N-Channel Enhancement-Mode MOSFET Transistors

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	0.8 to 3	0.18
	20 @ V_{GS} = 4.5 V		

Features

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

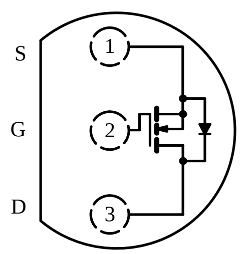
Benefits

- 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

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.

Updates to this data sheet may be obtained via facsimile by calling Siliconix FaxBack, 1-408-970-5600. Please request FaxBack document #70206.

Specifications[a]

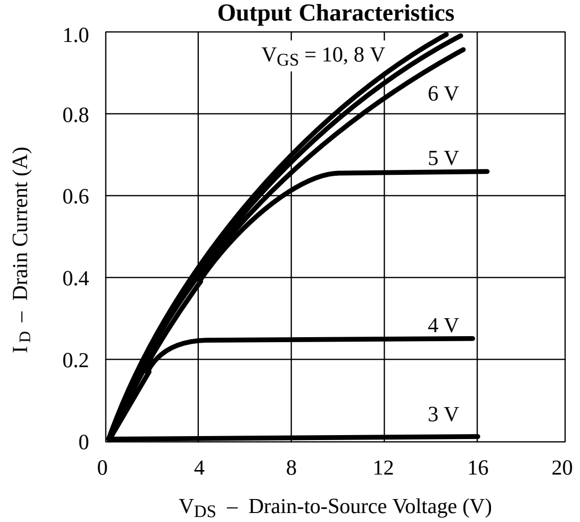
Parameter	Symbol	Test Conditions		Limits		Unit
			Min	Typ[b]	Max	
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0 V, I_D = 10 μA	300	320		V
Gate-Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$, I_D = 0.25 mA	0.8	2.1	3.0	V
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ± 20 V			± 10	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 120 V, V_{GS} = 0 V			0.1	μA
		T_J = 125°C			5	
On-State Drain Current[c]	$I_{D(on)}$	V_{DS} = 5 V, V_{GS} = 10 V	0.2	0.5		A
Drain-Source On-Resistance[c]	$r_{DS(on)}$	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_J = 125°C		20	40	
Forward Transconductance[c]	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[d]						
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. T_A = 25°C unless otherwise noted.
b. For DESIGN AID ONLY, not subject to production testing.
c. Pulse test: PW ≤ 300 μs duty cycle ≤ 2%.
d. Switching time is essentially independent of operating temperature.

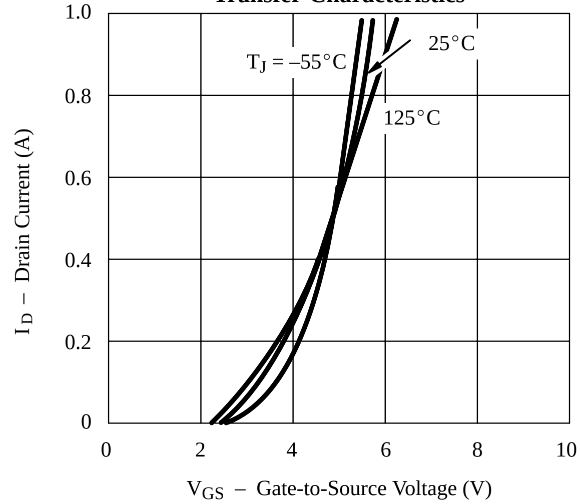
VNAS30

Typical Characteristics (25°C Unless Otherwise Noted)

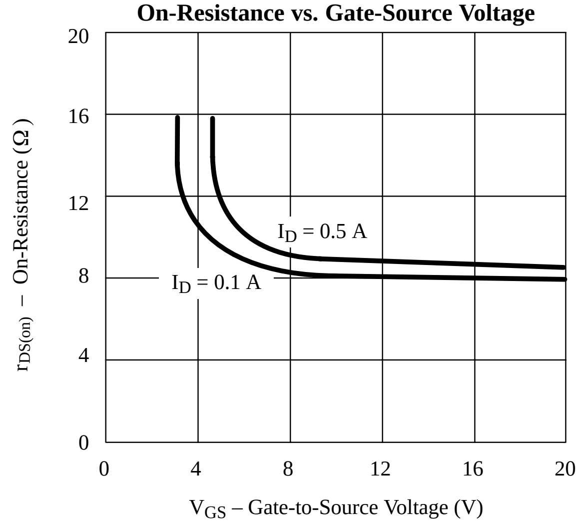
Output Characteristics



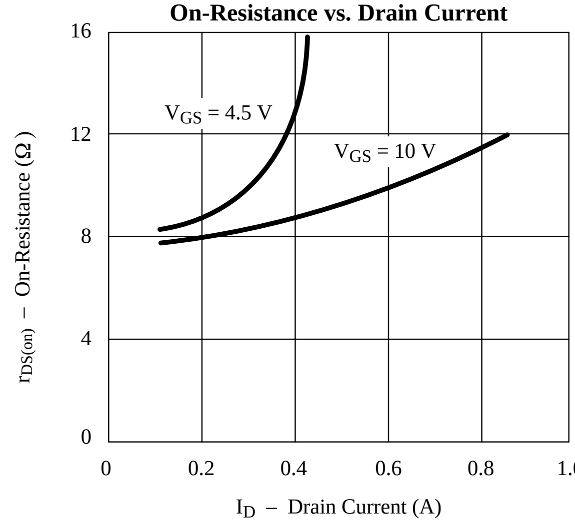
Transfer Characteristics



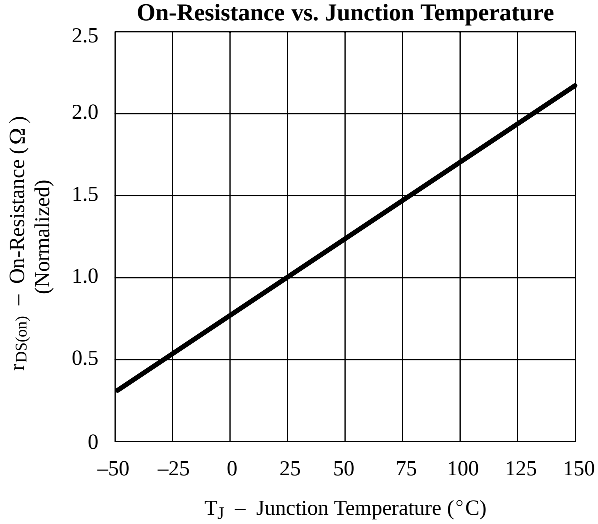
On-Resistance vs. Gate-Source Voltage



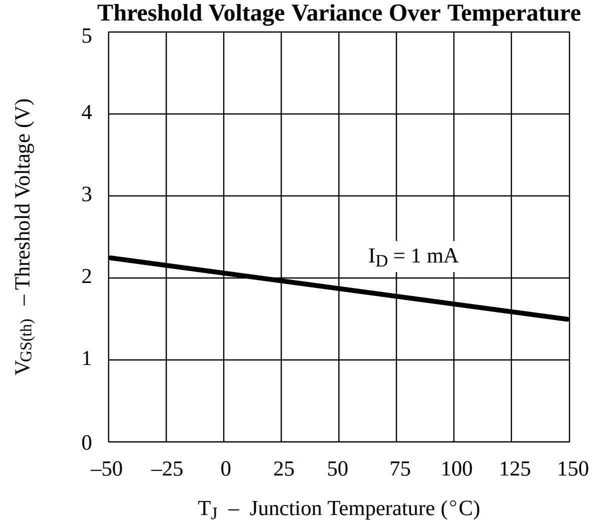
On-Resistance vs. Drain Current



On-Resistance vs. Junction Temperature



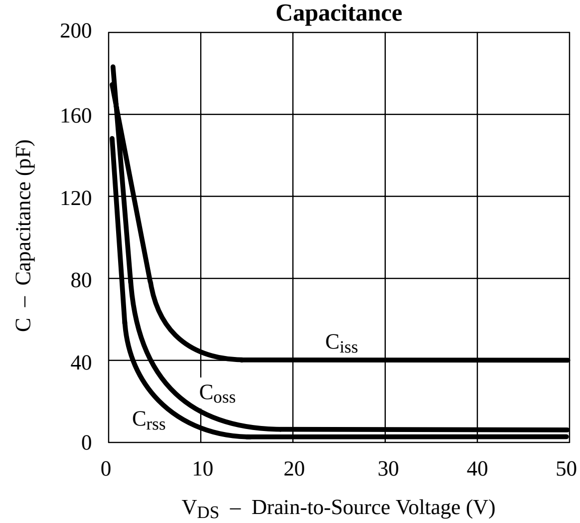
Threshold Voltage Variance Over Temperature



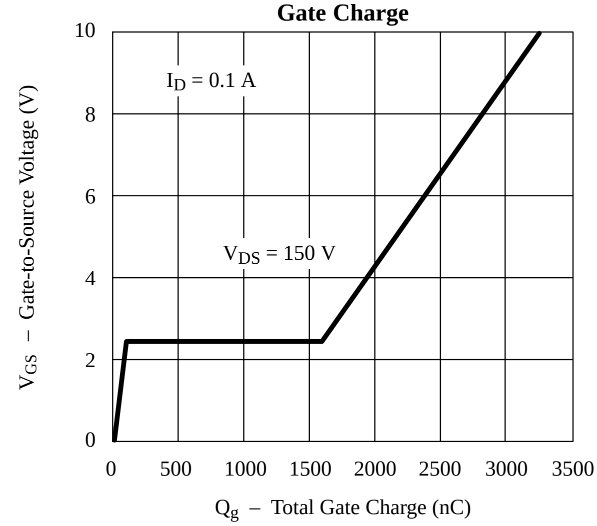
TN3012L

Typical Characteristics (25°C Unless Otherwise Noted)

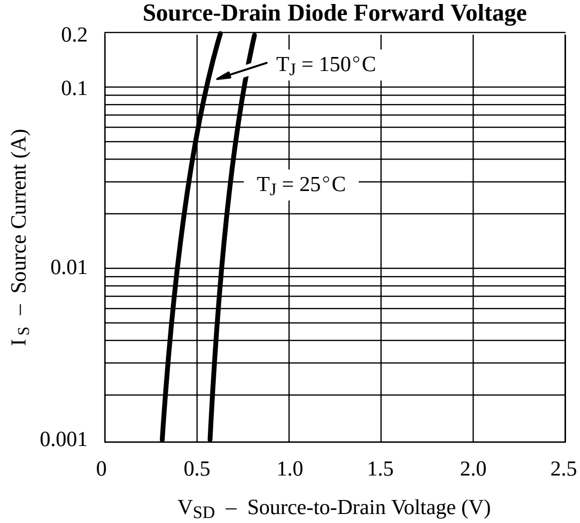
Capacitance



Gate Charge



Source-Drain Diode Forward Voltage



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