



Dual N- and P-Channel ± 20 -V Low-Threshold MOSFET

PRODUCT SUMMARY			
Channel	V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (mA)
N-Channel	20	2.0 @ $V_{GS} = 4.5$ V	250
		2.5 @ $V_{GS} = 2.5$ V	150
P-Channel	-20	3.8 @ $V_{GS} = -4.5$ V	-180
		5.0 @ $V_{GS} = -2.5$ V	-100

FEATURES

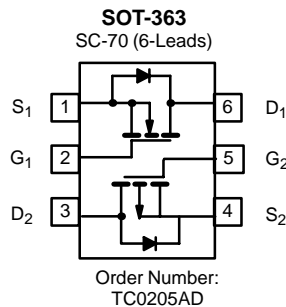
- Very Small Outline (SC-70, 6-Leads)
- Low On-Resistance: 2.0 Ω (N-Ch)
- Low Threshold: 0.9 V (typ)
- Fast Switching Speed: 35 ns
- 2.5-V or Lower Operation

BENEFITS

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

APPLICATIONS

- Replace Digital Transistors, Level-Shifter
- Battery Operated Systems
- Power Supply Converter Circuits
- Load/Power Switching-Cell Phones, PDA



ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)				
Parameter	Symbol	N-Channel	P-Channel	Unit
Drain-Source Voltage	V_{DS}	20	-20	V
Gate-Source Voltage	V_{GS}	± 8	± 8	
Continuous Drain Current ($T_J = 150^\circ\text{C}$) ^a	$T_A = 25^\circ\text{C}$	250	-180	mA
	$T_A = 70^\circ\text{C}$	200	-140	
Pulsed Drain Current	I_{DM}	500	-500	
Maximum Power Dissipation ^a	$T_A = 25^\circ\text{C}$	0.20 (Total)		W
	$T_A = 70^\circ\text{C}$	0.13 (Total)		
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55 to 150		$^\circ\text{C}$

THERMAL RESISTANCE RATINGS			
Parameter	Symbol	Limit	Unit
Maximum Junction-to-Ambient ^a	R_{thJA}	625 (Total)	$^\circ\text{C/W}$

Notes

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



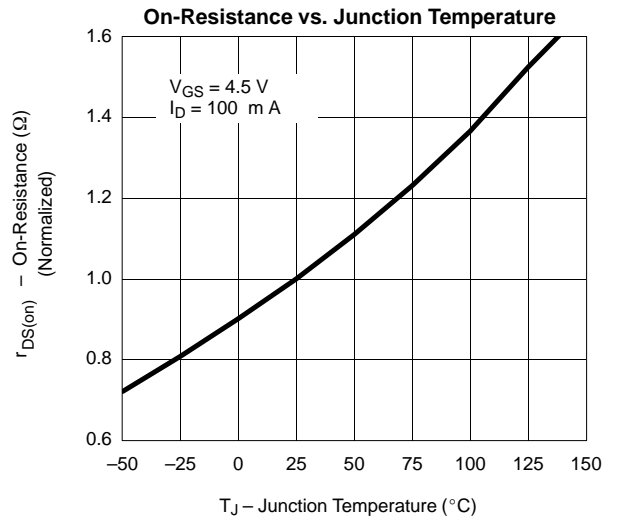
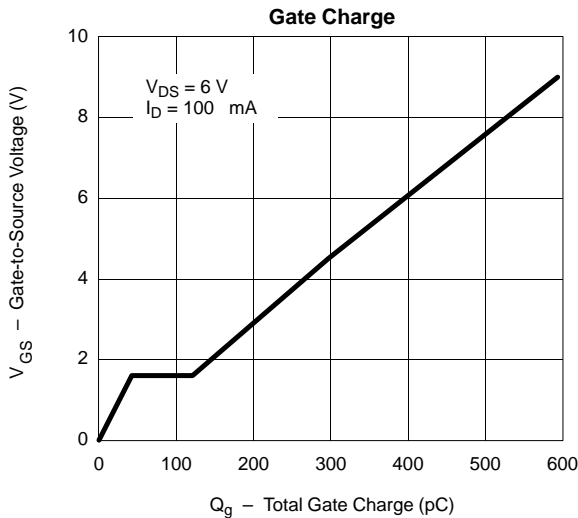
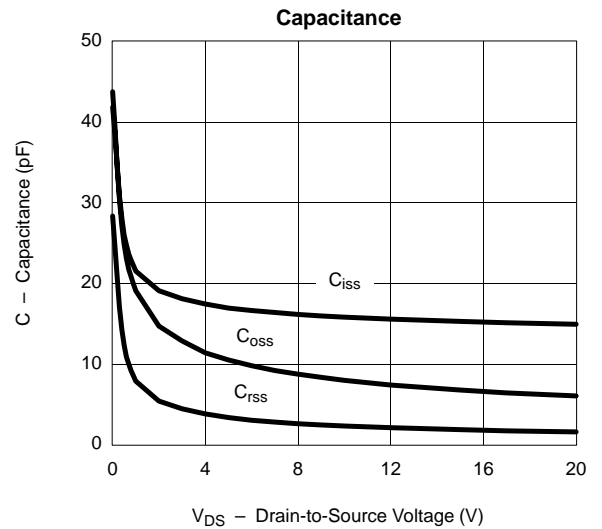
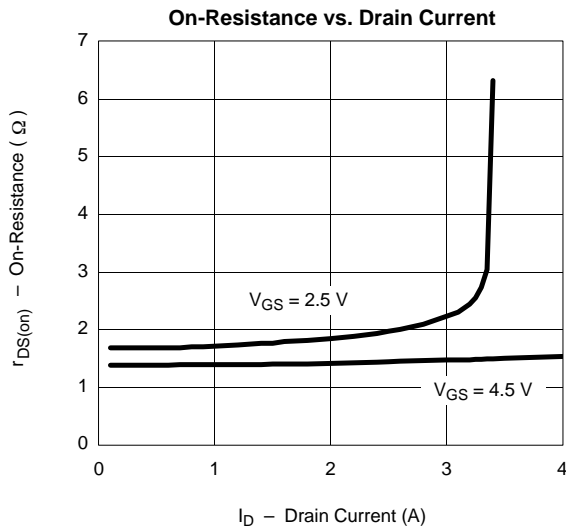
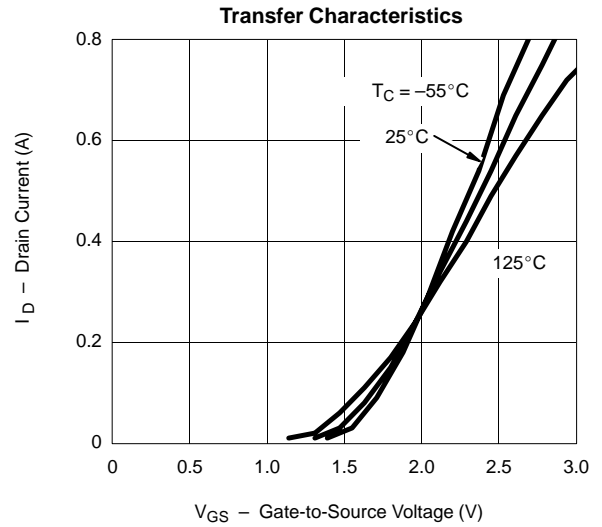
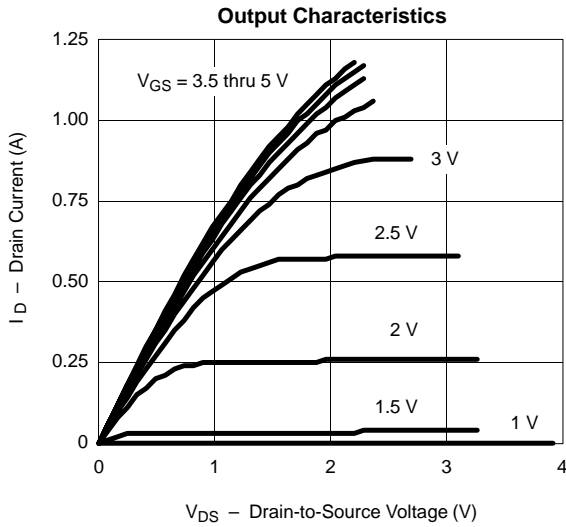
SPECIFICATIONS (T _J = 25 °C UNLESS OTHERWISE NOTED)							
Parameter	Symbol	Test Condition	Min	Typ	Max	Unit	
Static							
Drain-Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} = 0 V, I _D = 10 μA	N-Ch	20	24		V
		V _{GS} = 0 V, I _D = -10 μA	P-Ch	-20	-24		
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 50 μA	N-Ch	0.4	0.9	1.5	
		V _{DS} = V _{GS} , I _D = -50 μA	P-Ch	-0.4	-0.9	-1.5	
Gate-Body Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ±8 V	N-Ch		±2	±100	nA
			P-Ch		±2	±100	
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 20 V, V _{GS} = 0 V	N-Ch		0.001	100	μA
		V _{DS} = -20 V, V _{GS} = 0 V	P-Ch		-0.001	-100	
		V _{DS} = 20 V, V _{GS} = 0 V, T _J = 55 °C	N-Ch			1	
		V _{DS} = -20 V, V _{GS} = 0 V, T _J = 55 °C	P-Ch			-1	
On-State Drain Current ^b	I _{D(on)}	V _{DS} ≥ 2.5 V, V _{GS} = 5.0 V	N-Ch	120			mA
		V _{DS} ≥ -2.5 V, V _{GS} = -5.0 V	P-Ch	-120			
		V _{DS} ≥ 4.5 V, V _{GS} = 8.0 V	N-Ch	400			
		V _{DS} ≥ -4.5 V, V _{GS} = -8.0 V	P-Ch	-400			
Drain-Source On-State Resistance ^b	r _{DS(on)}	V _{GS} = 2.5 V, I _D = 150 mA	N-Ch		1.6	2.5	Ω
		V _{GS} = -2.5 V, I _D = -75 mA	P-Ch		4	5	
		V _{GS} = 4.5 V, I _D = 250 mA	N-Ch		1.2	2.0	
		V _{GS} = -4.5 V, I _D = -180 mA	P-Ch		2.6	3.8	
Forward Transconductance ^b	g _{fs}	V _{DS} = 2.5 V, I _D = 50 mA	N-Ch		150		mS
		V _{DS} = -2.5 V, I _D = -50 mA	P-Ch		200		
Diode Forward Voltage ^b	V _{SD}	I _S = 50 mA, V _{GS} = 0 V	N-Ch		0.7	1.2	V
		I _S = -50 mA, V _{GS} = 0 V	P-Ch		-0.7	-1.2	
Dynamic^a							
Total Gate Charge	Q _g	N-Channel V _{DS} = 5 V, V _{GS} = 4.5 V, I _D = 100 mA P-Channel V _{DS} = -5 V, V _{GS} = -4.5 V, I _D = -100 mA	N-Ch		300	450	pC
Gate-Source Charge	Q _{gs}		N-Ch		25		
Gate-Drain Charge	Q _{gd}		P-Ch		25		
Input Capacitance	C _{iss}	N-Channel V _{DS} = 5 V, V _{GS} = 0 V P-Channel V _{DS} = -5 V, V _{GS} = 0 V	N-Ch		15		pF
Output Capacitance	C _{oss}		N-Ch		11		
Reverse Transfer Capacitance	C _{rss}		P-Ch		11		
Switching							
Turn-On Time	t _{d(on)}	N-Channel V _{DD} = 3 V, R _L = 100 Ω I _D = 0.25 A, V _{GEN} = 4.5 V, R _G = 10 Ω P-Channel V _{DD} = -3 V, R _L = 100 Ω I _D = -0.25 A, V _{GEN} = -4.5 V, R _G = 10 Ω	N-Ch		7	12	ns
Rise Time	t _r		N-Ch		25	35	
			P-Ch		25	35	
Turn-Off Delay Time	t _{d(off)}		N-Ch		19	30	
		P-Ch		19	30		
Fall Time	t _f	N-Ch		9	15		
		P-Ch		9	15		

Notes

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



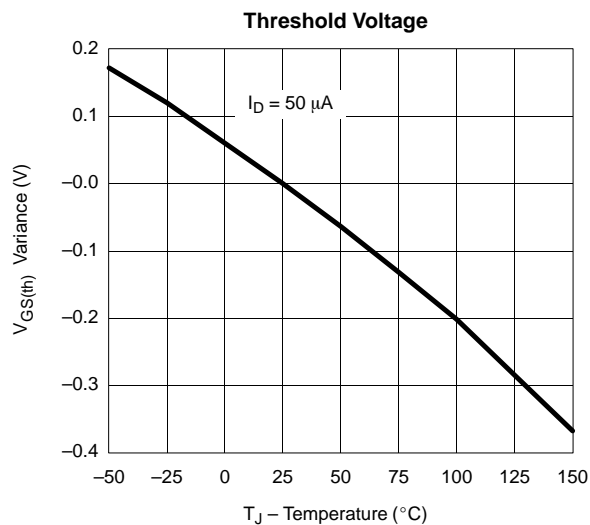
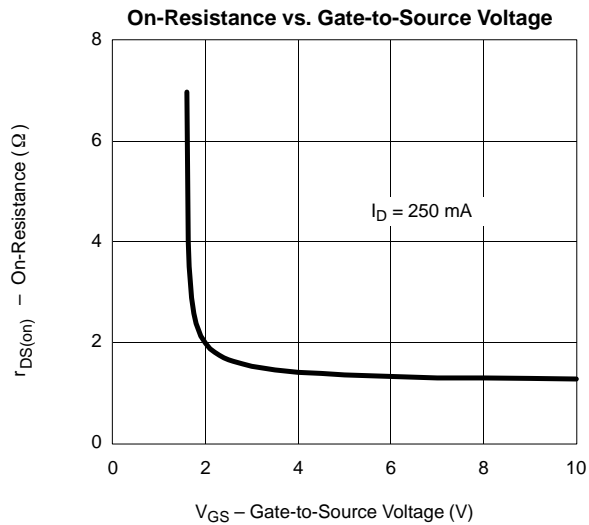
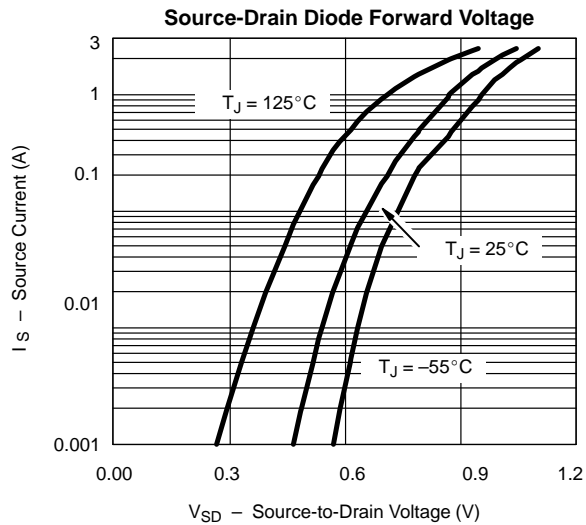
TYPICAL CHARACTERISTICS (25°C UNLESS NOTED) N-CHANNEL





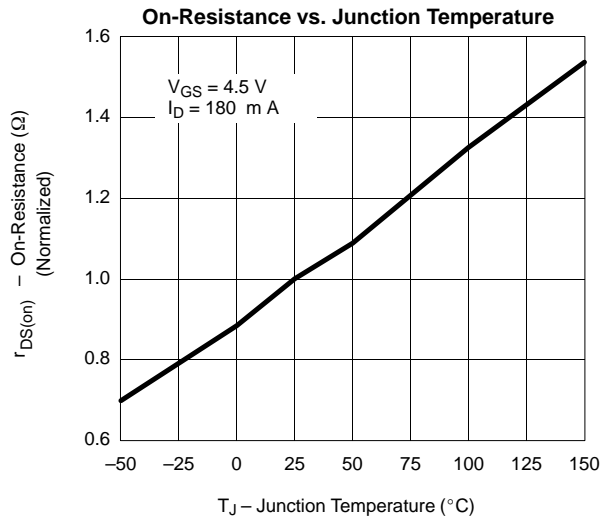
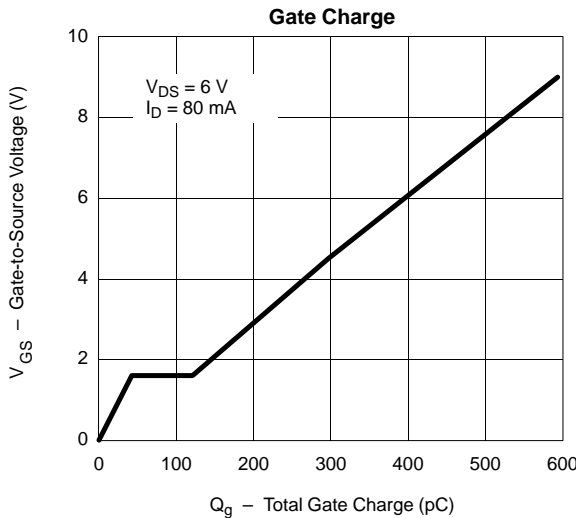
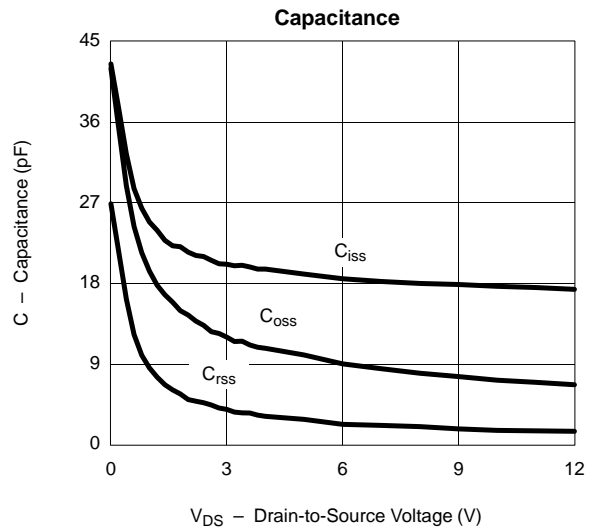
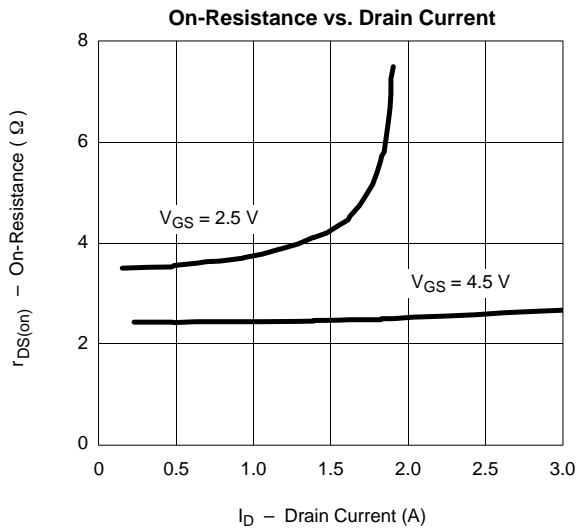
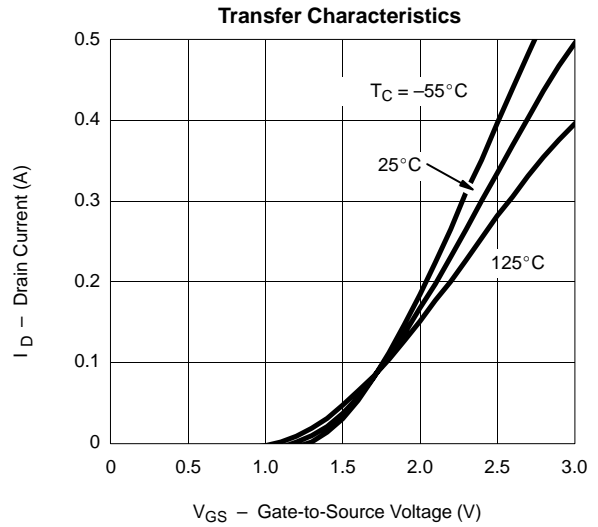
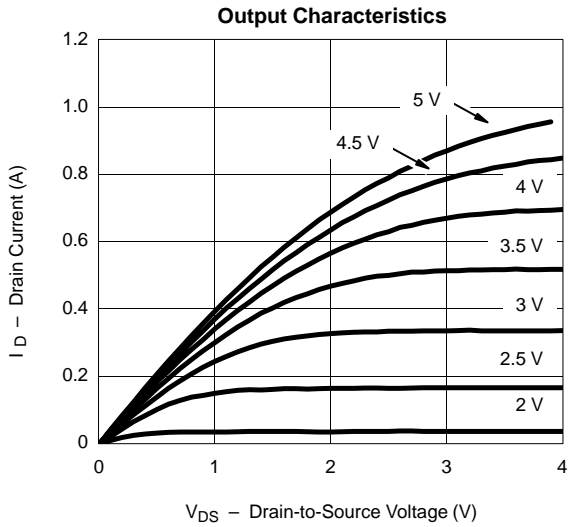
TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

N-CHANNEL





TYPICAL CHARACTERISTICS (25°C UNLESS NOTED) P-CHANNEL





TYPICAL CHARACTERISTICS (25°C UNLESS NOTED) P-CHANNEL

