N-Channel 60-V (D-S) MOSFET

Zener Gate Protected

PRODUCT SUMMARY			
$V_{(BR)DSS}$ Min (V)	$r_{DS(on)}$ Max (Ω)	$V_{GS(th)}$ (V)	I_D (A)
60	5 @ V_{GS} = 10 V	0.8 to 2.5	0.31

FEATURES

- Zener Diode Input Protected
- Low On-Resistance: 3 Ω
- Ultralow Threshold: 1.2 V
- Low Input Capacitance: 38 pF
- Low Input and Output Leakage

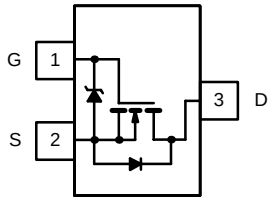
BENEFITS

- Extra ESD Protection
- Low Offset Voltage
- Low-Voltage Operation
- High-Speed, Easily Driven
- Low Error Voltage

APPLICATIONS

- Drivers: Relays, Solenoids, Lamps, Hammers, Displays, Memories, Transistors, etc.
- Battery Operated Systems
- Solid-State Relays
- Inductive Load Drivers

SC-59



Top View

VN10KC

Marking Code: F1*wll*

F1 = Part Number Code for VN10KC
w = Week Code
ll = Lot Traceability

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C UNLESS OTHERWISE NOTED)				
Parameter		**Symbol**	**Limits**	**Unit**
Drain-Source Voltage		V_{DS}	60	V
Gate-Source Voltage		V_{GS}	15/–0.3	
Continuous Drain Current (T_J = 150°C)	T_A= 25°C	I_D	0.31	A
	T_A= 100°C		0.20	
Pulsed Drain Current[a]		I_{DM}	0.6	
Power Dissipation	T_A= 25°C	P_D	0.6	W
	T_A= 100°C		0.24	
Maximum Junction-to-Ambient		R_{thJA}	208	°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)

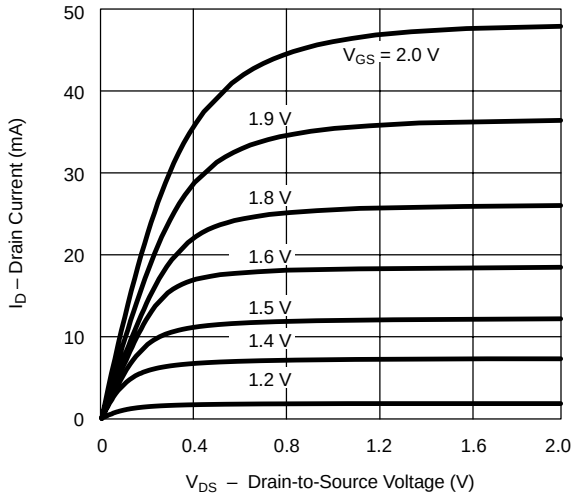
Parameter	Symbol	Test Conditions	Typ[a]	Limits Min	Limits Max	Unit
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0 V, I_D = 100 µA	120	60		V
Gate-Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 1 mA	1.2	0.8	2.5	V
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = 15 V	1		100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 48 V, V_{GS} = 0 V			10	µA
		T_A = 125°C			500	µA
On-State Drain Current[b]	$I_{D(on)}$	V_{DS} = 10 V, V_{GS} = 10 V	1	0.75		A
Drain-Source On-Resistance[b]	$r_{DS(on)}$	V_{GS} = 5 V, I_D = 0.2 A	4		7.5	Ω
		V_{GS} = 10 V, I_D = 0.5 A	3		5	Ω
		T_A = 125°C	5.6		9	Ω
Forward Transconductance[b]	g_{fs}	V_{DS} = 10 V, I_D = 0.5 A	300	100		mS
Common Source Output Conductance[b]	g_{os}	V_{DS} = 7.5 V, I_D = 0.05 A	0.2			mS
Dynamic						
Input Capacitance	C_{iss}	V_{DS} = 25 V, V_{GS} = 0 V, f = 1 MHz	38		60	pF
Output Capacitance	C_{oss}		16		25	pF
Reverse Transfer Capacitance	C_{rss}		2		5	pF
Switching[c]						
Turn-On Time	t_{ON}	V_{DD} = 15 V, R_L = 23 Ω I_D ≅ 0.6 A, V_{GEN} = 10 V R_G = 25 Ω	7		10	ns
Turn-Off Time	t_{OFF}		9		10	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.

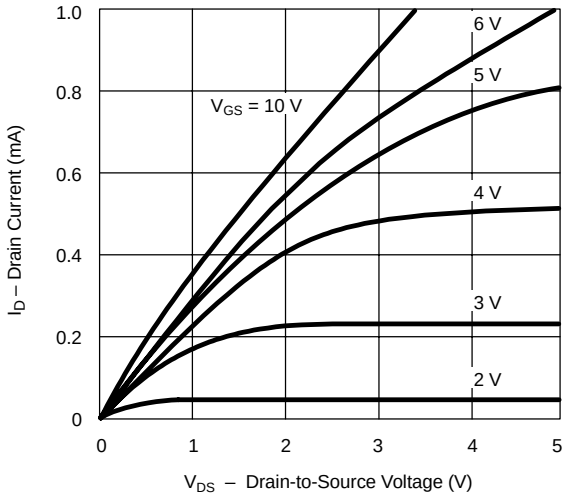
VNDP06

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

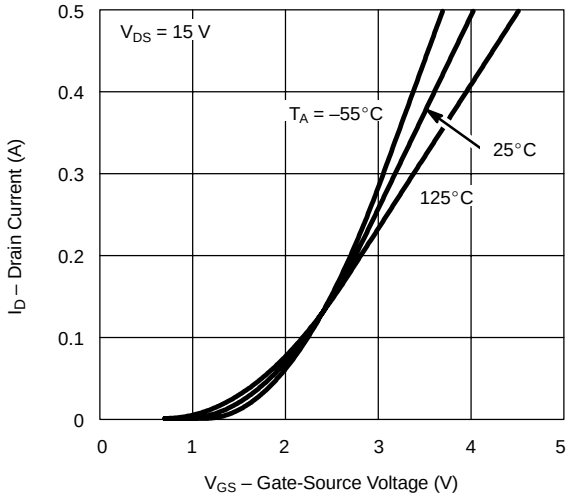
Ohmic Region Characteristics



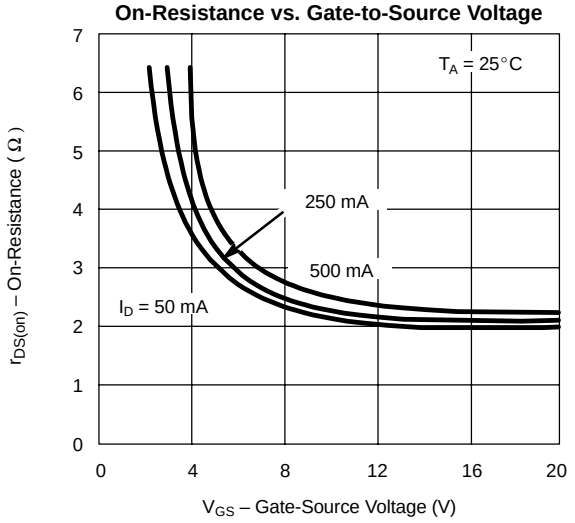
Output Characteristics for Low Gate Drive



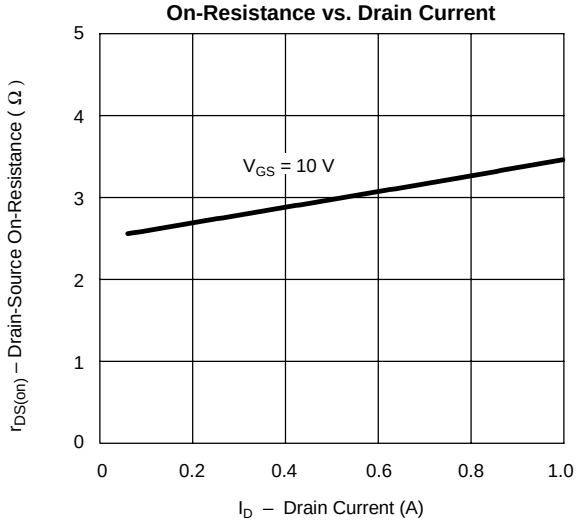
Transfer Characteristics



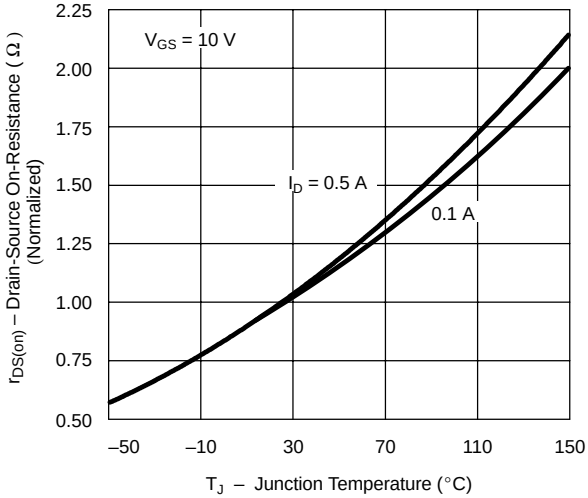
On-Resistance vs. Gate-to-Source Voltage



On-Resistance vs. Drain Current

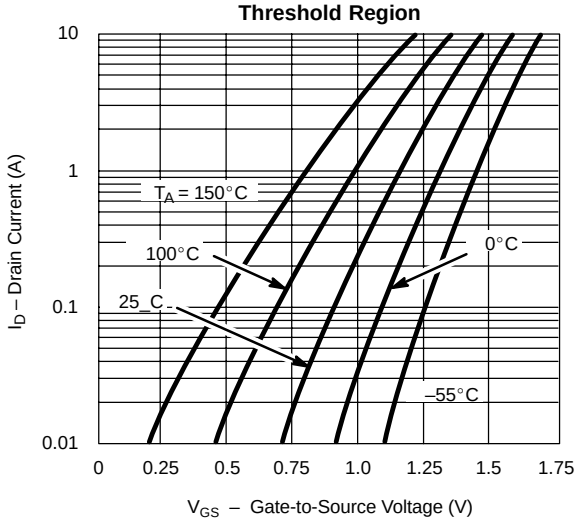


Normalized On-Resistance vs. Junction Temperature

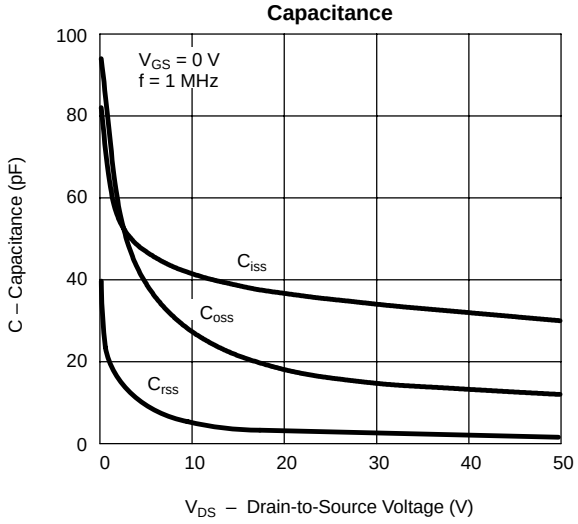


TYPICAL CHARACTERISTICS (T_A = 25°C UNLESS OTHERWISE NOTED)

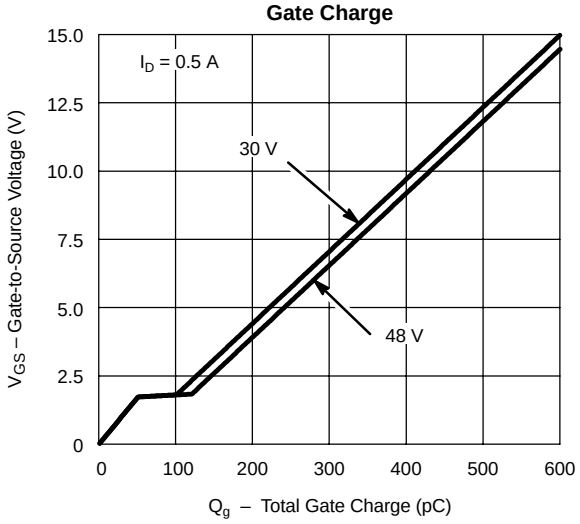
Threshold Region



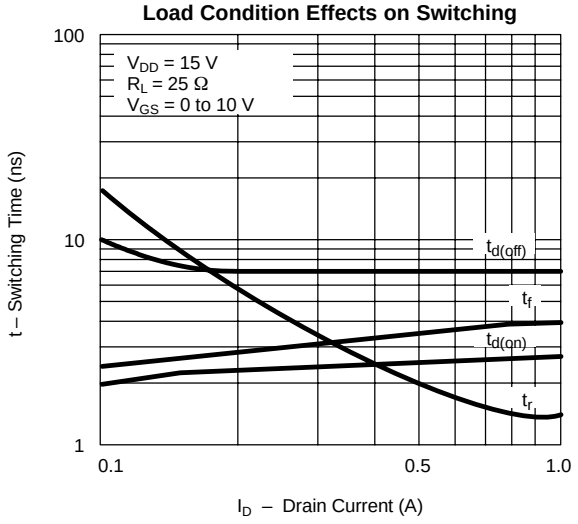
Capacitance



Gate Charge



Load Condition Effects on Switching



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