



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

TrenchFET®
MOSFETs**ESD Protected**
2000 V

PRODUCT SUMMARY			
$V_{(BR)DSS(min)}$ (V)	$r_{DS(on)}$ (Ω)	$V_{GS(th)}$ (V)	I_D (mA)
-60	6 @ $V_{GS} = -10$ V	-1 to -3.0	-185

FEATURES

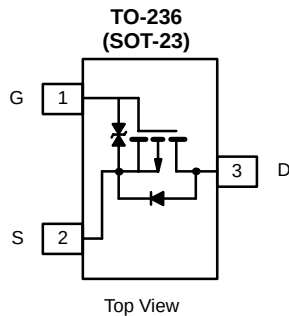
- High-Side Switching
- Low On-Resistance: 6 Ω
- Low Threshold: -2 V (typ)
- Fast Switching Speed: 20 ns (typ)
- Low Input Capacitance: 20 pF (typ)
- Gate-Source ESD Protection

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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	-60	V
Gate-Source Voltage	V_{GS}	± 20	
Continuous Drain Current ^a	I_D	$T_A = 25^\circ\text{C}$	mA
		$T_A = 100^\circ\text{C}$	
Pulse Drain Current ^b	I_{DM}	-800	
Power Dissipation ^a	P_D	$T_A = 25^\circ\text{C}$	mW
		$T_A = 100^\circ\text{C}$	
Maximum Junction-to-Ambient ^a	R_{thJA}	350	$^\circ\text{C/W}$
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55 to 150	$^\circ\text{C}$

Notes

a. Surface mounted on FR4 board.

b. Pulse width limited by maximum junction temperature.

SPECIFICATIONS ($T_A = 25^\circ\text{C}$ 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	−60			V
Gate-Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = −250 μA	−1		−3.0	
Gate-Body Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ±20 V			±10	μA
		V _{DS} = 0 V, V _{GS} = ±10 V			±200	
		V _{DS} = 0 V, V _{GS} = ±10 V, T _J = 85°C			±500	
		V _{DS} = 0 V, V _{GS} = ±5 V			±100	
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = −50 V, V _{GS} = 0 V			−25	nA
		V _{DS} = −50 V, V _{GS} = 0 V, T _J = 85°C			−250	
On-State Drain Current ^a	I _{D(on)}	V _{DS} = −10 V, V _{GS} = −4.5 V	−50			mA
		V _{DS} = −10 V, V _{GS} = −10 V	−600			
Drain-Source On-Resistance ^a	r _{DS(on)}	V _{GS} = −4.5 V, I _D = −25 mA			10	Ω
		V _{GS} = −10 V, I _D = −500 mA			6	
		V _{GS} = −10 V, I _D = −500 mA, T _J = 125°C			9	
Forward Transconductance ^a	g _{fs}	V _{DS} = −10 V, I _D = −100 mA	80			mS
Diode Forward Voltage ^a	V _{SD}	I _S = −200 mA, V _{GS} = 0 V			−1.4	V
Dynamic						
Total Gate Charge	Q _g	V _{DS} = −30 V, V _{GS} = −15 V, I _D ≅ −500 mA		1.7		nC
Gate-Source Charge	Q _{gs}			0.26		
Gate-Drain Charge	Q _{gd}			0.46		
Input Capacitance	C _{iss}	V _{DS} = −25 V, V _{GS} = 0 V, f = 1 MHz		23		pF
Output Capacitance	C _{oss}			10		
Reverse Transfer Capacitance	C _{rss}			5		
Switching ^b						
Turn-On Time	t _{ON}	V _{DD} = −25 V, R _L = 150 Ω I _D ≅ −200 mA, V _{GEN} = −10 V R _G = 10 Ω		20		ns
Turn-Off Time	t _{OFF}			35		

Notes

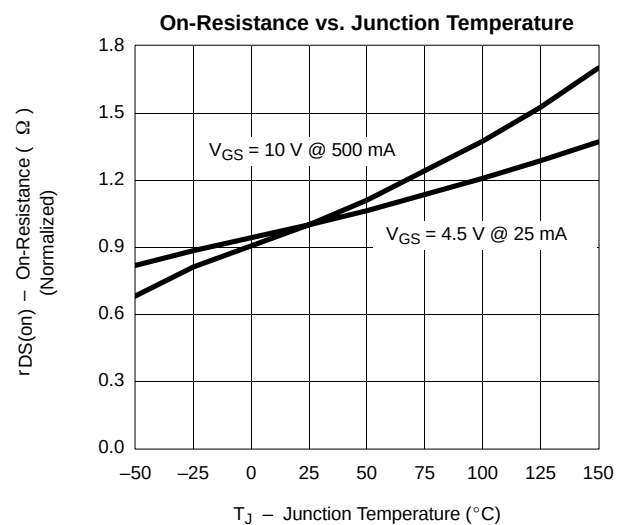
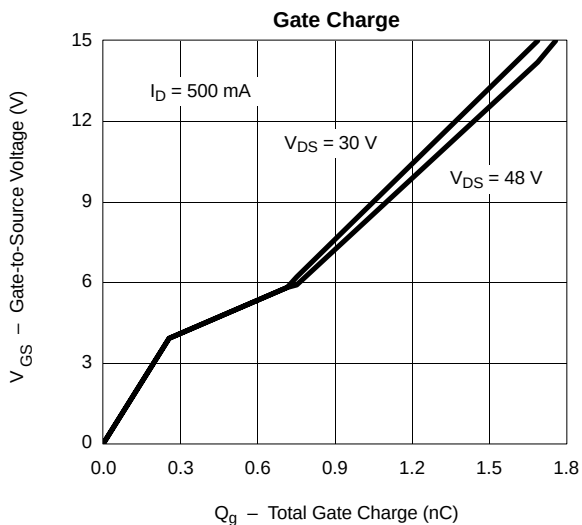
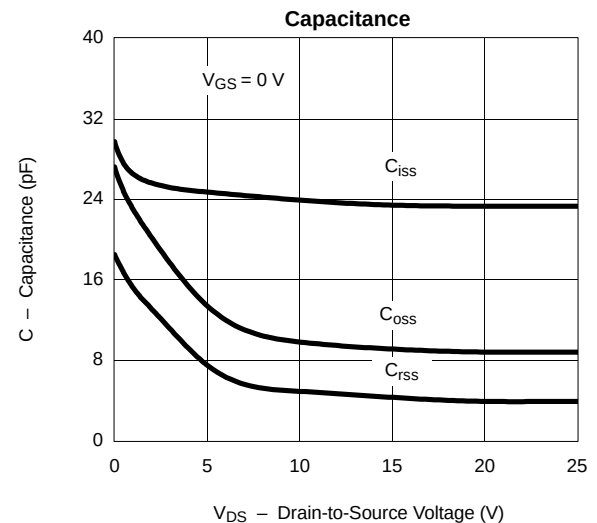
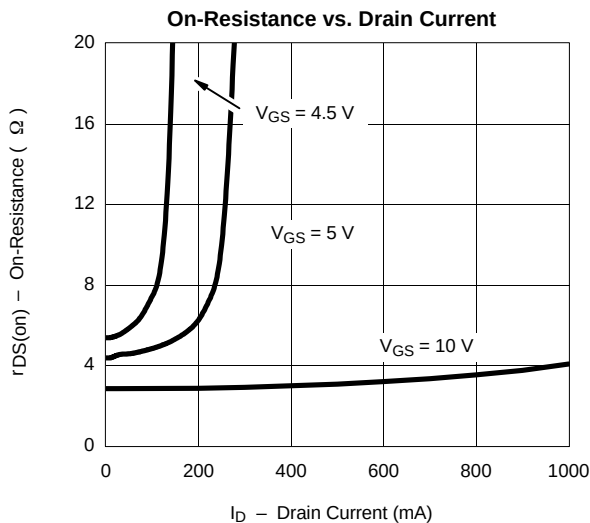
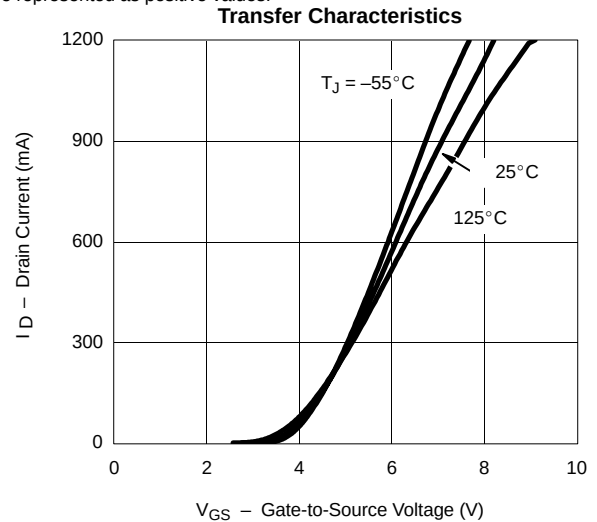
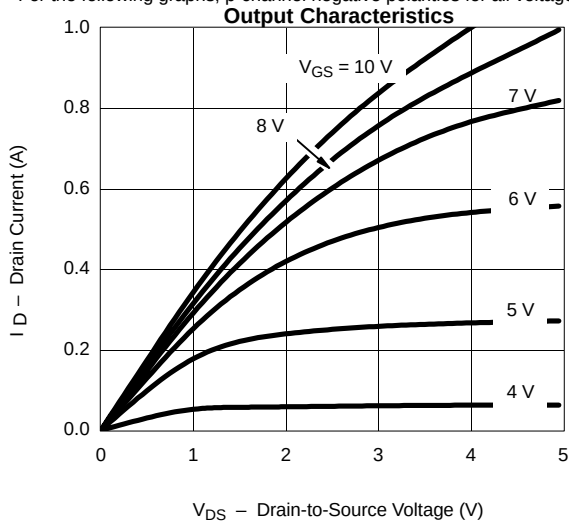
a. Pulse test: $PW \leq 300\text{ ms}$ duty cycle $\leq 2\%$.

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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