



N-Channel 20-V MOSFET

PRODUCT SUMMARY

V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (mA)
20	2.0 @ $V_{GS} = 4.5$ V	250
	2.5 @ $V_{GS} = 2.5$ V	150

FEATURES

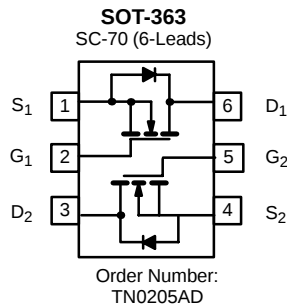
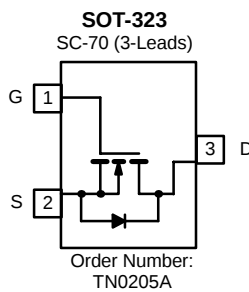
- Low On-Resistance: 2.0 Ω
- Low Threshold: 0.9 V (typ)
- Fast Switching Speed: 35 ns
- 2.5-V or Lower Operation

BENEFITS

- Ease in Driving Switches
- Low Offset (Error) Voltage
- Low-Voltage Operation
- High-Speed Circuits
- Low Battery Voltage Operation

APPLICATIONS

- Drivers: Relays, Solenoids, Lamps, Hammers, Display, Memories
- Battery operated Systems
- Solid State Relay
- Load/Power Switching-Cell Phones, PDA



Marking Code:
TN0205A: B/
TN0205AD: Dwl
w = Week Code
l = Lot Traceability

ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)

Parameter		Symbol	TN0205A	TN0205AD	Unit
Drain-Source Voltage		V _{DS}	20		V
Gate-Source Voltage		V _{GS}	± 8		
Continuous Drain Current (T _J = 150°C) ^a	T _A = 25°C	I _D	250		mA
	T _A = 70°C		200		
Pulsed Drain Current		I _{DM}	500		
Maximum Power Dissipation ^a	T _A = 25°C	P _D	0.15	0.20 (Total)	W
	T _A = 70°C		0.10	0.13 (Total)	
Operating Junction and Storage Temperature Range		T _J , T _{stg}	−55 to 150		°C

THERMAL RESISTANCE RATINGS

Parameter	Symbol	TN0205A	TN0205AD	Unit
Thermal Resistance, Junction-to-Ambient ^a	R_{thJA}	833	625 (Total)	$^\circ\text{C/W}$

Notes

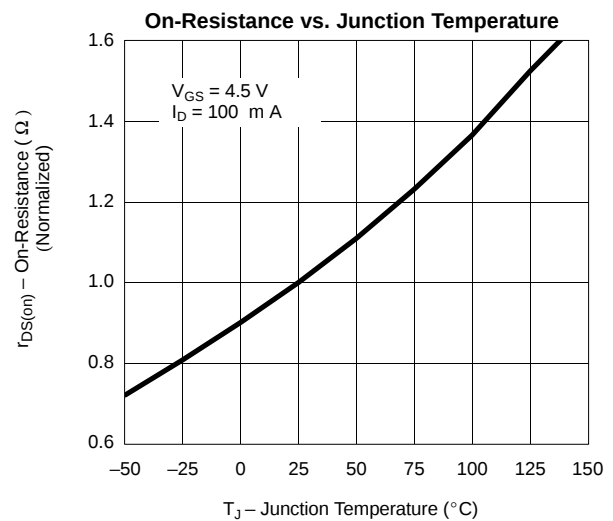
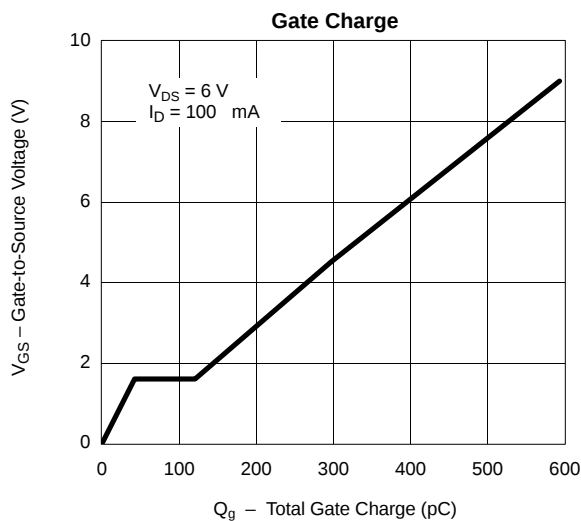
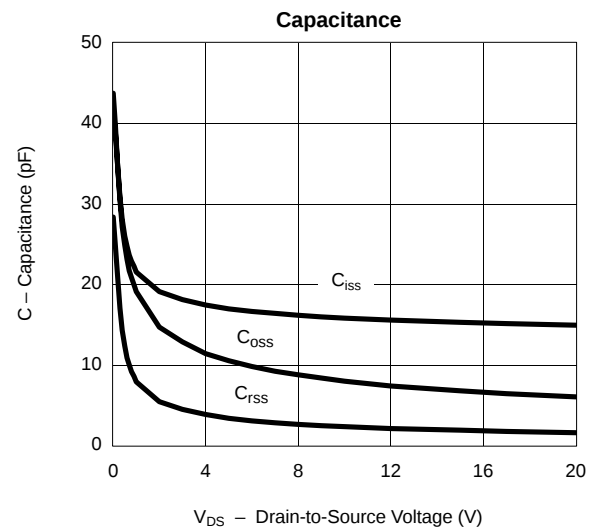
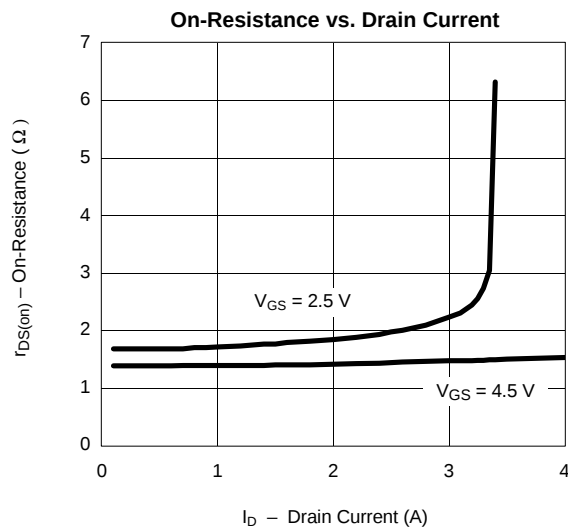
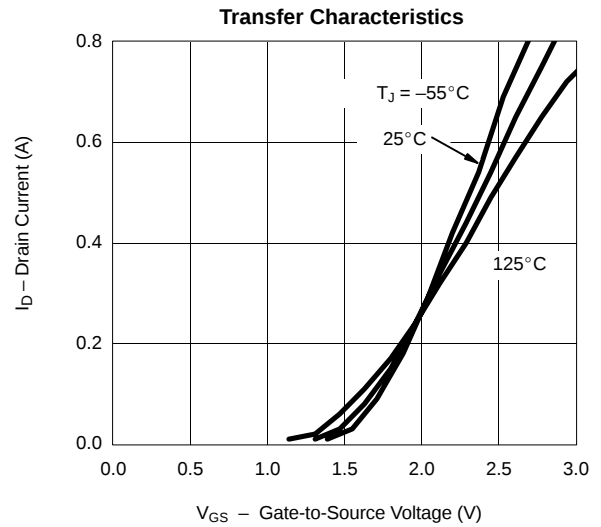
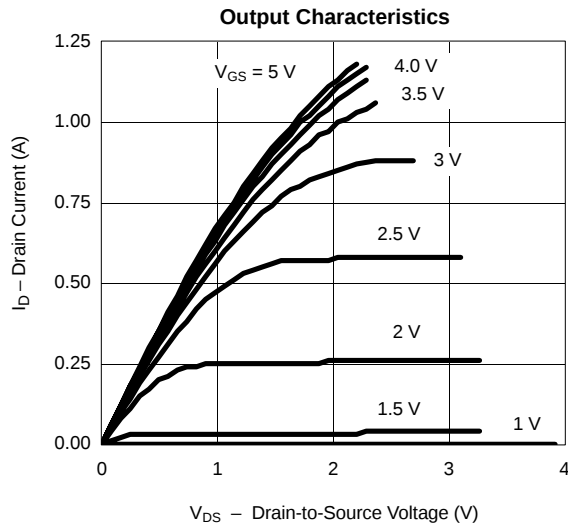
a. Surface Mounted on FR4 Board, $t \leq 10$ sec.

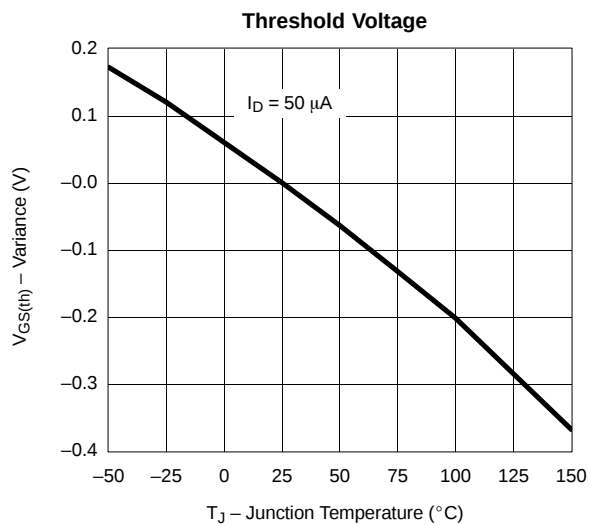
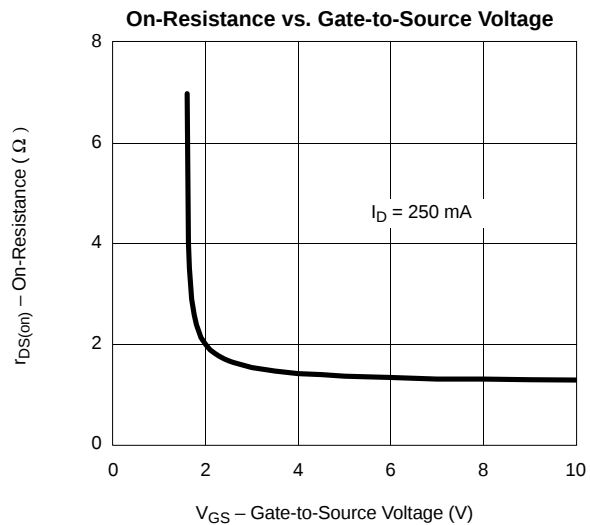
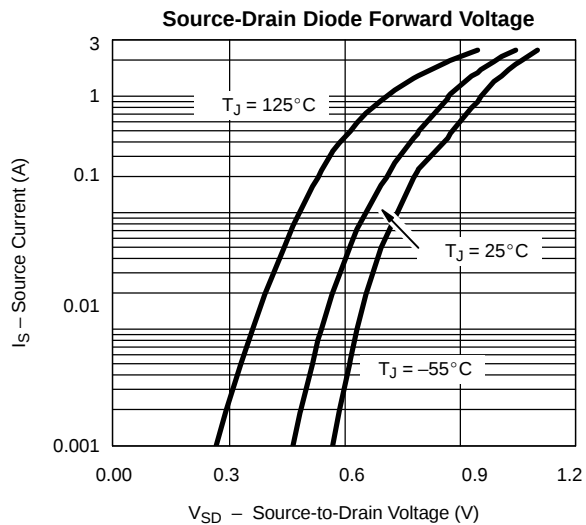
SPECIFICATIONS (T _A = 25° C UNLESS OTHERWISE NOTED)						
Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Static						
Drain-Source Breakdown Voltage	V _{(BR)DSS}	V _{DS} = 0 V, I _D = 10 μA	20	24		V
Gate-Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 50 μA	0.4	0.9	1.5	
Gate-Body Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ±8 V		±2	±100	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 20 V, V _{GS} = 0 V		0.001	100	
		V _{DS} = 20 V, V _{GS} = 0 V, T _J = 55°C			5	μA
On-State Drain Current ^a	I _{D(on)}	V _{DS} = 5.0 V, V _{GS} = 2.5 V	120	160		mA
		V _{DS} = 8.0 V, V _{GS} = 4.5 V	400	800		
Drain-Source On-State Resistance ^a	r _{DS(on)}	V _{GS} = 2.5 V, I _D = 150 mA		1.6	2.5	Ω
		V _{GS} = 4.5 V, I _D = 250 mA		1.2	2.0	
Forward Transconductance ^a	g _{fs}	V _{DS} = 2.5 V, I _D = 50 mA		200		mS
Diode Forward Voltage ^a	V _{SD}	I _S = 50 mA, V _{GS} = 0 V		0.7	1.2	V
Dynamic						
Total Gate Charge	Q _g	V _{DS} = 5.0 V, V _{GS} = 4.5 V, I _D = 100 mA		350	450	pC
Gate-Source Charge	Q _{gs}			25		
Gate-Drain Charge	Q _{gd}			100		
Input Capacitance	C _{iss}	V _{DS} = 5.0 V, V _{GS} = 0 V, f = 1 MHz		20		pF
Output Capacitance	C _{oss}			14		
Reverse Transfer Capacitance	C _{rss}			5		
Switching ^{b, c}						
Turn-On Delay Time	t _{d(on)}	V _{DD} = 3.0 V, R _L = 100 Ω I _D = 0.25 A, V _{GEN} = 4.5 V, R _G = 10 Ω		7	12	ns
Rise Time	t _r			25	35	
Turn-Off Delay Time	t _{d(off)}			19	30	
Fall Time	t _f			9	15	

Notes

- a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.
b. For design only, not subject to production testing.
c. Switching time is essentially independent of operating temperature.

VNOJ

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

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