



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

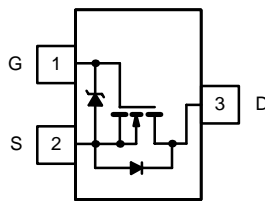
BENEFITS

- 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 w//

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
		$T_A = 100^\circ\text{C}$	0.20
Pulsed Drain Current ^a	I_{DM}	0.6	A
Power Dissipation	P_D	$T_A = 25^\circ\text{C}$	0.6
		$T_A = 100^\circ\text{C}$	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 ($T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)

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

Notes

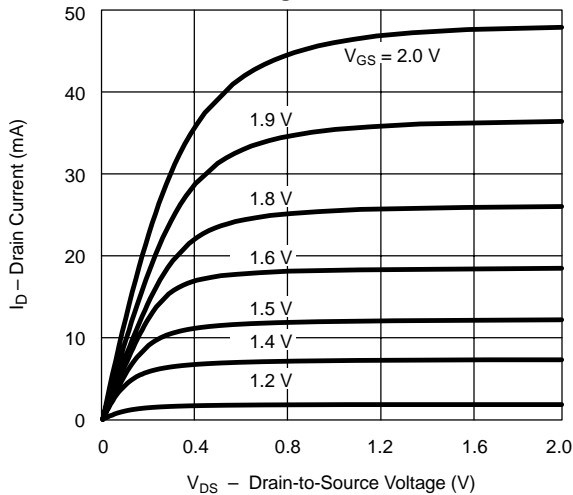
- For DESIGN AID ONLY, not subject to production testing.
- Pulse test: $PW \leq 300\ \mu\text{s}$ duty cycle $\leq 2\%$.
- Switching time is essentially independent of operating temperature.

VNNDP06

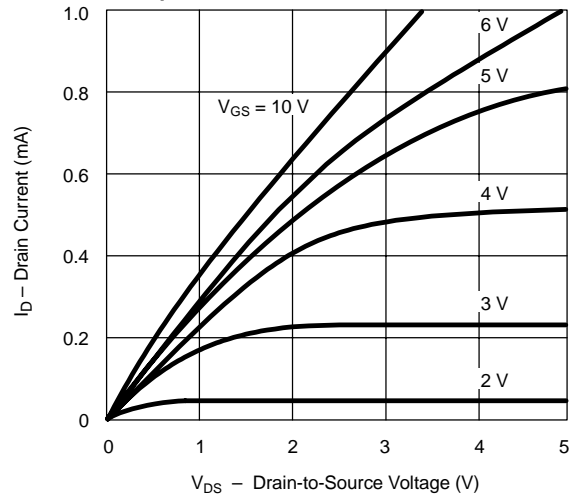


TYPICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)

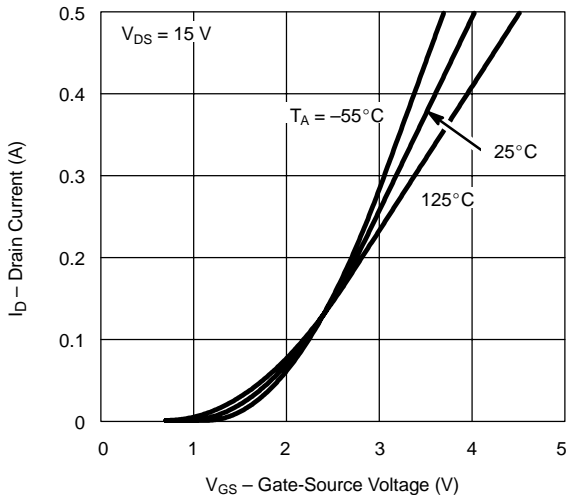
Ohmic Region Characteristics



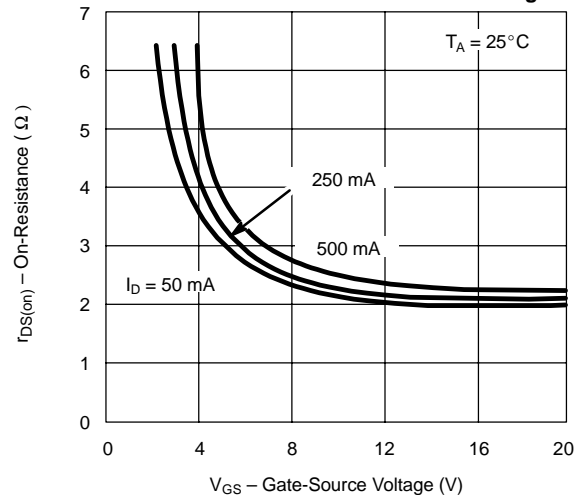
Output Characteristics for Low Gate Drive



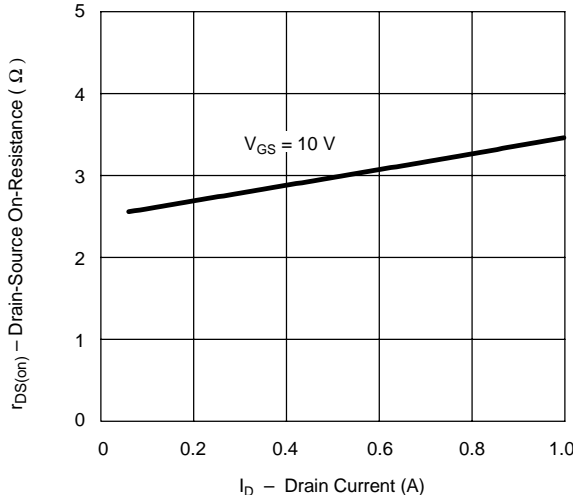
Transfer Characteristics



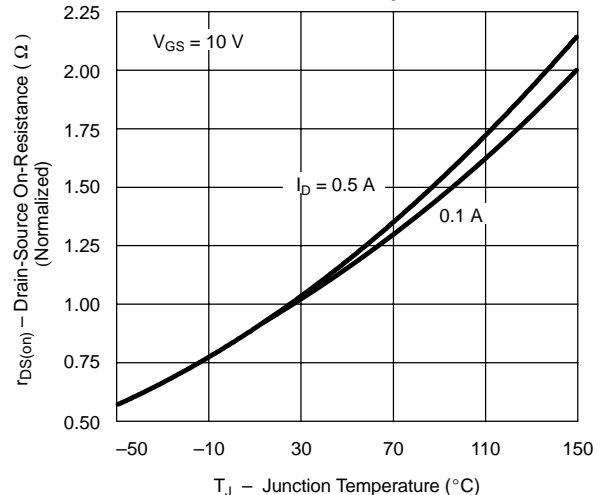
On-Resistance vs. Gate-to-Source Voltage



On-Resistance vs. Drain Current

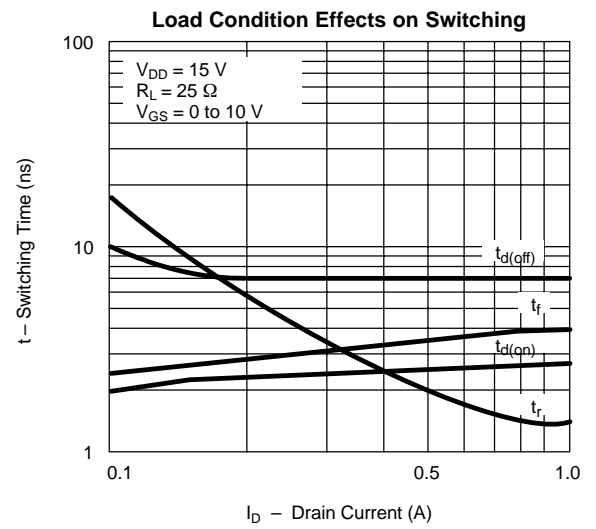
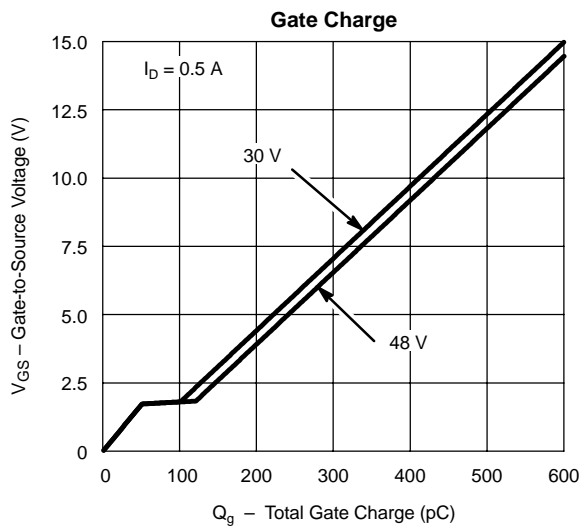
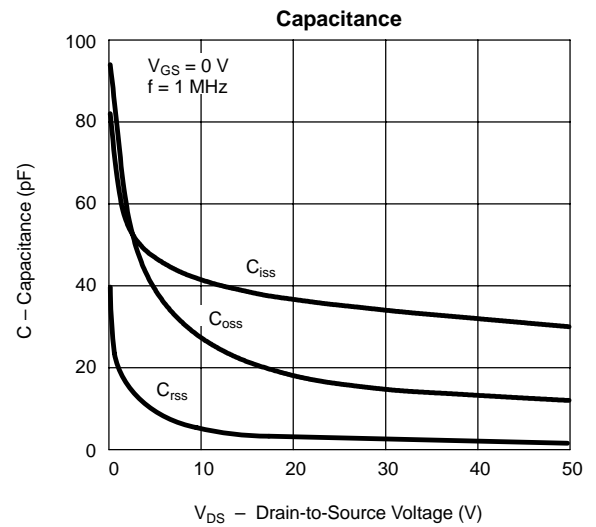
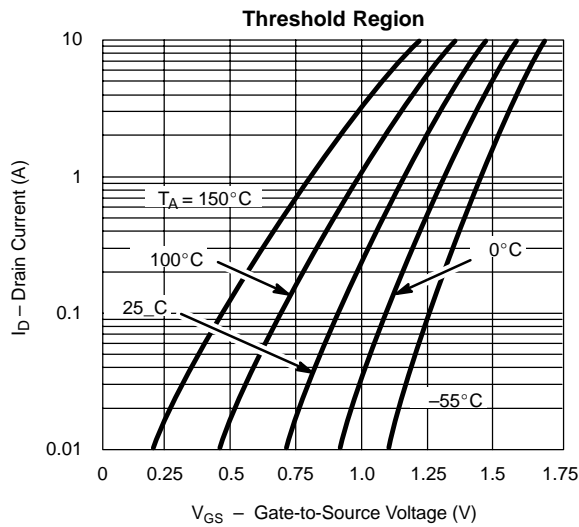


Normalized On-Resistance vs. Junction Temperature





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





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