



P-Channel 20-V (D-S) MOSFET, Low-Threshold

PRODUCT SUMMARY		
V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (mA)
-20	3.8 @ $V_{GS} = -4.5$ V	-180
	5.0 @ $V_{GS} = -2.5$ V	-100

FEATURES

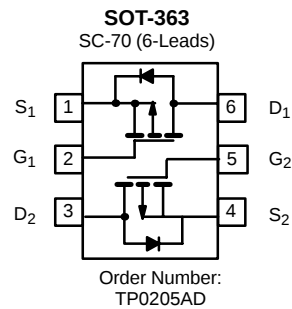
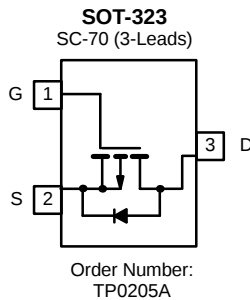
- High-Side Switching
- Low On-Resistance: 2.6 Ω (typ)
- Low Threshold: 0.9 V (typ)
- Fast Switching Speed: 35 ns
- 2.5 V or Lower Operation

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
- Load/Power Switching-Cell Phones, PDA



Marking Code:

TP0205A: A/
TP0205AD: Cw/w = Week Code
/ = Lot TraceabilityABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)

Parameter		Symbol	TP0205A	TP0205AD	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	−180		mA
	T _A = 70°C		−140		
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	TP0205A	TP0205AD	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 ^b	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			−1	μA
On-State Drain Current ^a	I _{D(on)}	V _{GS} = −4.5 V, V _{DS} = −8.0 V	−400			mA
		V _{GS} = −2.5 V, V _{DS} = −5.0 V	−120			
Drain-Source On-State Resistance ^a	r _{DS(on)}	V _{GS} = −4.5 V, I _D = −180 mA		2.6	3.8	Ω
		V _{GS} = −2.5 V, I _D = −75 mA		4.0	5.0	
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}			125		
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 ^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	

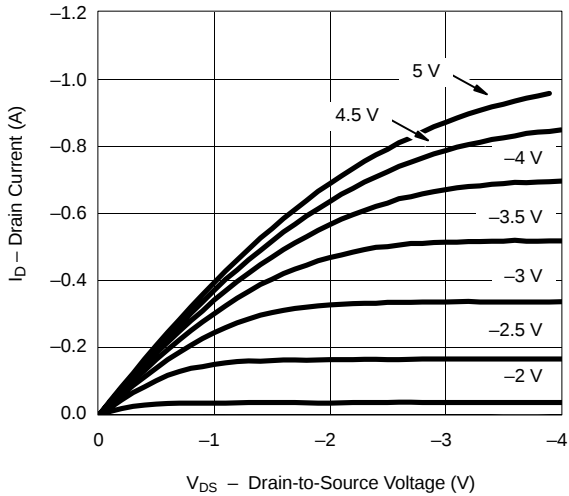
Notes

- 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.

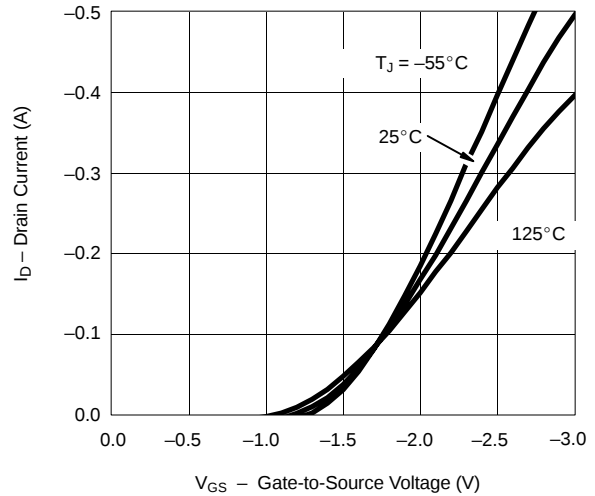
VPOJ

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

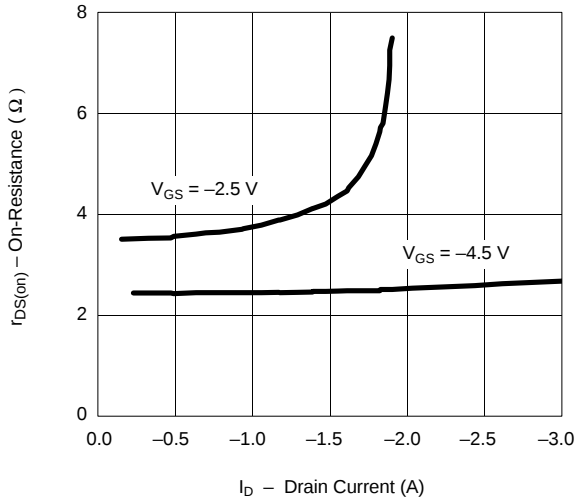
Output Characteristics



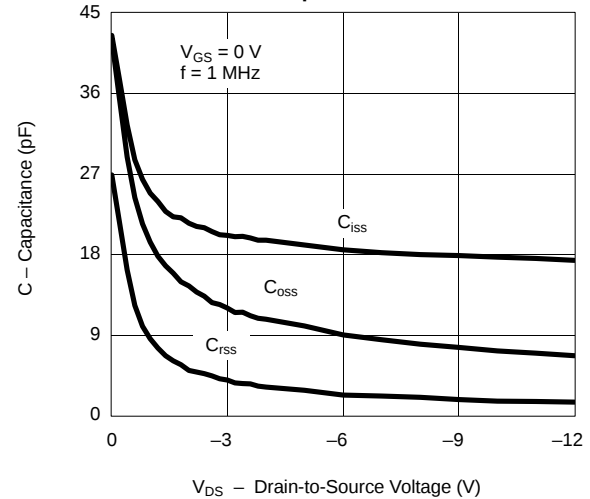
Transfer Characteristics



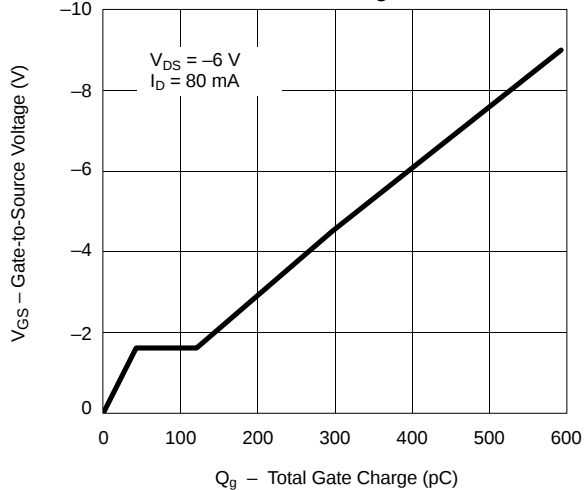
On-Resistance vs. Drain Current



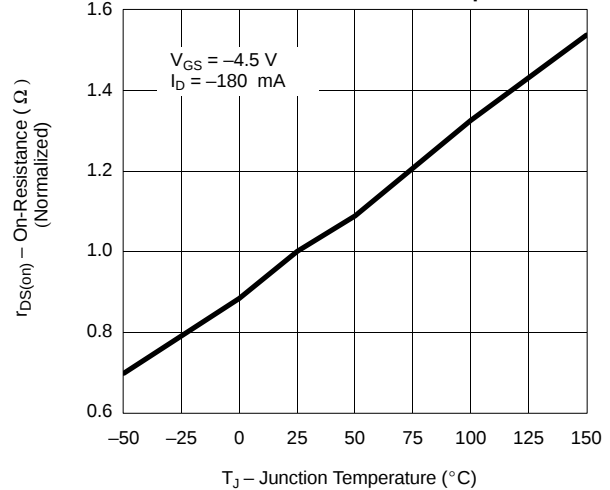
Capacitance



Gate Charge



On-Resistance vs. Junction Temperature



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