N-Channel 20-V (D-S) MOSFETs

PRODUCT SUMMARY			
		I_D (A)	
V_{DS} (V)	$r_{DS(on)}$ (Ω)	TN0200T	TN0200TS
20	0.4 @ V_{GS} = 4.5 V	0.73	1.2
	0.5 @ V_{GS} = 2.5 V	0.65	1.1

FEATURES

- Low On-Resistance: 0.29 Ω
- Low Threshold: 0.9 V (typ)
- 2.5-V or Lower Operation
- Fast Switching Speed: 22 ns
- Low Input and Output Leakage

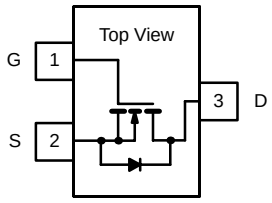
BENEFITS

- Low Offset Voltage
- Low-Voltage Operation
- High-Speed Circuits
- Low Error Voltage
- Low Battery Voltage Operation

APPLICATIONS

- Direct Logic-Level Interfact: TTL/CMOS
- Dirvers: Relays, Solenoids, Lamps, Hammers
- Battery Operated Systems, DC/DC Converters
- Solid-State Relays
- Load/Power Switching-Cell Phones, Pagers

TO-236
(SOT-23)



Marking Code:

TN0200T: NO*wll*
TN0200TS: NS*wll*

w = Week Code
ll = Lot Traceability

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C UNLESS OTHERWISE NOTED)					
Parameter		Symbol	TN0200T	TN0200TS[c]	Unit
Drain-Source Voltage		V_{DS}	20	20	V
Gate-Source Voltage		V_{GS}	±8	±8	
Continuous Drain Current (T_J = 150°C)[b]	T_A= 25°C	I_D	0.73	1.2	A
	T_A= 70°C		0.58	1.0	
Pulsed Drain Current[a]		I_{DM}	4	4	
Continuous Source Current (Diode Conduction)[b]		I_S	0.6	1.0	
Power Dissipation[b]	T_A= 25°C	P_D	0.35	1.0	W
	T_A= 70°C		0.22	0.65	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	-55 to 150		°C

THERMAL RESISTANCE RATINGS				
Parameter	Symbol	TN0200T	TN0200TS[c]	Unit
Maximum Junction-to-Ambient[b]	R_{thJA}	357	125	°C/W

Notes
a. Pulse width limited by maximum junction temperature.
b. Surface Mounted on FR4 Board, t ≤ 10 sec.
c. Copper lead frame.

SPECIFICATIONS (T_A = 25°C UNLESS OTHERWISE NOTED)

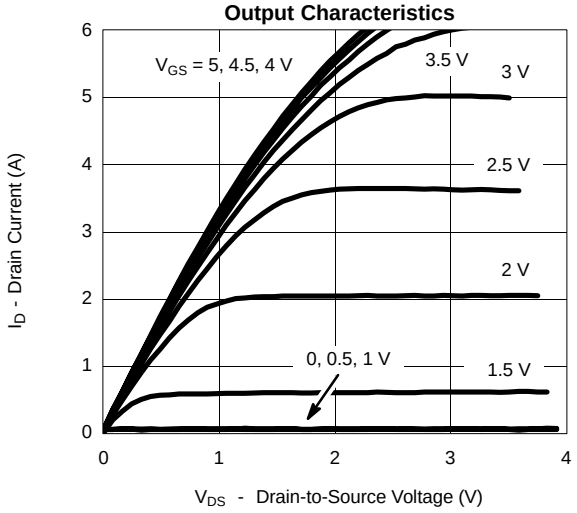
Parameter	Symbol	Test Conditions	Limits Min	Limits Typ	Limits Max	Unit
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0 V, I_D = 10 μA	20	36		V
Gate-Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 50 μA	0.5	0.9	1.5	V
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ±8 V			±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 16 V, V_{GS} = 0 V			1	μA
		T_J = 55°C			10	
On-State Drain Current[a]	$I_{D(on)}$	V_{DS} ≥ 5 V, V_{GS} = 4.5 V	2.5			A
		V_{DS} ≥ 5 V, V_{GS} = 2.5 V	1.5			
Drain-Source On-Resistance[a]	$r_{DS(on)}$	V_{GS} = 4.5 V, I_D = 0.6 A		0.29	0.4	Ω
		V_{GS} = 2.5 V, I_D = 0.6 A		0.34	0.5	
Forward Transconductance[a]	g_{fs}	V_{DS} = 5 V, I_D = 0.6 A		2.2		S
Diode Forward Voltage[a]	V_{SD}	I_S = 0.6 A, V_{GS} = 0 V		0.8	1.2	V
Dynamic						
Total Gate Charge	Q_g	V_{DS} = 10 V, V_{GS} = 4.5 V, I_D = 0.6 A		1900	2800	pC
Gate-Source Charge	Q_{gs}			50		
Gate-Drain Charge	Q_{gd}			750		
Input Capacitance	C_{iss}	V_{DS} = 10 V, V_{GS} = 0 V, f = 1 MHz		90		pF
Output Capacitance	C_{oss}			45		
Reverse Transfer Capacitance	C_{rss}			12		
Switching						
Turn-On Delay Time	$t_{d(on)}$	V_{DD} = 10 V, R_L = 16 Ω I_D ≅ 0.6 A, V_{GEN} = 4.5 V, R_G = 6 Ω		8	13	ns
Rise Time	t_r			14	21	
Turn-Off Delay Time	$t_{d(off)}$			21	30	
Fall-Time	t_f			7	11	

Notes
a. Pulse test: PW ≤300 μs duty cycle ≤2%.

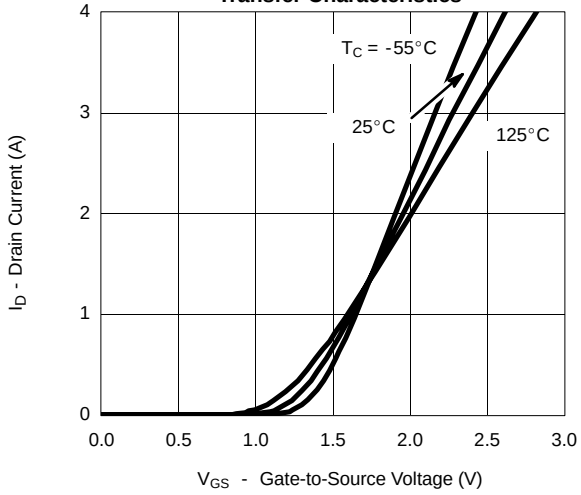
VNLJ02

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

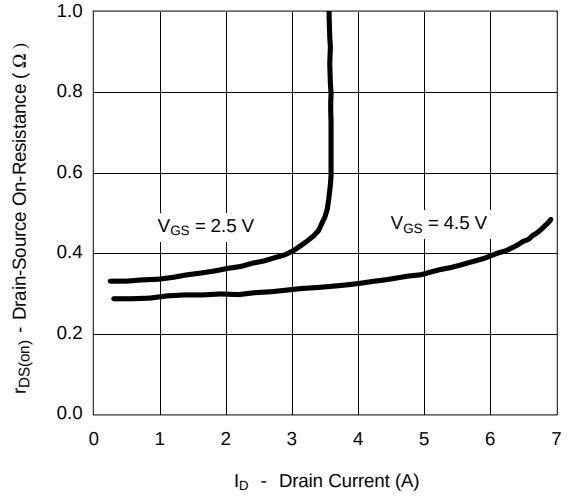
Output Characteristics



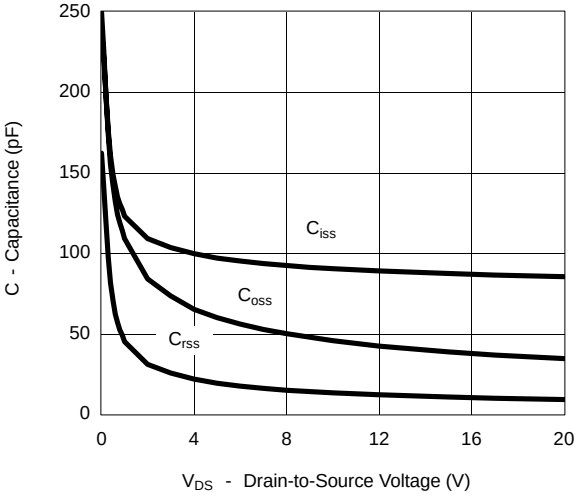
Transfer Characteristics



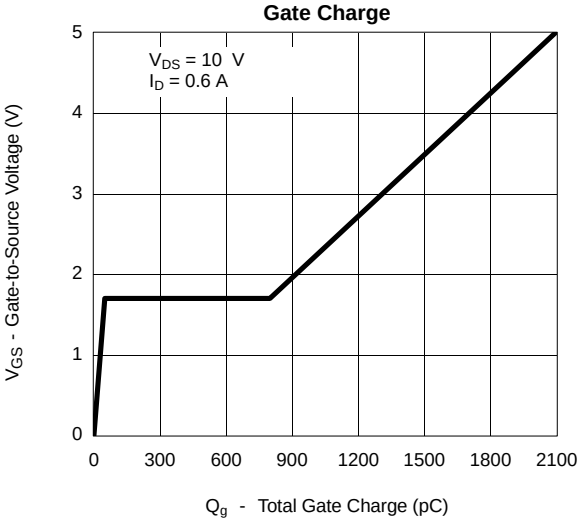
On-Resistance vs. Drain Current



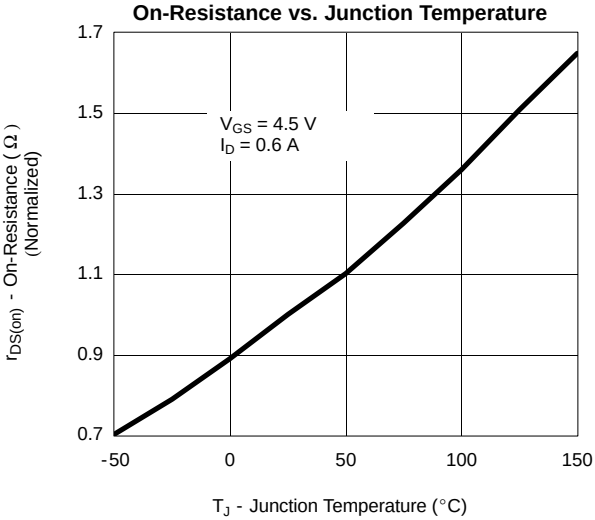
Capacitance



Gate Charge

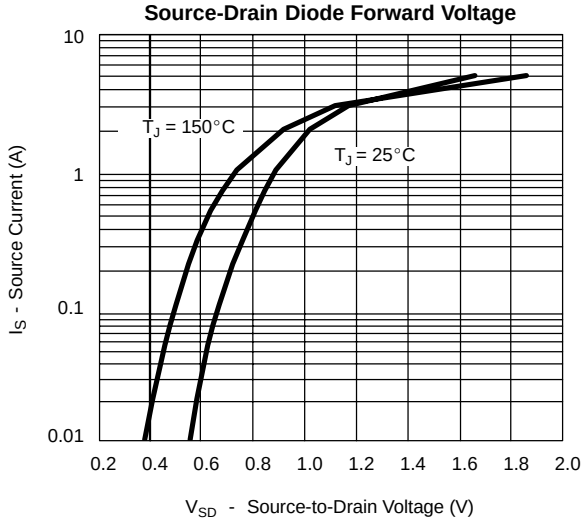


On-Resistance vs. Junction Temperature

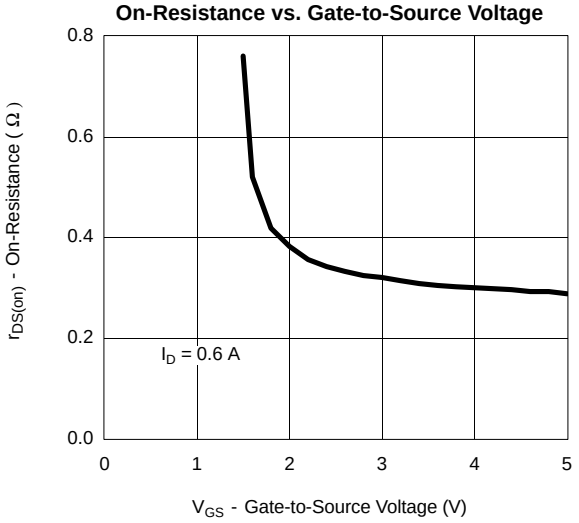


TYPICAL CHARACTERISTICS (T_A = 25°C UNLESS OTHERWISE NOTED)

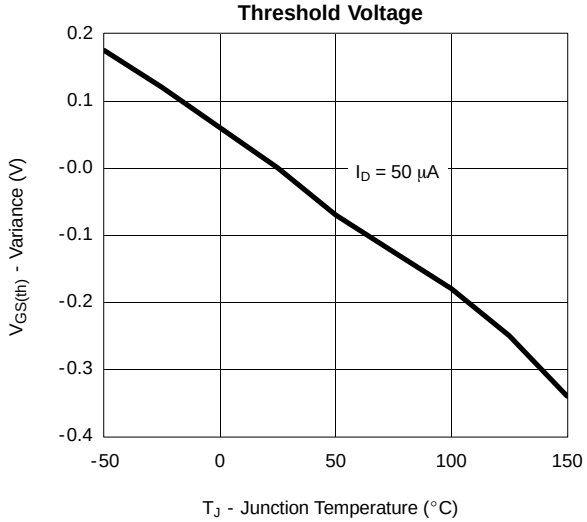
Source-Drain Diode Forward Voltage



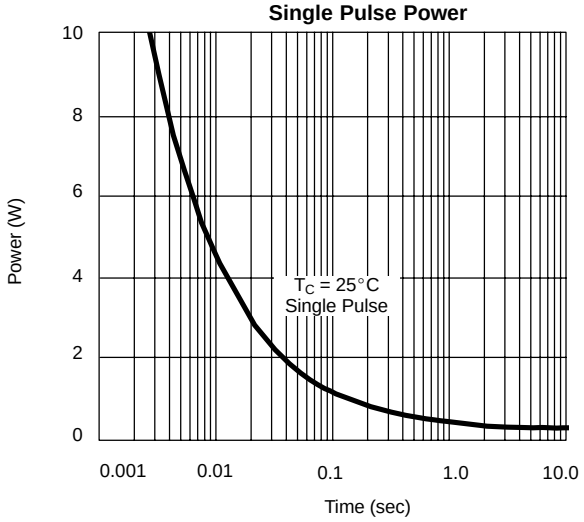
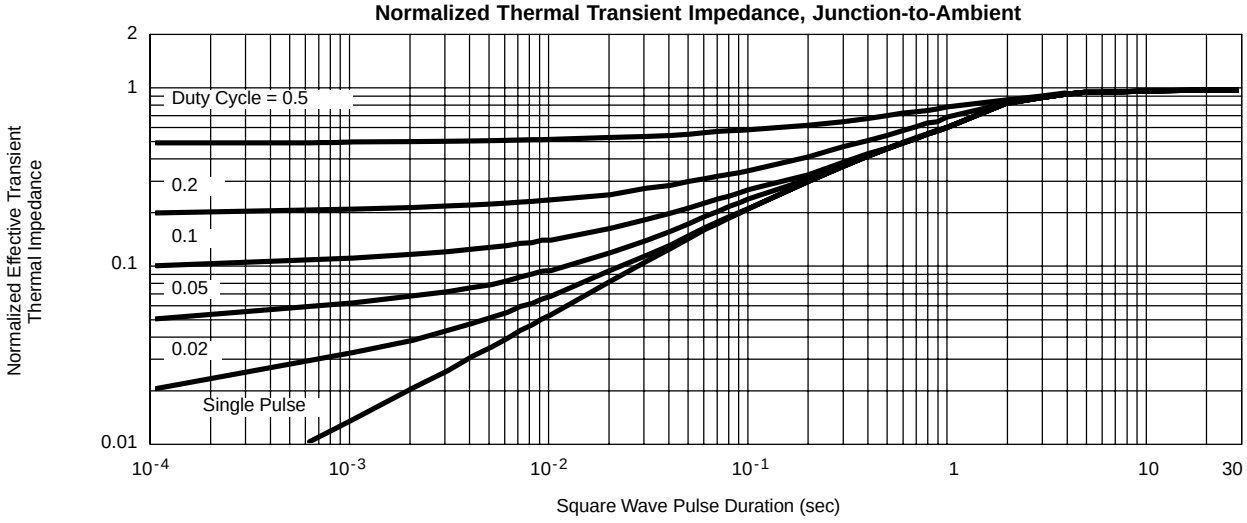
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



Single Pulse Power



Normalized Thermal Transient Impedance, Junction-to-Ambient