N-Channel 120-V (D-S) MOSFET

PRODUCT SUMMARY			
$V_{(BR)DSS}$ Min (V)	$r_{DS(on)}$ Max (Ω)	$V_{GS(th)}$ (V)	I_D (A)
120	6 @ V_{GS} = 10 V	0.8 to 2	0.23

FEATURES

- Low On-Resistance: 3.8 Ω
- Low Threshold: 1.4 V
- Low Input Capacitance: 35 pF
- Fast Switching Speed: 10 ns
- Low Input and Output Leakage

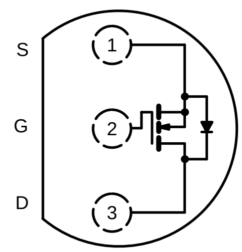
BENEFITS

- Low Offset Voltage
- Low-Voltage Operation
- Easily Driven Without Buffer
- High-Speed Circuits
- Low Error Voltage

APPLICATIONS

- Direct Logic-Level Interface: TTL/CMOS
- Drivers: Relays, Solenoids, Lamps, Hammers, Displays, Memories, Transistors, etc.
- Battery Operated Systems
- Solid-State Relays

TO-226AA
(TO-92)



Top View

VN1206L

Device Marking
Front View

"S" VN
1206L
xxyy

"S" = Siliconix Logo
xxyy = Date Code

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C UNLESS OTHERWISE NOTED)				
Parameter		Symbol	Limits	Unit
Drain-Source Voltage		V_{DS}	120	V
Gate-Source Voltage		V_{GS}	± 30	
Continuous Drain Current (T_J = 150°C)	T_A= 25°C	I_D	0.23	A
	T_A= 100°C		0.15	
Pulsed Drain Current[a]		I_{DM}	2	
Power Dissipation	T_A= 25°C	P_D	0.8	W
	T_A= 100°C		0.32	
Thermal Resistance, 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)

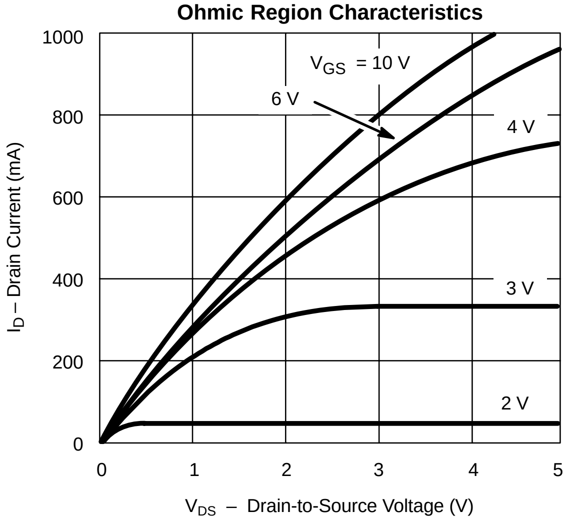
Parameter	Symbol	Test Conditions	Limits Min	Limits Typ[a]	Limits Max	Unit
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0 V, I_D = 100 μA	120	145		V
Gate-Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250 μA		1.4		V
		V_{DS} = V_{GS}, I_D = 1 mA	0.8	1.5	2	V
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ±15 V			±100	nA
		T_J = 125°C			±500	nA
		V_{DS} = 0 V, V_{GS} = ±20 V				nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 96 V, V_{GS} = 0 V				μA
		T_J = 125°C				μA
		V_{DS} = 120 V, V_{GS} = 0 V			10	μA
		T_J = 125°C			500	μA
On-State Drain Current[b]	$I_{D(on)}$	V_{DS} = 10 V, V_{GS} = 4.5 V		0.6		A
		V_{DS} = 10 V, V_{GS} = 10 V	1	1.6		A
Drain-Source On-Resistance[b]	$r_{DS(on)}$	V_{GS} = 2.5 V, I_D = 0.1 A		6	10	Ω
		V_{GS} = 3.5 V, I_D = 0.1 A		4.5		Ω
		V_{GS} = 10 V, I_D = 0.3 A		3.3		Ω
		V_{GS} = 4.5 V, I_D = 0.2 A		3.8		Ω
		T_J = 125°C		7.6		Ω
		V_{GS} = 10 V, I_D = 0.5 A		3.3	6	Ω
		T_J = 125°C		7	14.8	Ω
Forward Transconductance[b]	g_{fs}	V_{DS} = 10 V, I_D = 0.2 A		400		mS
		V_{DS} = 10 V, I_D = 0.5 A	300	425		mS
Common Source Output Conductance[b]	g_{os}	V_{DS} = 7.5 V, I_D = 0.1 A		0.4		mS
Dynamic						
Input Capacitance	C_{iss}	V_{DS} = 25 V, V_{GS} = 0 V f = 1 MHz		35	125	pF
Output Capacitance	C_{oss}			15	50	pF
Reverse Transfer Capacitance	C_{rss}			2	20	pF
Switching[c]						
Turn-On Time	t_{ON}	V_{DD} = 60 V, R_L = 150 Ω I_D ≅ 0.4 A, V_{GEN} = 10 V R_G = 25 Ω		6		ns
	$t_{d(on)}$			3	8	ns
	t_r			3	8	ns
Turn-Off Time	t_{OFF}			10		ns
	$t_{d(off)}$			7	18	ns
	t_f			2.5	12	ns

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.

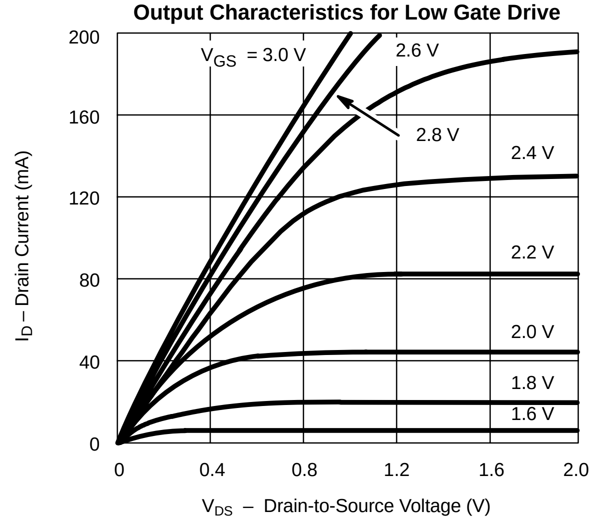
VNDQ12

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

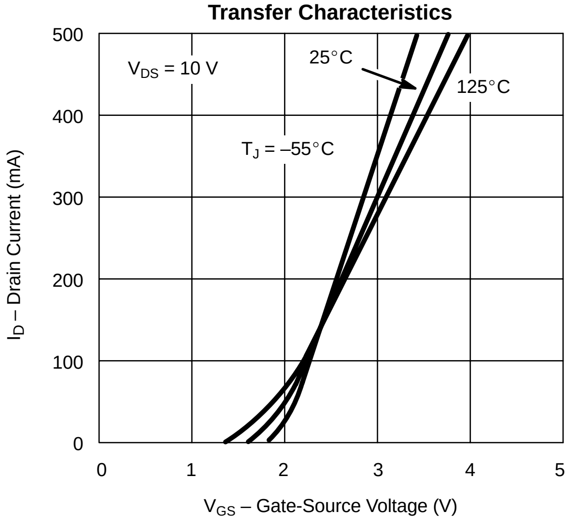
Ohmic Region Characteristics



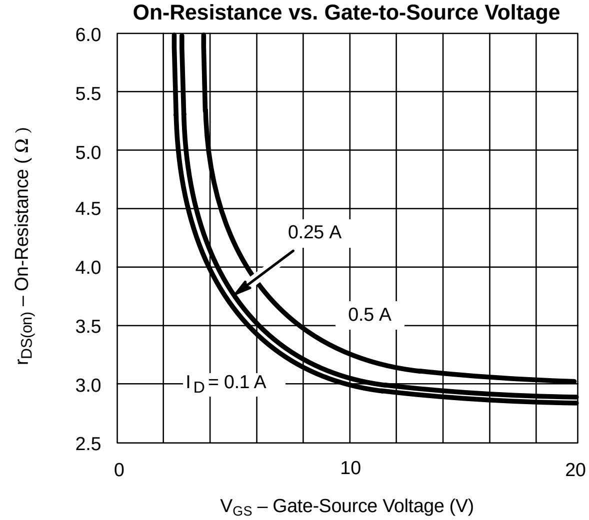
Output Characteristics for Low Gate Drive



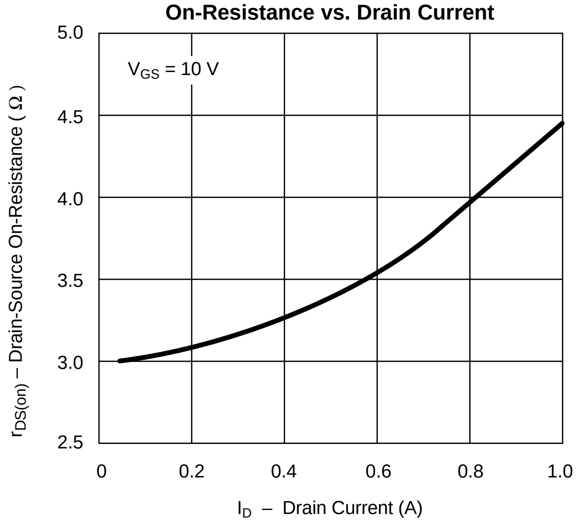
Transfer Characteristics



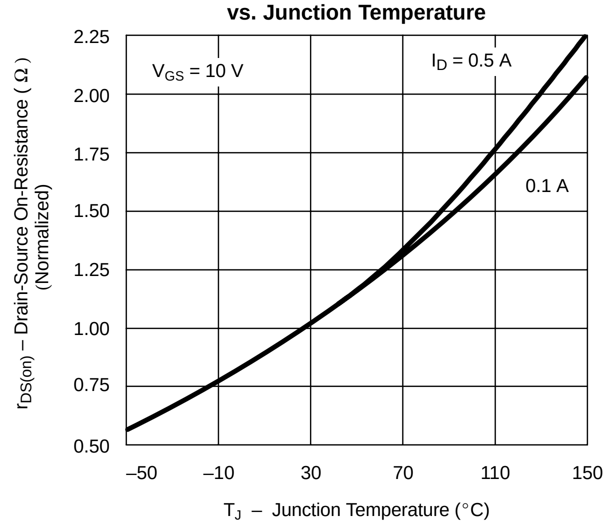
On-Resistance vs. Gate-to-Source Voltage



On-Resistance vs. Drain Current

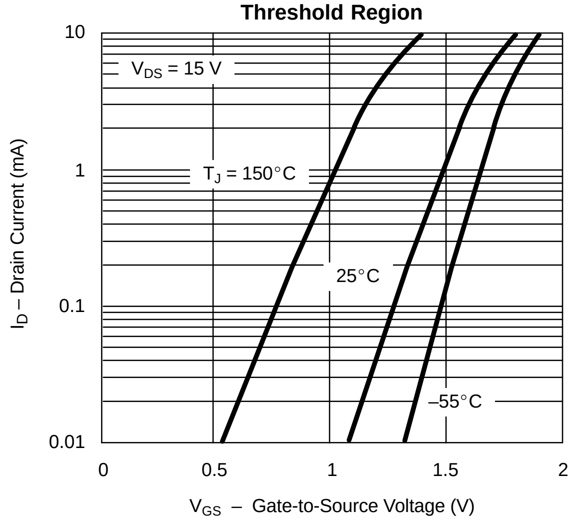


Normalized On-Resistance vs. Junction Temperature

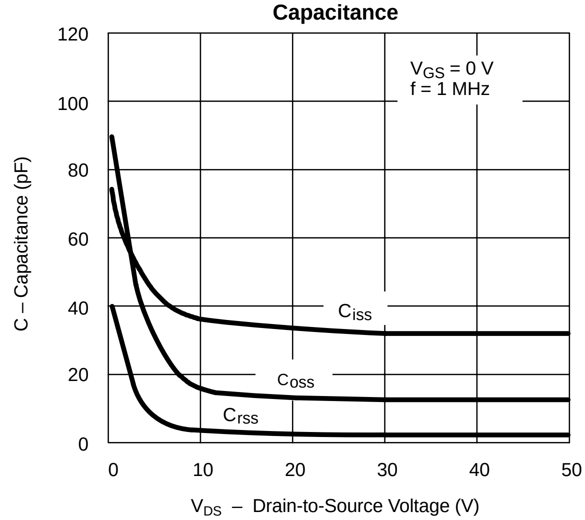


TYPICAL CHARACTERISTICS (T_A = 25°C UNLESS OTHERWISE NOTED)

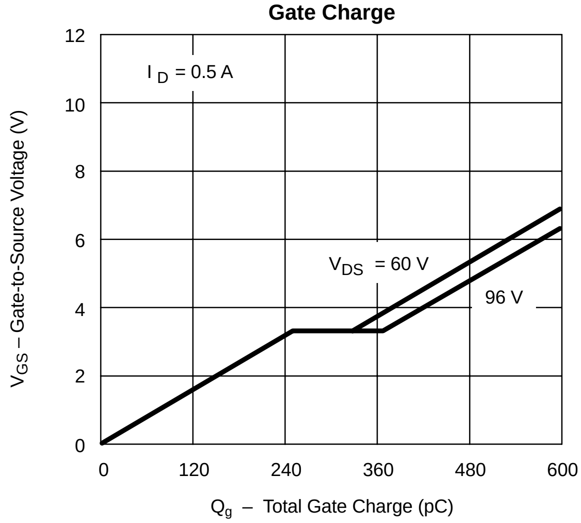
Threshold Region



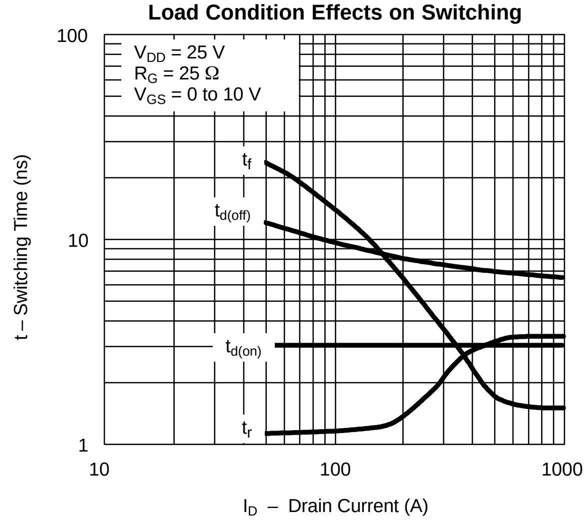
Capacitance



Gate Charge



Load Condition Effects on Switching



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