

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

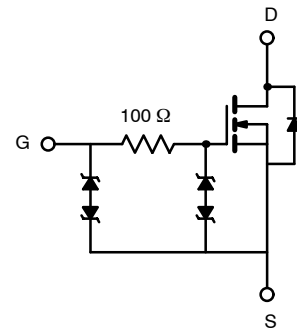
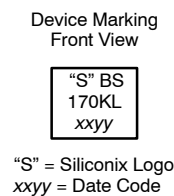
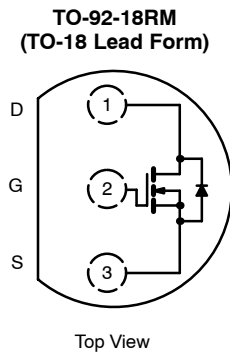
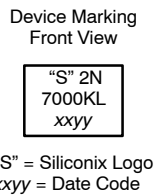
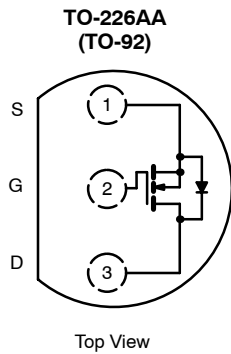
PRODUCT SUMMARY			
V_{DS} (V)	$r_{DS(on)}$ (Ω)	$V_{GS(th)}$ (V)	I_D (A)
60	2 @ $V_{GS} = 10$ V	1.0 to 2.5	0.47
	4 @ $V_{GS} = 4.5$ V		0.33

FEATURES

- TrenchFET® Power MOSFET
- ESD Protected: 2000 V

APPLICATIONS

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



Ordering Information: 2N7000KL-TR1

Ordering Information: BS170KL-TR1

ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)			
Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	60	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current ($T_J = 150^\circ\text{C}$)	I_D	$T_A = 25^\circ\text{C}$	0.47
		$T_A = 70^\circ\text{C}$	0.37
Pulsed Drain Current ^a	I_{DM}	1.0	A
Power Dissipation	P_D	$T_A = 25^\circ\text{C}$	0.8
		$T_A = 70^\circ\text{C}$	0.51
Maximum Junction-to-Ambient	R_{thJA}	156	$^\circ\text{C}/\text{W}$
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.

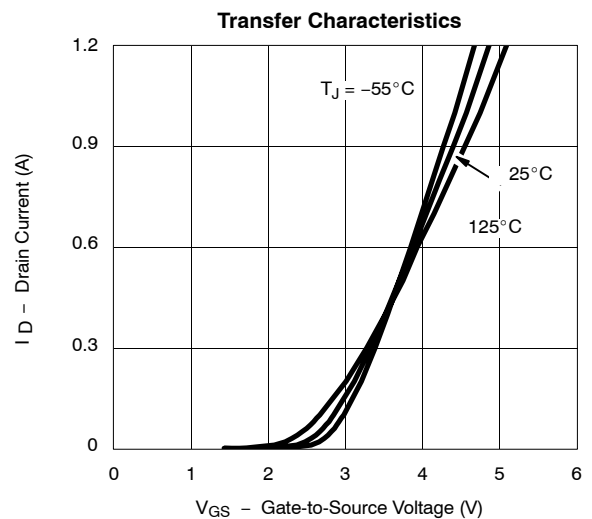
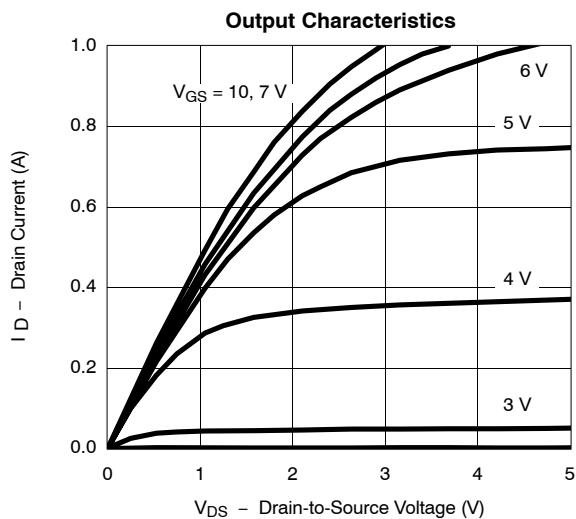
SPECIFICATIONS^a (T_A = 25 °C UNLESS OTHERWISE NOTED)

Parameter	Symbol	Test Conditions	Limits			Unit
			Min	Typ	Max	
Static						
Drain-Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} = 0 V, I _D = 10 μA	60			V
Gate-Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	1	2.0	2.5	
Gate-Body Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ±10 V			±1	μA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 60 V, V _{GS} = 0 V			1	μA
		V _{DS} = 60 V, V _{GS} = 0 V, T _J = 55 °C			10	
On-State Drain Current ^b	I _{D(on)}	V _{GS} = 10 V, V _{DS} = 7.5 V	0.8			A
		V _{GS} = 4.5 V, V _{DS} = 10 V	0.5			
Drain-Source On-Resistance ^b	r _{DS(on)}	V _{GS} = 10 V, I _D = 0.5 A		1.1	2	Ω
		V _{GS} = 4.5 V, I _D = 0.2 A		1.6	4	
Forward Transconductance ^b	g _{fs}	V _{DS} = 10 V, I _D = 0.5 A		550		mS
Diode Forward Voltage	V _{SD}	I _S = 0.3 A, V _{GS} = 0 V		0.87	1.3	V
Dynamic^b						
Total Gate Charge	Q _g	V _{DS} = 10 V, V _{GS} = 4.5 V I _D ≅ 0.25 A		0.4	0.6	nC
Gate-Source Charge	Q _{gs}			0.11		
Gate-Drain Charge	Q _{gd}			0.15		
Gate Resistance	R _g			173		Ω
Turn-On Time	t _{d(on)}	V _{DD} = 30 V, R _L = 150 Ω I _D ≅ 0.2 A, V _{GEN} = 10 V R _g = 10 Ω		3.8	10	ns
	t _r			4.8	15	
Turn-Off Time	t _{d(off)}			12.8	20	
	t _f			9.6	15	

Notes

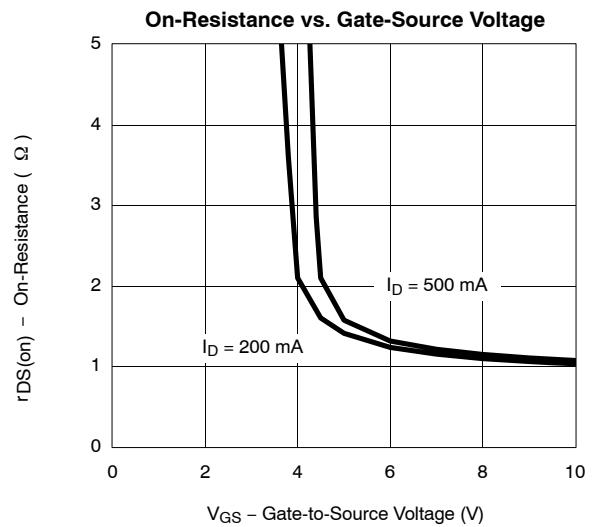
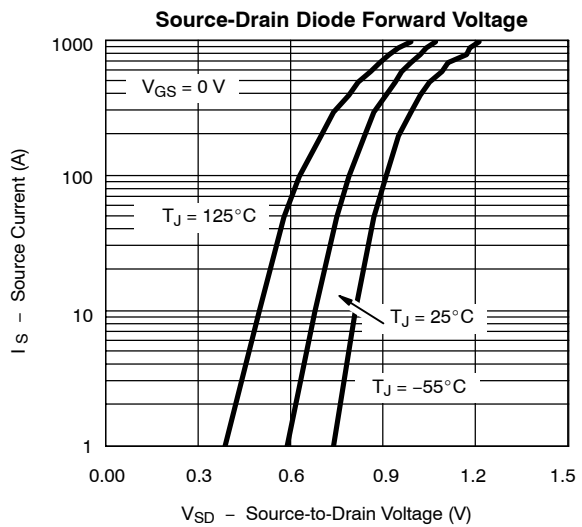
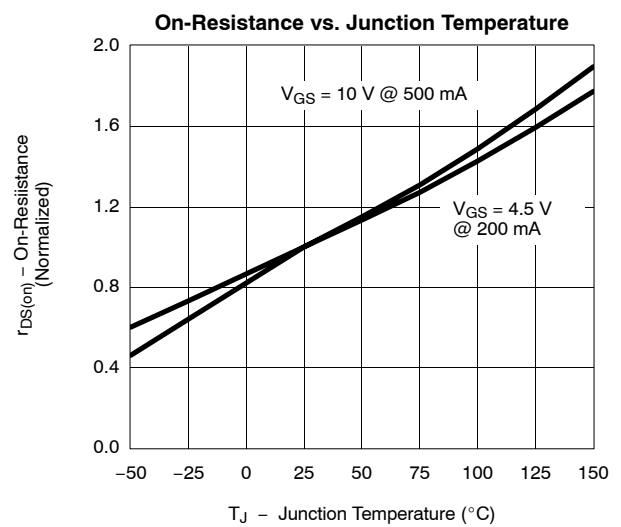
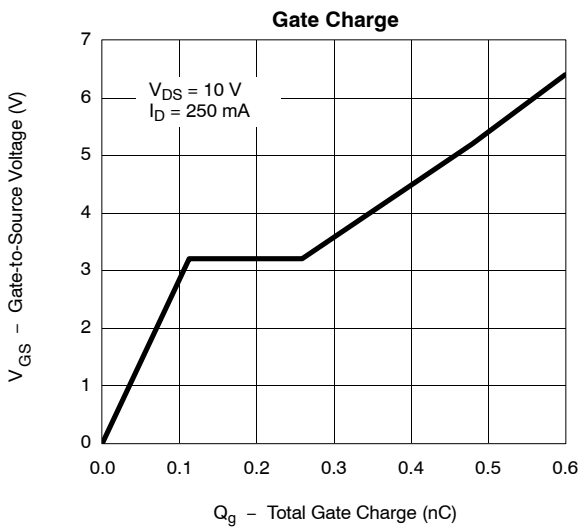
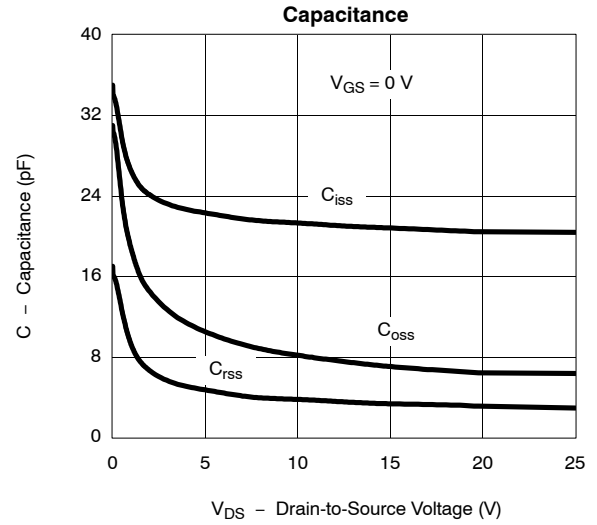
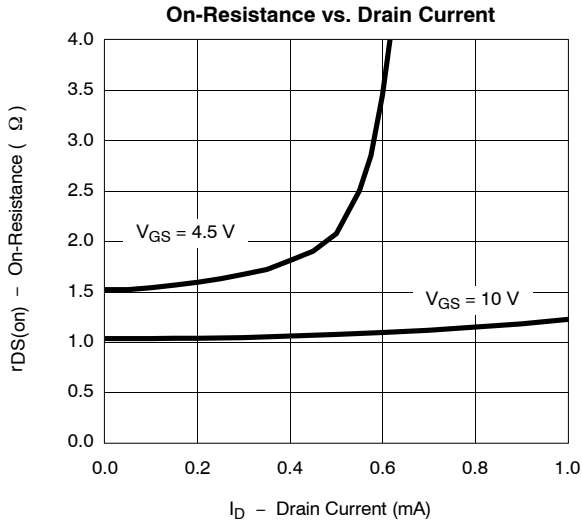
- a. Pulse test: PW ≤ 300 μs duty cycle ≤ 2%.
- b. Guaranteed by design, not subject to production testing.

TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)



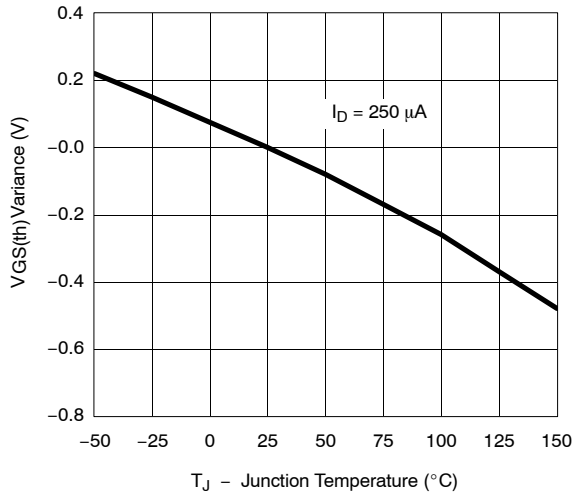


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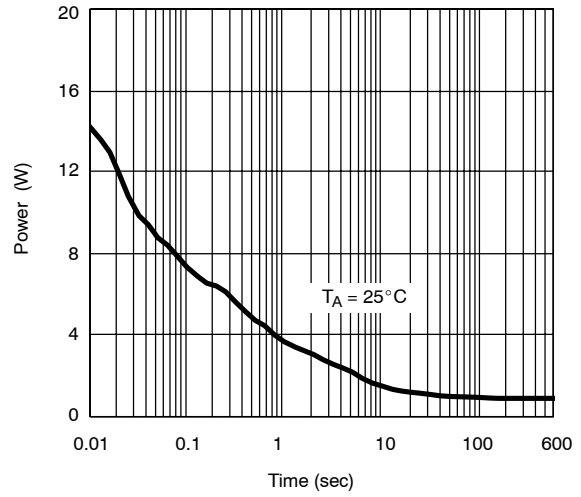


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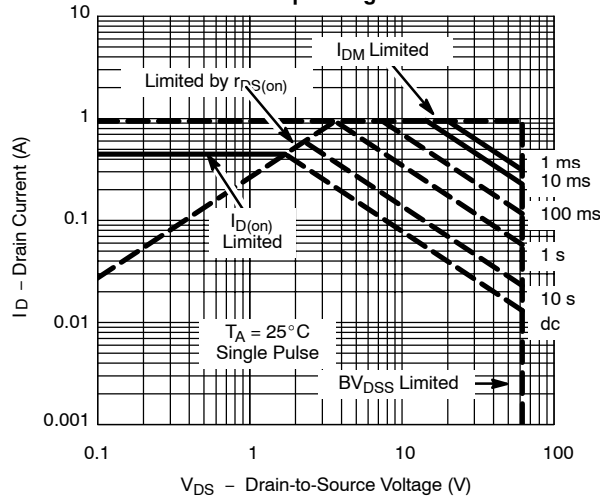
Threshold Voltage Variance Over Temperature



Single Pulse Power, Junction-to-Ambient



Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Ambient

