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

PRODUCT SUMMARY			
V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (A) TP0101T	I_D (A) TP0101TS
–20	0.65 @ V_{GS} = –4.5 V	–0.6	–1.0
	0.85 @ V_{GS} = –2.5 V	–0.5	–0.9

FEATURES

- High-Side Switching
- Low On-Resistance: 0.45 Ω
- Low Threshold: 0.9 V (typ)
- Fast Switching Speed: 32 ns
- 2.5-V or Lower Operation

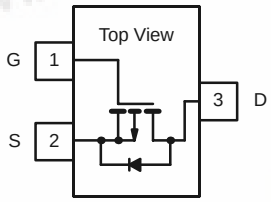
BENEFITS

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

APPLICATIONS

- Drivers: Relays, Solenoids, Lamps, Hammers, Displays, Memories
- Battery Operated Systems, DC/DC Converters
- Power Supply Converter Circuits
- Load/Power Switching–Cell Phones, Pagers

TO-236
(SOT-23)



Marking Code:

TP0101T: PO*wll*
TP0101TS: PS*wll*

w = Week Code
l = Lot Traceability

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C UNLESS OTHERWISE NOTED)					
Parameter		Symbol	TP0101T	TP0101TS[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	–0.6	–1.0	A
	T_A= 70°C		–0.48	–0.8	
Pulsed Drain Current[a]		I_{DM}	–3	–3	
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	–55 to 150	°C

THERMAL RESISTANCE RATINGS				
Parameter	Symbol	TP0101T	TP0101TS[c]	Unit
Thermal Resistance, 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)

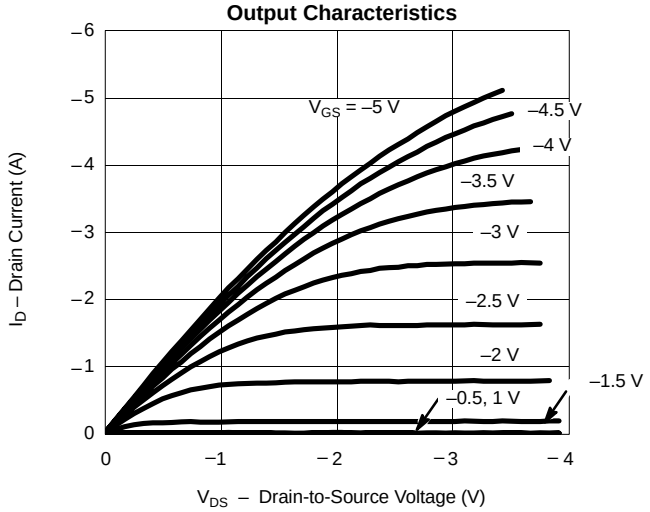
Parameter	Symbol	Test Conditions	Limits Min	Limits Typ	Limits Max	Unit
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0 V, I_D = –10 µA	–20	–26		V
Gate-Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = –50 µA	–0.5	–0.9	–1.5	V
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ±8 V			±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = –9.6 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	–0.5			
Drain-Source On-Resistance[a]	$r_{DS(on)}$	V_{GS} = –4.5 V, I_D = –0.6 A		0.45	0.65	Ω
		V_{GS} = –2.5 V, I_D = –0.5 A		0.69	0.85	
Forward Transconductance[a]	g_{fs}	V_{DS} = –5 V, I_D = –0.6 A		1300		mS
Diode Forward Voltage[a]	V_{SD}	I_S = –0.6 A, V_{GS} = 0 V		–0.9	–1.2	V
Dynamic						
Total Gate Charge	Q_g	V_{DS} = –6 V, V_{GS} = –4.5 V I_D ≅ –0.6 A		2020	3000	pC
Gate-Source Charge	Q_{gs}			180		
Gate-Drain Charge	Q_{gd}			720		
Input Capacitance	C_{iss}	V_{DS} = –6 V, V_{GS} = 0, f = 1 MHz		110		pF
Output Capacitance	C_{oss}			80		
Reverse Transfer Capacitance	C_{rss}			30		
Switching						
Turn-On Time	$t_{d(on)}$	V_{DD} = –6 V, R_L = 12 Ω I_D ≅ –0.6 A, V_{GEN} = –4.5 V R_G = 6 Ω		7	12	ns
	t_r			25	35	
Turn-Off Time	$t_{d(off)}$			19	30	
	t_f			9	15	

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

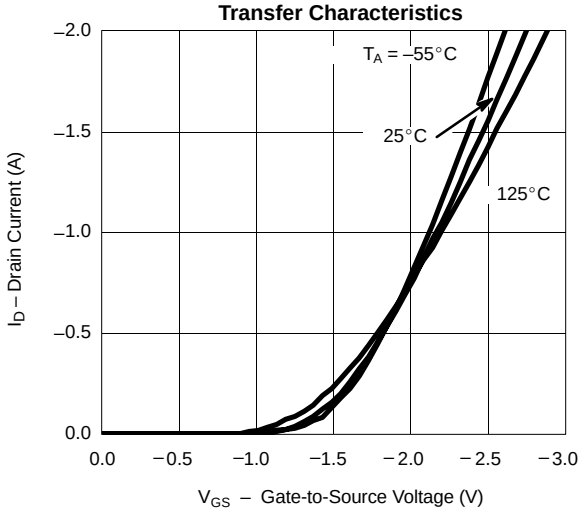
VPLJ01

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

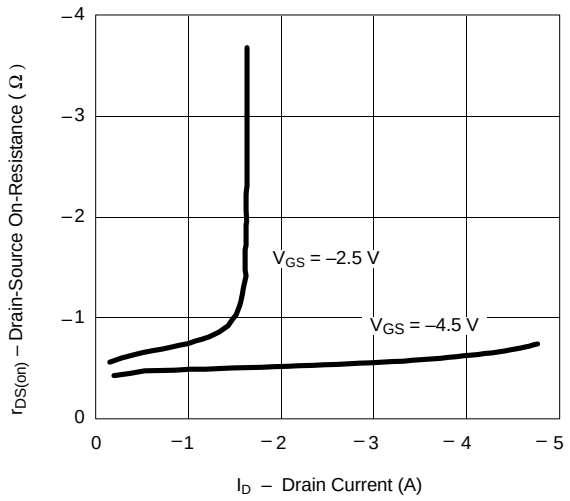
Output Characteristics



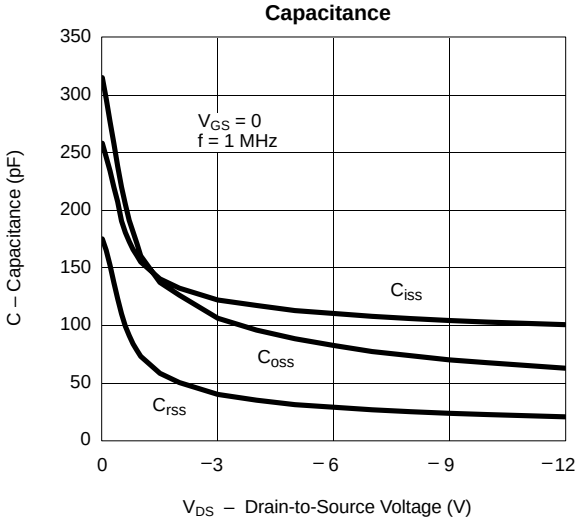
Transfer Characteristics



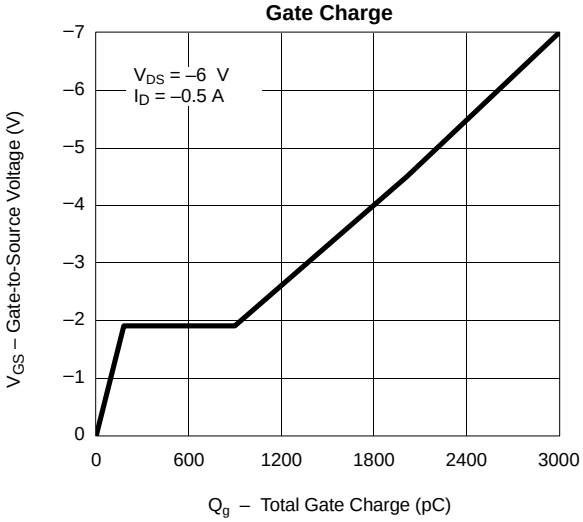
On-Resistance vs. Drain Current



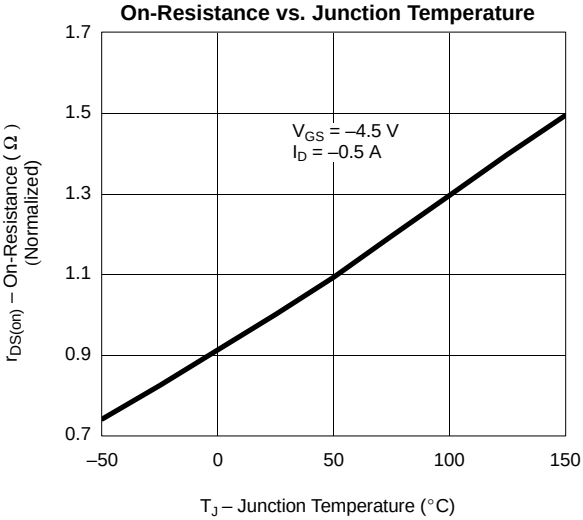
Capacitance



Gate Charge

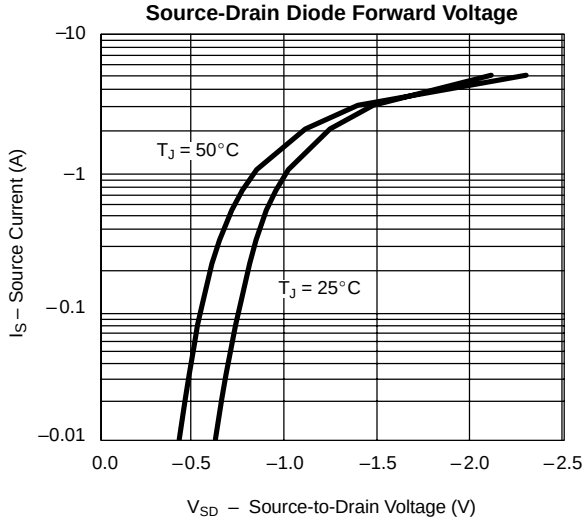


On-Resistance vs. Junction Temperature

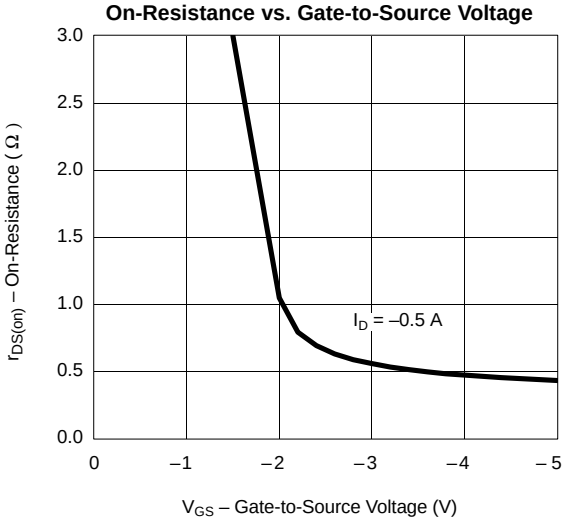


TYPICAL CHARACTERISTICS (T_A = 25°C UNLESS OTHERWISE NOTED)

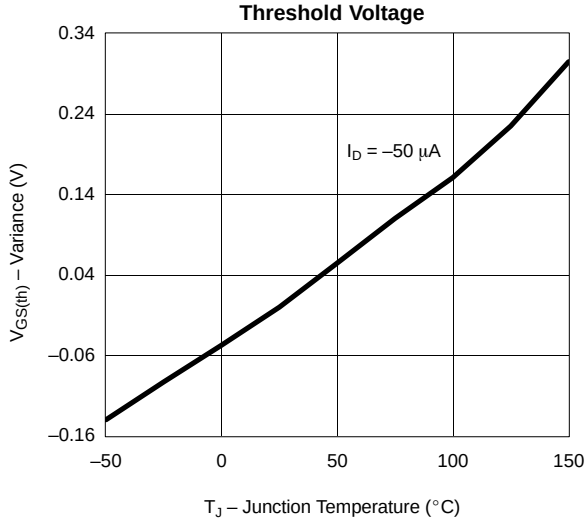
Source-Drain Diode Forward Voltage



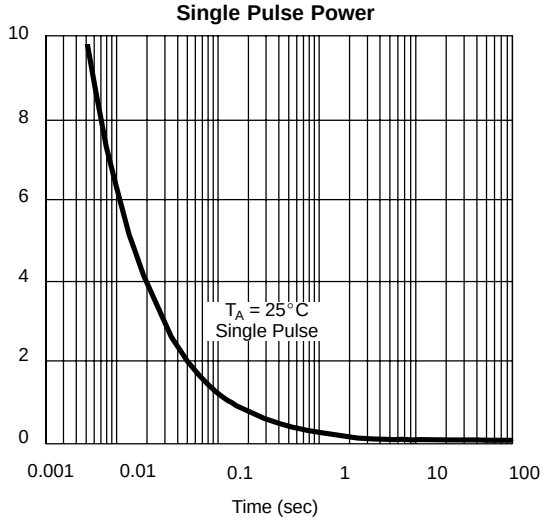
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



Single Pulse Power



Normalized Thermal Transient Impedance, Junction-to-Ambient