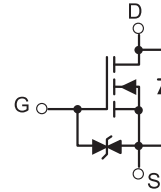


## N-Channel Power MOSFET

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	$I_D$
20V	700mΩ@4.5V	500mA
	850mΩ@2.5V	

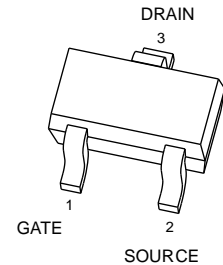


### FEATURE

- High-Side Switching
- Low On-Resistance
- Low Threshold
- Fast Switching Speed
- ESD protected

### APPLICATIONS

- Drivers: Relays, Solenoids, Lamps, Hammers, Displays, Memories
- Battery Operated Systems
- Power Supply Converter Circuits
- Load/Power Switching Cell Phones, Pagers



**SOT-323**

**Marking : NA1**

### Maximum ratings ( $T_a=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source voltage <sup>e</sup>	$V_{DSS}$	20	V
Gate-Source Voltage	$V_{GS}$	±10	
Drain Current-Continuous	$I_{D(DC)}$	500	mA
Drain Current -Pulsed(note1)	$I_{DM(pulse)}$	1000	
Power Dissipation (note 2 , $T_a=25^\circ\text{C}$ )	$P_D$	150	mW
Maximum Power Dissipation (note 3 , $T_c=25^\circ\text{C}$ )		275	
Thermal Resistance from Junction to Ambient	$R_{\theta JA}$	833	$^\circ\text{C/W}$
Thermal Resistance from Junction to Case	$R_{\theta JC}$	455	
Storage Temperature	$T_j$	150	$^\circ\text{C}$
Junction Temperature	$T_{stg}$	-55 ~+150	

**N-Channel Power MOSFET****T<sub>a</sub>=25 °C unless otherwise specified**

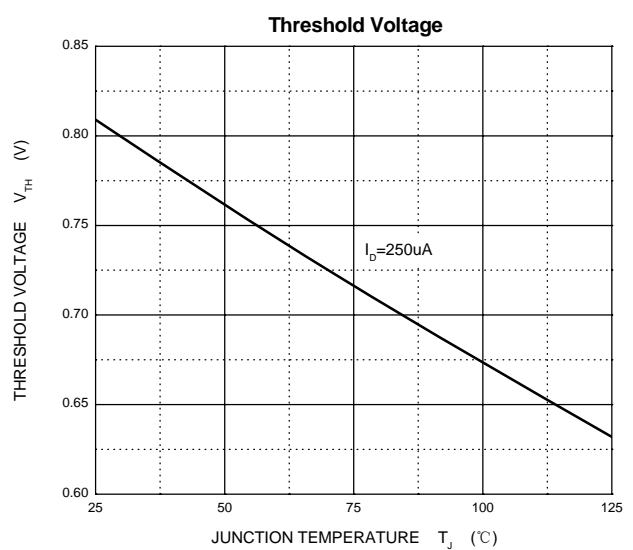
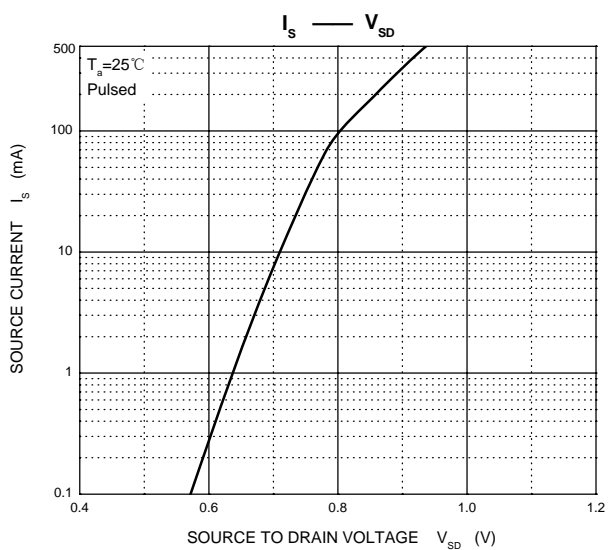
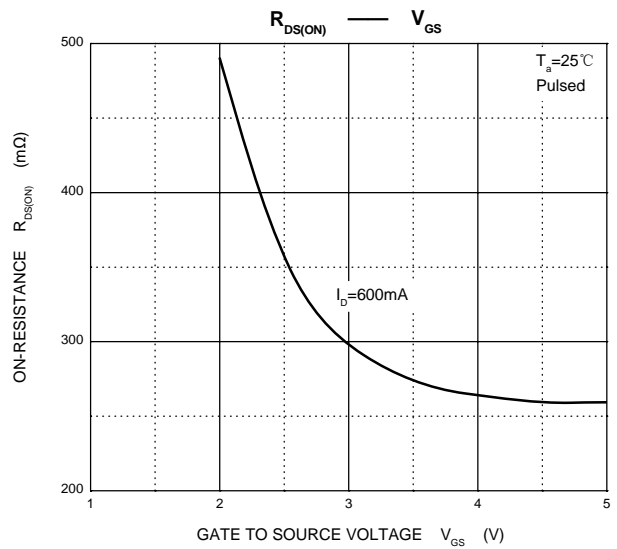
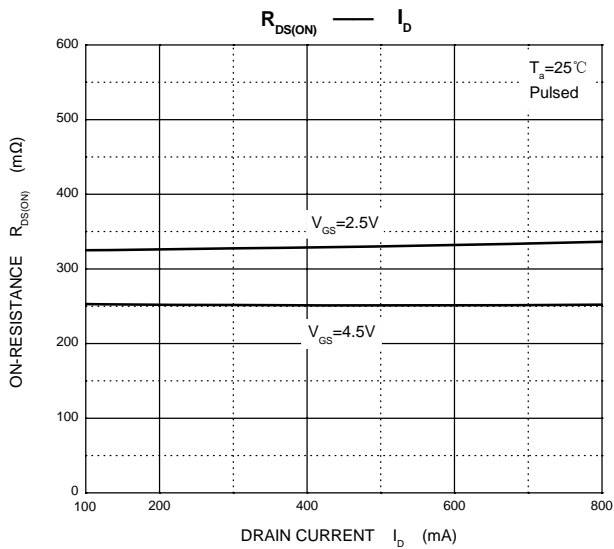
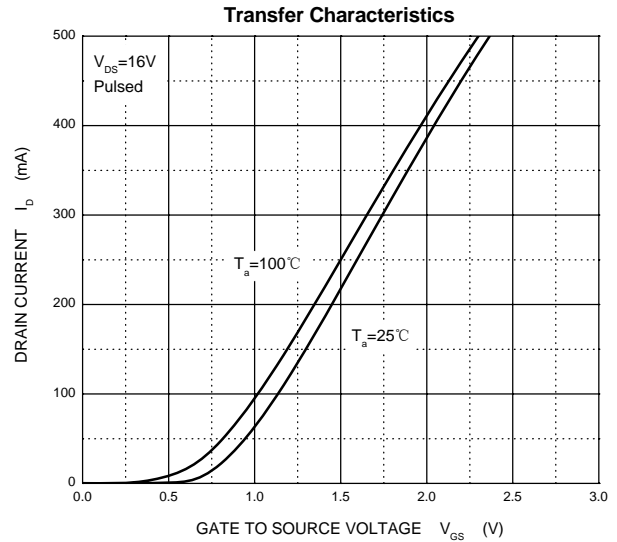
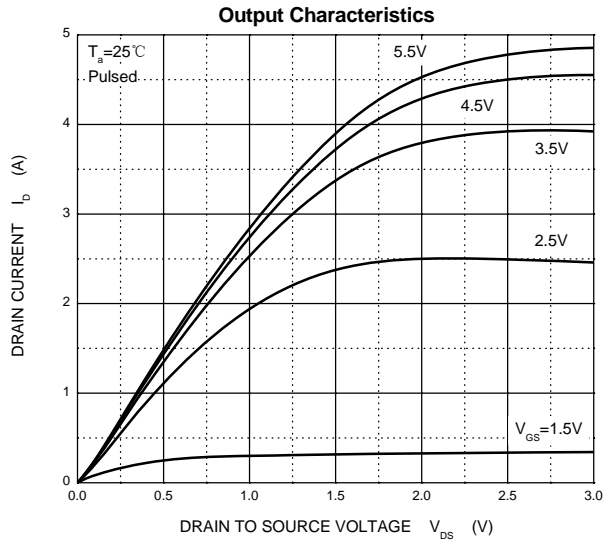
Parameter	Symbol	Test Condition	Min	Typ	Max	Unit	
<b>On/Off States</b>							
Drain-Source Breakdown Voltage	V <sub>(BR)DSS</sub>	V <sub>GS</sub> = 0V, I <sub>D</sub> =250μA	20			V	
Gate-Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	0.45	0.8	1.2		
Gate-Body Leakage Current	I <sub>GSS</sub>	V <sub>DS</sub> =0V, V <sub>GS</sub> =±4.5V			±1	μA	
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =16V, V <sub>GS</sub> =0V			100	nA	
Drain-Source On-State Resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> =4.5V, I <sub>D</sub> =600mA		250	700	mΩ	
		V <sub>GS</sub> =2.5V, I <sub>D</sub> =500mA		330	850		
Forward Transconductance	g <sub>FS</sub>	V <sub>DS</sub> =10V, I <sub>D</sub> =400mA		1		S	
<b>Dynamic Characteristics</b>							
Input Capacitance (note 4)	C <sub>ISS</sub>	V <sub>DS</sub> =16V, V <sub>GS</sub> =0V, f =1MHz		100		pF	
Output Capacitance (note 4)	C <sub>OSS</sub>				16		
Reverse Transfer Capacitance (note 4)	C <sub>RSS</sub>				12		
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =10V, V <sub>GS</sub> =4.5V, I <sub>D</sub> =250mA		750		nC	
Gate-Source Charge	Q <sub>gs</sub>				75		
Gate-Drain Charge	Q <sub>gd</sub>				225		
<b>Switching Times (note 4)</b>							
Turn-On Delay Time	t <sub>d(on)</sub>	V <sub>DD</sub> =10V, R <sub>L</sub> =47Ω, I <sub>D</sub> =200mA, V <sub>GS</sub> =4.5V, R <sub>G</sub> =10Ω		5		nS	
Rise Time	t <sub>r</sub>				5		
Turn-Off Delay Time	t <sub>d(off)</sub>				25		
Fall Time	t <sub>f</sub>				11		
<b>Drain-Source Diode Characteristics</b>							
Drain-Source Diode Forward Voltage (note 5)	V <sub>SD</sub>	I <sub>S</sub> =0.15A, V <sub>GS</sub> = 0V			1.2	V	

**Notes:**

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. This test is performed with no heat sink at T<sub>a</sub>=25°C.
3. This test is performed with infinite heat sink at T<sub>c</sub>=25°C.
4. These parameters have no way to verify.
5. Pulse Test : Pulse Width≤300μs, Duty Cycle≤0.5%.

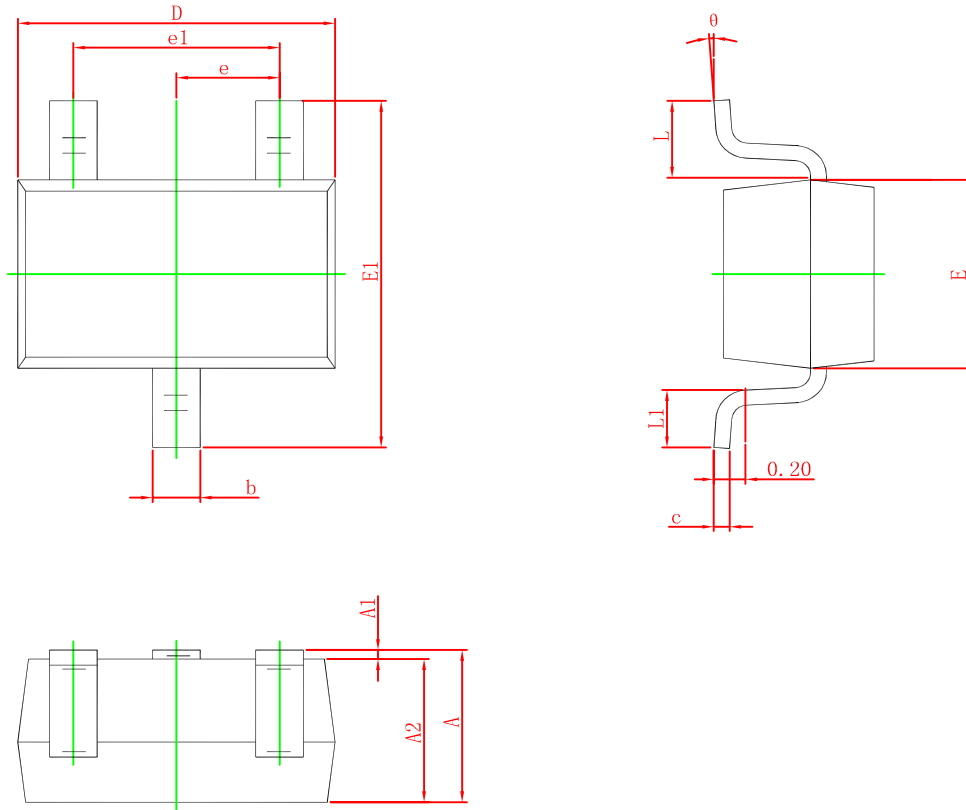
## N-Channel Power MOSFET

### Typical Characteristics



## N-Channel Power MOSFET

### SOT-323 PACKAGE OUTLINE DIMENSIONS



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.900	1.100	0.035	0.043
A1	0.000	0.100	0.000	0.004
A2	0.900	1.000	0.035	0.039
b	0.200	0.400	0.008	0.016
c	0.080	0.150	0.003	0.006
D	2.000	2.200	0.079	0.087
E	1.150	1.350	0.045	0.053
E1	2.150	2.450	0.085	0.096
e	0.650 TYP.		0.026 TYP.	
e1	1.200	1.400	0.047	0.055
L	0.525 REF.		0.021 REF.	
L1	0.260	0.460	0.010	0.018
$\theta$	0°	8°	0°	8°