



P-Channel 60-V (D-S) MOSFET

TrenchFET<sup>®</sup>  
MOSFETs

PRODUCT SUMMARY			
V <sub>(BR)DSS(min)</sub> (V)	r <sub>DS(on)</sub> (Ω)	V <sub>GS(th)</sub> (V)	I <sub>D</sub> (mA)
-60	6 @ V <sub>GS</sub> = -10 V	-1 to -3.0	-185



ESD Protected  
2000 V

FEATURES

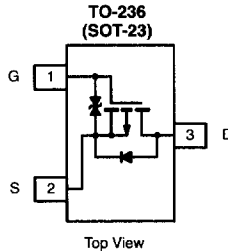
- High-Side Switching
- Low On-Resistance: 6 Ω
- Low Threshold: -2 V (typ)
- Fast Switching Speed: 20 ns (typ)
- Low Input Capacitance: 20 pF (typ)
- Gate-Source ESD Protection

BENEFITS

- Ease in Driving Switches
- Low Offset (Error) Voltage
- Low-Voltage Operation
- High-Speed Circuits
- Easily Driven Without Buffer

APPLICATIONS

- Drivers: Relays, Solenoids, Lamps, Hammers, Displays, Memories, Transistors, etc.
- Battery Operated Systems
- Power Supply Converter Circuits
- Solid State Relays



Marking Code: 6Kw//  
6K = Part Number Code for TP0610K  
w = Week Code  
// = Lot Traceability

ABSOLUTE MAXIMUM RATINGS (T <sub>A</sub> = 25°C UNLESS OTHERWISE NOTED)			
Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V <sub>DS</sub>	-60	V
Gate-Source Voltage	V <sub>GS</sub>	±20	
Continuous Drain Current <sup>a</sup>	I <sub>D</sub>	T <sub>A</sub> = 25°C	-185
		T <sub>A</sub> = 100°C	-115
Pulse Drain Current <sup>b</sup>	I <sub>DM</sub>	-800	mA
Power Dissipation <sup>a</sup>	P <sub>D</sub>	T <sub>A</sub> = 25°C	350
		T <sub>A</sub> = 100°C	140
Maximum Junction-to-Ambient <sup>a</sup>	R <sub>thJA</sub>	350	°C/W
Operating Junction and Storage Temperature Range	T <sub>J</sub> , T <sub>stg</sub>	-55 to 150	°C

Notes  
a. Surface mounted on FR4 board.  
b. Pulse width limited by maximum junction temperature.



SPECIFICATIONS (T <sub>A</sub> = 25 °C UNLESS OTHERWISE NOTED)						
Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	V <sub>(BR)DSS</sub>	V <sub>GS</sub> = 0 V, I <sub>D</sub> = -10 μA	-60			V
Gate-Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250 μA	-1		-3.0	
Gate-Body Leakage	I <sub>GSS</sub>	V <sub>DS</sub> = 0 V, V <sub>GS</sub> = ± 20 V			± 10	μA
		V <sub>DS</sub> = 0 V, V <sub>GS</sub> = ± 10 V			± 200	
		V <sub>DS</sub> = 0 V, V <sub>GS</sub> = ± 10 V, T <sub>J</sub> = 85 °C			± 500	
		V <sub>DS</sub> = 0 V, V <sub>GS</sub> = ± 5 V			± 100	
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> = -50 V, V <sub>GS</sub> = 0 V			-25	nA
		V <sub>DS</sub> = -50 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 85 °C			-250	
On-State Drain Current <sup>a</sup>	I <sub>D(on)</sub>	V <sub>DS</sub> = -10 V, V <sub>GS</sub> = -4.5 V	-50			mA
		V <sub>DS</sub> = -10 V, V <sub>GS</sub> = -10 V	-600			
Drain-Source On-Resistance <sup>a</sup>	r <sub>DS(on)</sub>	V <sub>GS</sub> = -4.5 V, I <sub>D</sub> = -25 mA			10	Ω
		V <sub>GS</sub> = -10 V, I <sub>D</sub> = -500 mA			6	
		V <sub>GS</sub> = -10 V, I <sub>D</sub> = -500 mA, T <sub>J</sub> = 125 °C			9	
Forward Transconductance <sup>a</sup>	g <sub>fs</sub>	V <sub>DS</sub> = -10 V, I <sub>D</sub> = -100 mA	80			mS
Diode Forward Voltage <sup>a</sup>	V <sub>SD</sub>	I <sub>S</sub> = -200 mA, V <sub>GS</sub> = 0 V			-1.4	V
<b>Dynamic</b>						
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> = -30 V, V <sub>GS</sub> = -15 V, I <sub>D</sub> = -500 mA		1.7		nC
Gate-Source Charge	Q <sub>gs</sub>			0.26		
Gate-Drain Charge	Q <sub>gd</sub>			0.46		
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> = -25 V, V <sub>GS</sub> = 0 V, f = 1 MHz		23		pF
Output Capacitance	C <sub>oss</sub>			10		
Reverse Transfer Capacitance	C <sub>rss</sub>			5		
<b>Switching<sup>b</sup></b>						
Turn-On Time	t <sub>ON</sub>	V <sub>DD</sub> = -25 V, R <sub>L</sub> = 150 Ω I <sub>D</sub> = -200 mA, V <sub>GEN</sub> = -10 V R <sub>G</sub> = 10 Ω		20		ns
Turn-Off Time	t <sub>OFF</sub>			35		

Notes

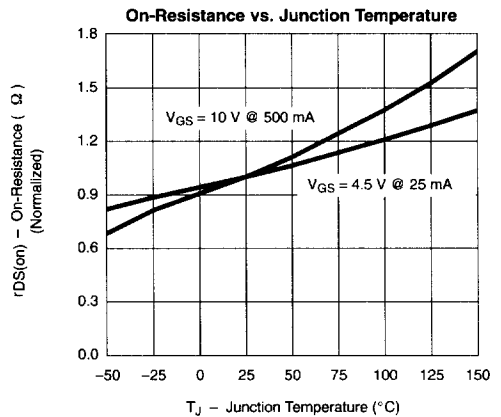
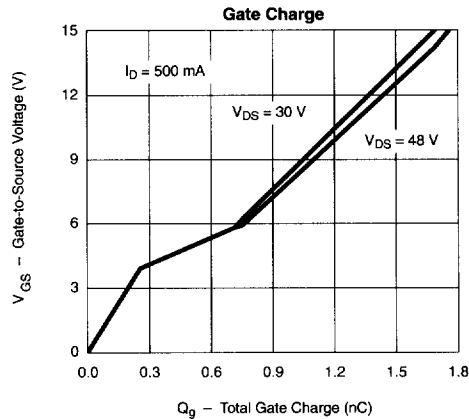
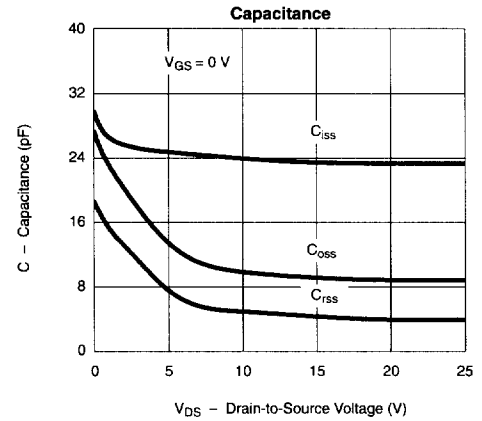
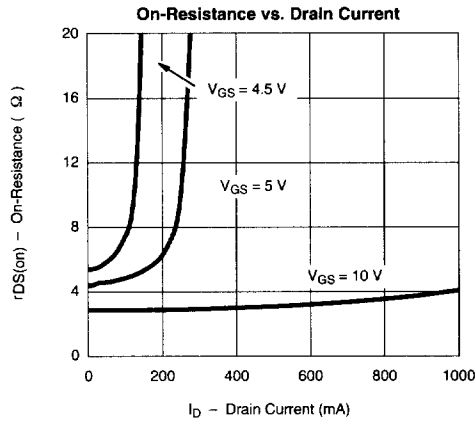
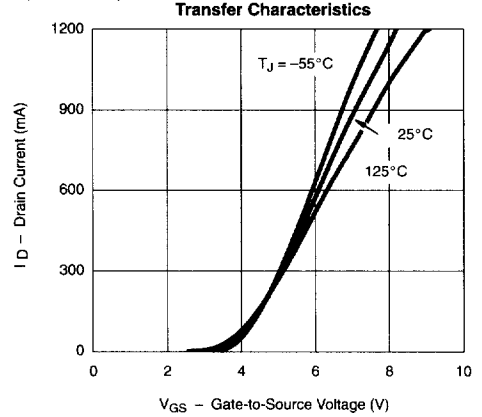
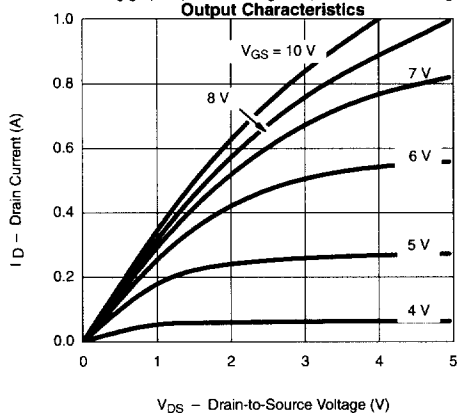
- a. Pulse test: PW ≤ 300 ms duty cycle ≤ 2%.
- b. Switching time is essentially independent of operating temperature.

TPJO60



**TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)**

For the following graphs, p-channel negative polarities for all voltage and current values are represented as positive values.





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