



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

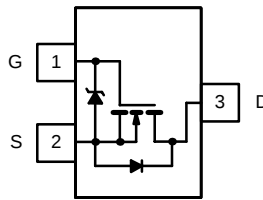
BENEFITS

- 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: F1w//

F1 = Part Number Code for VN10KC

w = Week Code

// = Lot Traceability

ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ 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 ($T_J = 150^\circ\text{C}$)	I_D	$T_A = 25^\circ\text{C}$ 0.31	A
		$T_A = 100^\circ\text{C}$ 0.20	
Pulsed Drain Current ^a	I_{DM}	0.6	
Power Dissipation	P_D	$T_A = 25^\circ\text{C}$ 0.6	W
		$T_A = 100^\circ\text{C}$ 0.24	
Maximum Junction-to-Ambient	R_{thJA}	208	$^\circ\text{C/W}$
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55 to 150	$^\circ\text{C}$

Notes

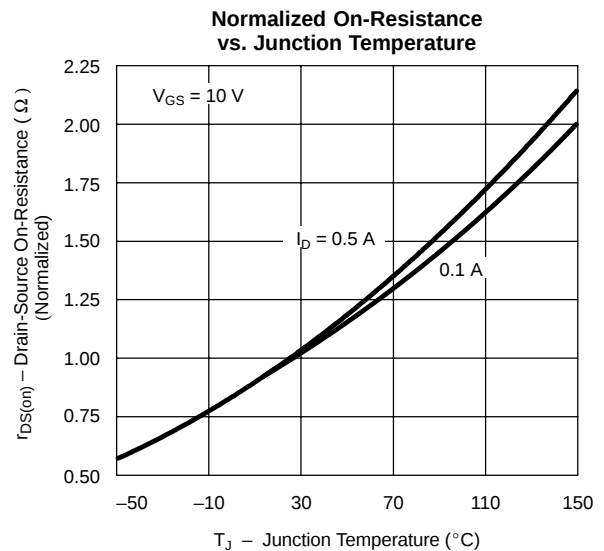
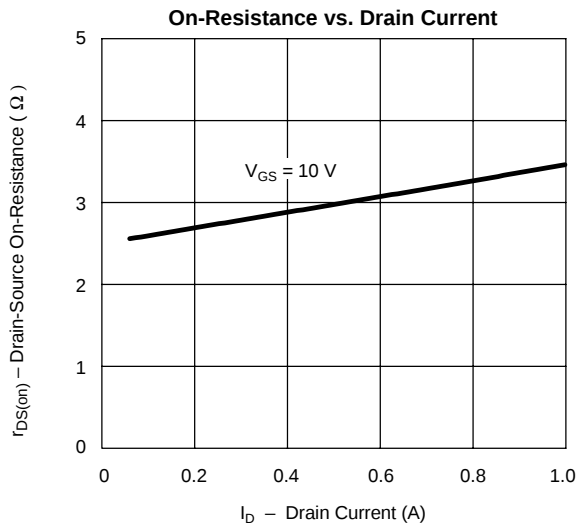
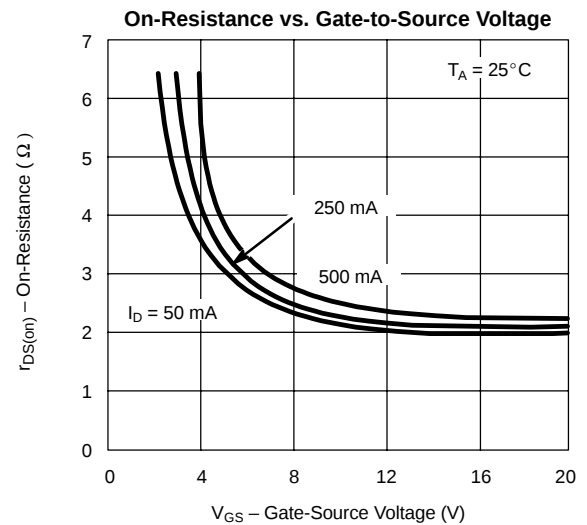
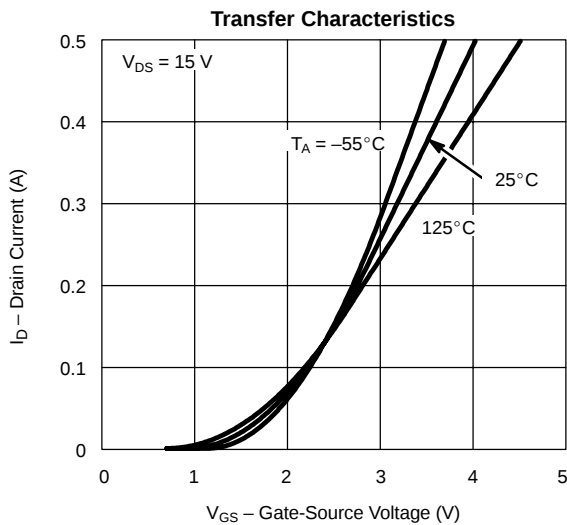
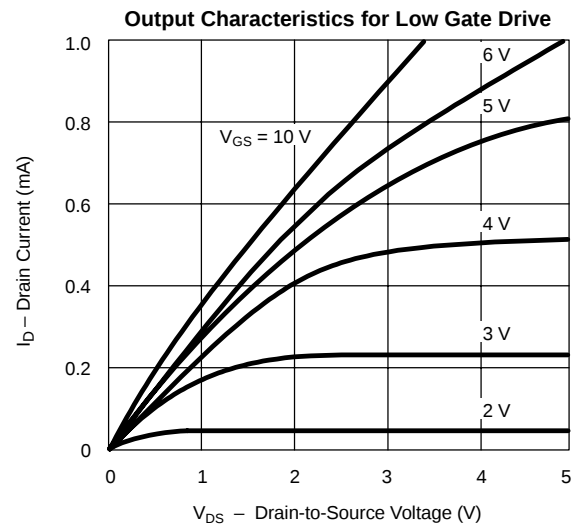
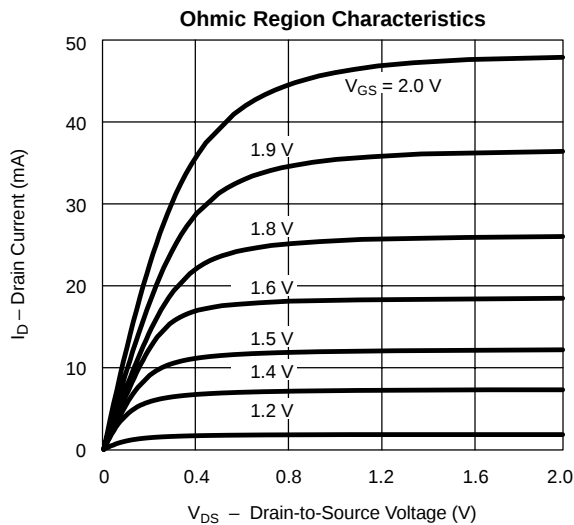
a. Pulse width limited by maximum junction temperature.

SPECIFICATIONS (T _A = 25 °C UNLESS OTHERWISE NOTED)						
Parameter	Symbol	Test Conditions	Typ ^a	Limits		Unit
				Min	Max	
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	
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	
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	
		T _A = 125 °C	5.6		9	
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			
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	
Reverse Transfer Capacitance	C _{rss}		2		5	
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	

Notes

- a. For DESIGN AID ONLY, not subject to production testing.
b. Pulse test: $PW \leq 300\text{ }\mu\text{s}$ duty cycle $\leq 2\%$.
c. Switching time is essentially independent of operating temperature.

VNPD06

**TYPICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)**

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