N-Channel 300-V (D-S) MOSFET

PRODUCT SUMMARY			
$V_{(BR)DSS}$ Min (V)	$r_{DS(on)}$ Max (Ω)	$V_{GS(th)}$ (V)	I_D (A)
300	12 @ V_{GS} = 10 V 20 @ V_{GS} = 4.5 V	0.8 to 3	0.18

FEATURES

- Low On-Resistance: 9 Ω
- Secondary Breakdown Free: 320 V
- Low Power/Voltage Driven
- Low Input and Output Leakage
- Excellent Thermal Stability

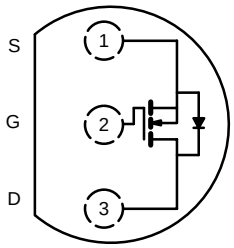
BENEFITS

- Low Offset Voltage
- Full-Voltage Operation
- Easily Driven Without Buffer
- Low Error Voltage
- No High-Temperature "Run-Away"

APPLICATIONS

- High-Voltage Drivers: Relays, Solenoids, Lamps, Hammers, Displays, Transistors, etc.
- Telephone Mute Switches, Ringer Circuits
- Power Supply, Converters
- Motor Control

TO-226AA
(TO-92)



Top View

Device Marking
Front View

"S" = Siliconix Logo
xxyy = Date Code

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C UNLESS OTHERWISE NOTED)

Parameter		Symbol	Limit	Unit
Drain-Source Voltage		V_{DS}	300	V
Gate-Source Voltage		V_{GS}	±20	
Continuous Drain Current (T_J = 150°C)	T_A= 25°C	I_D	0.18	A
	T_A= 100°C		0.14	
Pulsed Drain Current[a]		I_{DM}	0.5	
Power Dissipation	T_A= 25°C	P_D	0.8	W
	T_A= 100°C		0.32	
Maximum Junction-to-Ambient		R_{thJA}	156	°C/W
Operating Junction and Storage Temperature Range		T_J, T_{stg}	–55 to 150	°C

Notes
a. Pulse width limited by maximum junction temperature.

SPECIFICATIONS (T_A = 25°C UNLESS OTHERWISE NOTED)

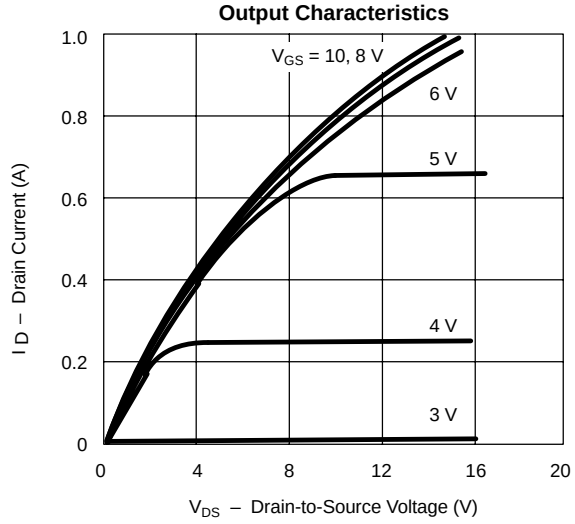
Parameter	Symbol	Test Conditions	Limits Min	Limits Typ[a]	Limits Max	Unit
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0 V, I_D = 10 µA	300	320		V
Gate-Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 0.25 mA	0.8	2.1	3.0	V
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ±20 V			±10	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 120 V, V_{GS} = 0 V			0.1	µA
		T_A = 125°C			5	
On-State Drain Current[b]	$I_{D(on)}$	V_{DS} = 5 V, V_{GS} = 10 V	0.2	0.5		A
Drain-Source On-Resistance[b]	$r_{DS(on)}$	V_{GS} = 10 V, I_D = 0.18 A		9	12	Ω
		V_{GS} = 4.5 V, I_D = 0.14 A		11	20	
		T_A = 125°C		20	40	
Forward Transconductance[b]	g_{fs}	V_{DS} = 15 V, I_D = 0.1 A		160		mS
Diode Forward Voltage	V_{SD}	I_S = 0.18 A, V_{GS} = 0 V		0.8		V
Dynamic						
Total Gate Charge	Q_g	V_{DS} = 50 V, V_{GS} = 10 V, I_D ≅ 100 mA		3300		pC
Gate-Source Charge	Q_{gs}			38		
Gate-Drain Charge	Q_{gd}			1600		
Input Capacitance	C_{iss}	V_{DS} = 50 V, V_{GS} = 0 V, f = 1 MHz		40		pF
Output Capacitance	C_{oss}			8		
Reverse Transfer Capacitance	C_{rss}			3		
Switching[c]						
Turn-On Time	$t_{d(on)}$	V_{DD} = 50 V, R_L = 500 Ω, I_D ≅ 100 mA V_{GEN} = 10 V, R_G = 25 Ω		5	10	ns
	t_r			20	40	
Turn-Off Time	$t_{d(off)}$			25	50	
	t_f			30	60	

Notes
a. For DESIGN AID ONLY, not subject to production testing.
b. Pulse test: PW ≤ 300 µs duty cycle ≤ 2%.
c. Switching time is essentially independent of operating temperature.

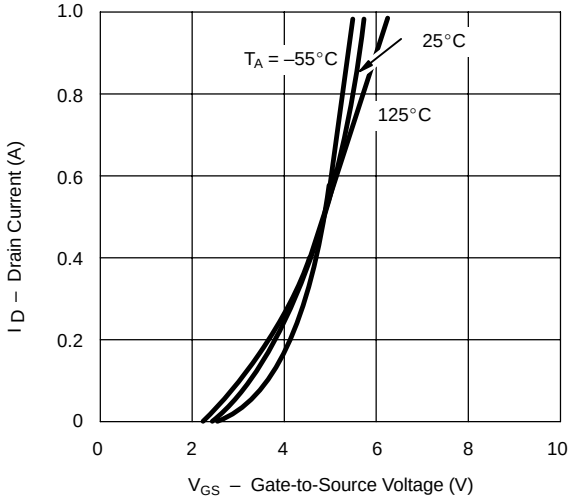
VNAS30

TYPICAL CHARACTERISTICS (T_A = 25°C UNLESS OTHERWISE NOTED)

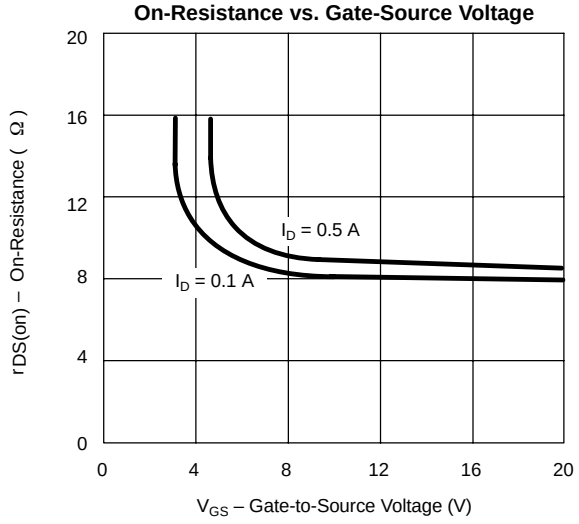
Output Characteristics



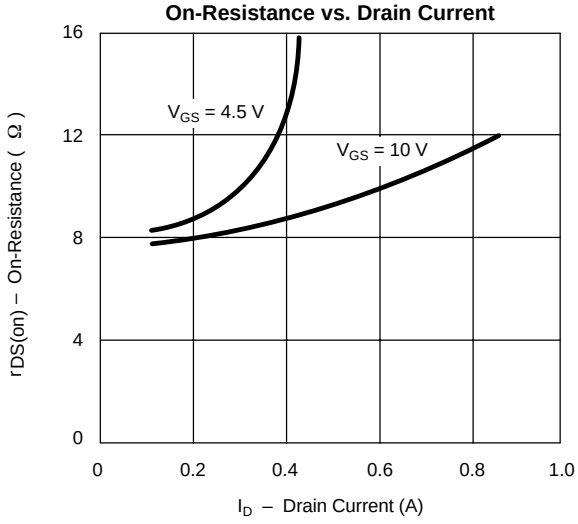
Transfer Characteristics



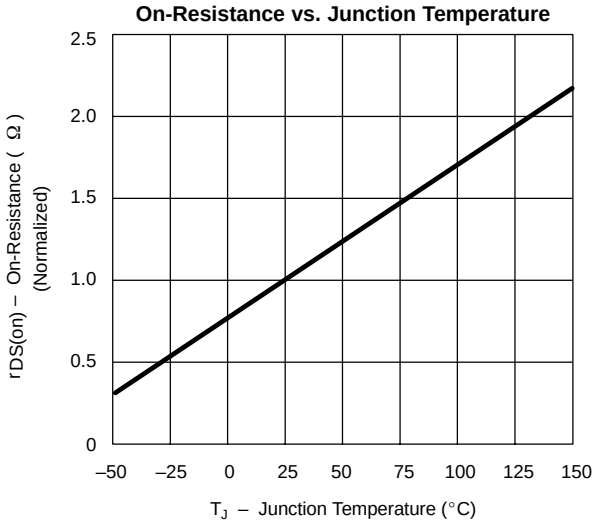
On-Resistance vs. Gate-Source Voltage



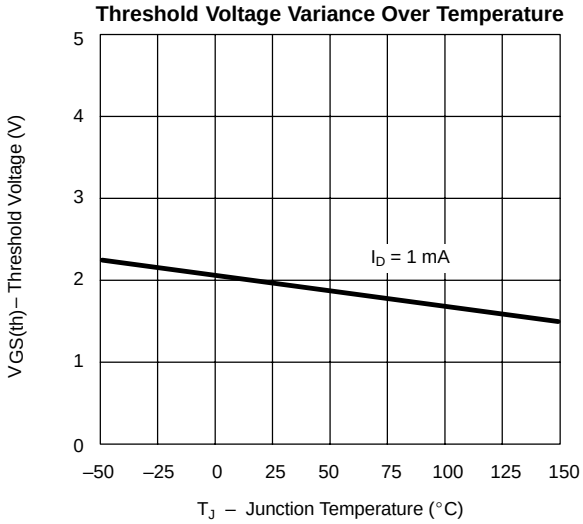
On-Resistance vs. Drain Current



On-Resistance vs. Junction Temperature

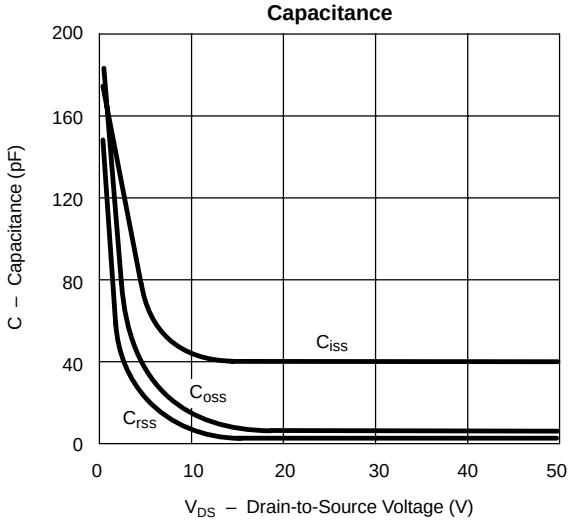


Threshold Voltage Variance Over Temperature

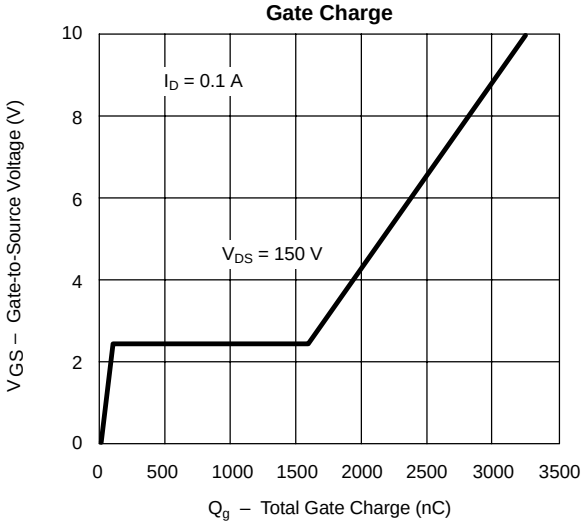


TYPICAL CHARACTERISTICS (T_A = 25°C UNLESS OTHERWISE NOTED)

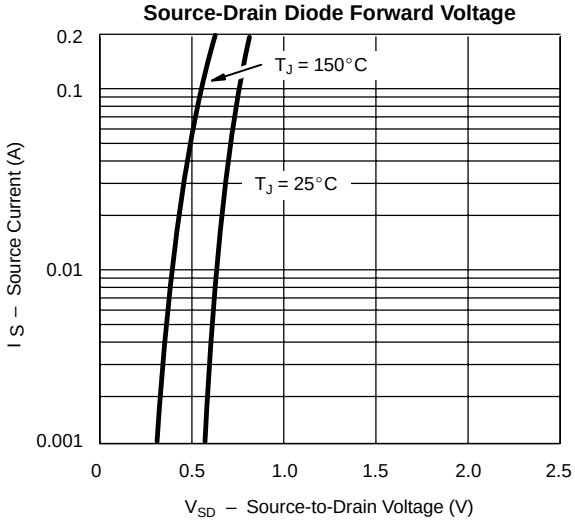
Capacitance



Gate Charge



Source-Drain Diode Forward Voltage



Normalized Effective Transient Thermal Impedance, Junction-to-Ambient (TO-226AA)