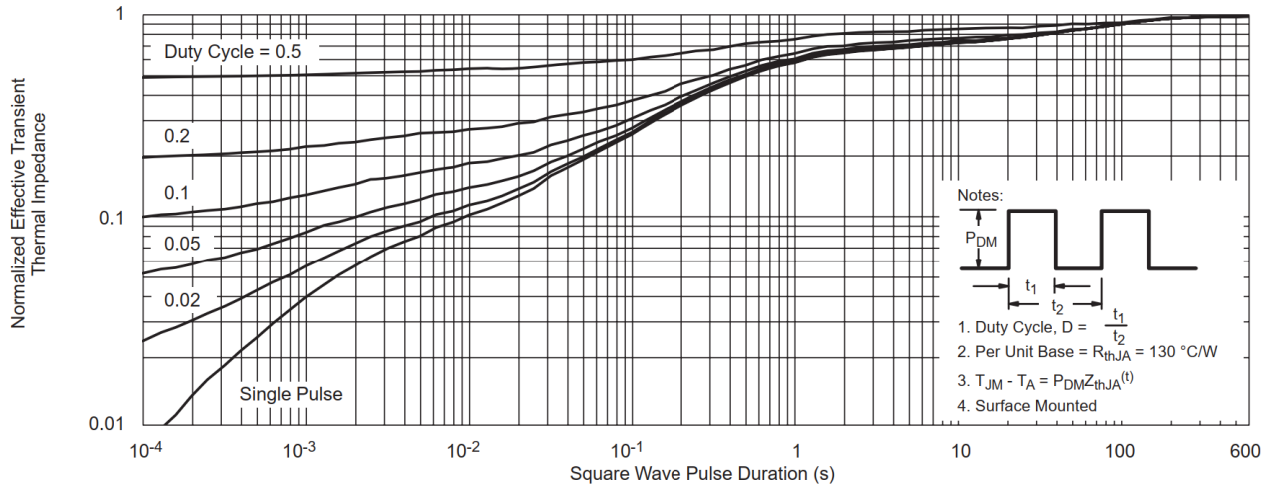
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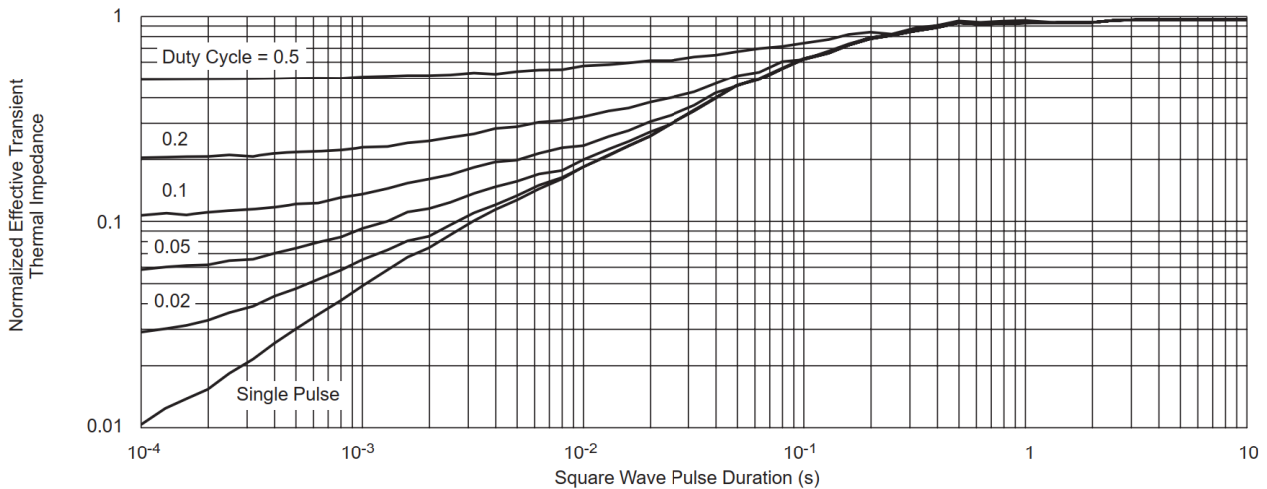
Source-Drain Diode Forward Voltage



Safe Operating Area
* $V_{GS} >$ minimum V_{GS} at which $R_{DS(on)}$ is specified

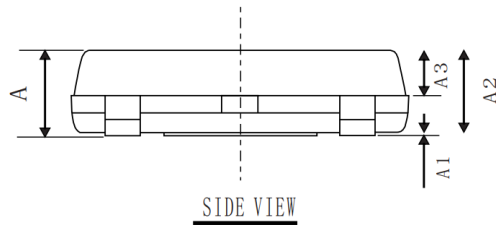
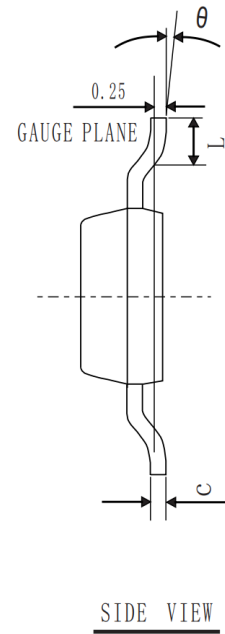
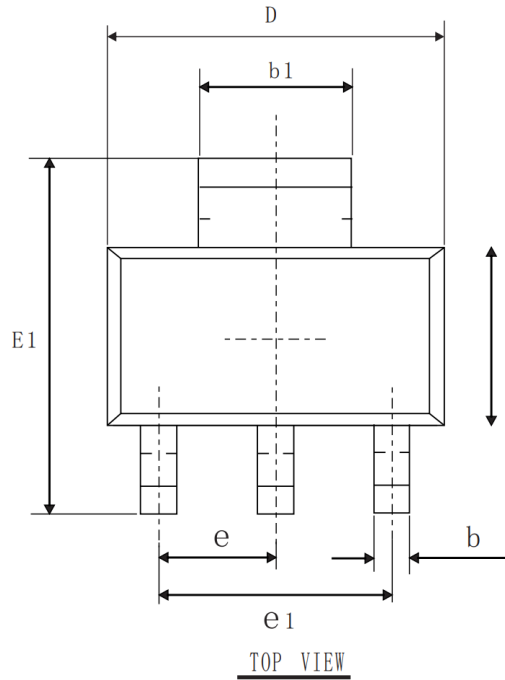


Normalized Thermal Transient Impedance, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Foot

SOT-223-3L PACKAGE OUTLINE



COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)

SYMBOL	MIN	TYP	MAX
A	-	-	1.95
A1	0.00	0.05	0.16
A2	1.35	1.60	1.85
A3	0.65	0.90	1.15
b	0.55	0.70	0.90
b1	2.75	3.00	3.30
C	0.18	0.30	0.42
D	6.00	6.50	7.00
E	3.10	3.50	3.90
E1	6.50	7.00	7.50
e1	4.20	4.60	5.00
L	0.78	-	1.28
θ	0°	5°	10°
e	2.3BSC		

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