

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

PRODUCT SUMMARY

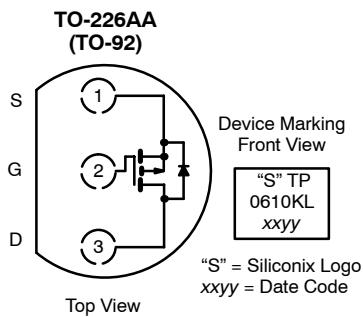
$V_{(BR)DSS(\min)}$ (V)	$r_{DS(on)}$ (Ω)	$V_{GS(\text{th})}$ (V)	I_D (A)
-60	6 @ $V_{GS} = -10$ V	-1 to -3.0	-0.27
	10 @ $V_{GS} = -4.5$ V		-0.21

FEATURES

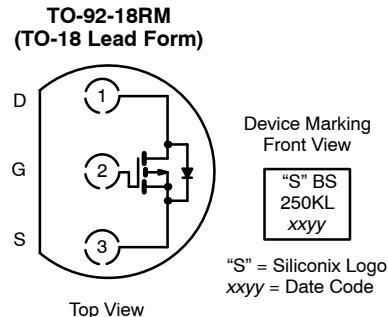
- TrenchFET® Power MOSFET
- ESD Protected: 2000 V

APPLICATIONS

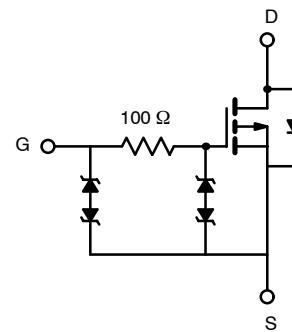
- Drivers: Relays, Solenoids, Lamps, Hammers, Displays, Memories, Transistors, etc.
- Battery Operated Systems
- Power Supply, Converter Circuits
- Motor Control



Ordering Information: TP0610KL-TR1



Ordering Information: BS250KL-TR1



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	I_D	-0.27	A
		-0.22	
Pulse Drain Current ^a	I_{DM}	-1.0	
Power Dissipation	P_D	0.8	W
		0.51	
Maximum Junction-to-Ambient	R_{thJA}	156	°C/W
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55 to 150	°C

Notes

a. Pulse width limited by maximum junction temperature.

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

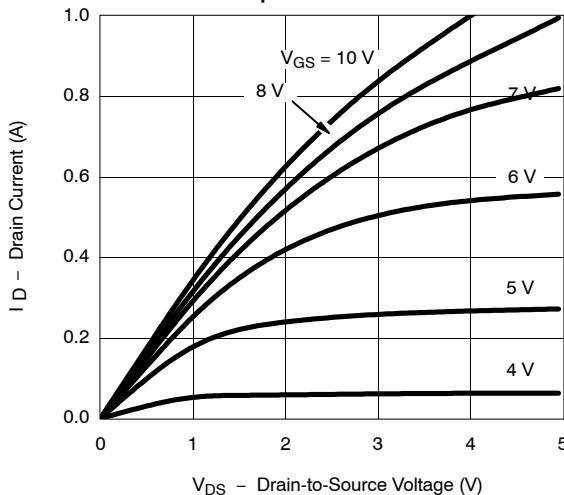
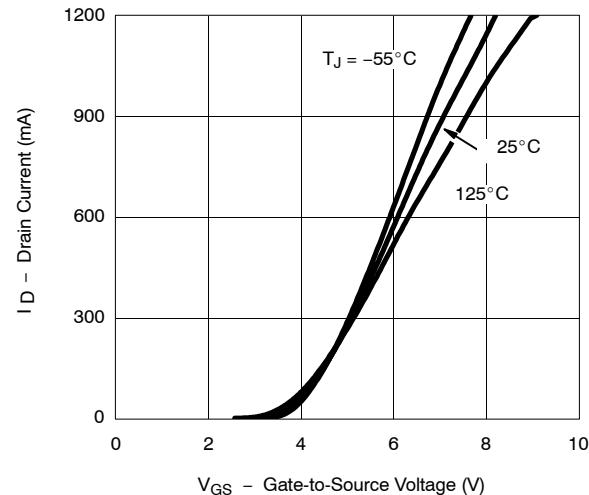
Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Static						
Drain-Source Breakdown Voltage	$V_{(\text{BR})\text{DSS}}$	$V_{\text{GS}} = 0 \text{ V}, I_D = -10 \mu\text{A}$	-60			V
Gate-Threshold Voltage	$V_{\text{GS}(\text{th})}$	$V_{\text{DS}} = V_{\text{GS}}, I_D = -250 \mu\text{A}$	-1	-2.1	-3.0	
Gate-Body Leakage	I_{GSS}	$V_{\text{DS}} = 0 \text{ V}, V_{\text{GS}} = \pm 20 \text{ V}$			± 10	μA
		$V_{\text{DS}} = 0 \text{ V}, V_{\text{GS}} = \pm 10 \text{ V}$			± 200	
		$V_{\text{DS}} = 0 \text{ V}, V_{\text{GS}} = \pm 10 \text{ V}, T_J = 85^\circ\text{C}$			± 500	
		$V_{\text{DS}} = 0 \text{ V}, V_{\text{GS}} = \pm 5 \text{ V}$			± 100	
Zero Gate Voltage Drain Current	I_{DSS}	$V_{\text{DS}} = -60 \text{ V}, V_{\text{GS}} = 0 \text{ V}$			-1	μA
		$V_{\text{DS}} = -60 \text{ V}, V_{\text{GS}} = 0 \text{ V}, T_J = 55^\circ\text{C}$			-10	
On-State Drain Current ^a	$I_{\text{D}(\text{on})}$	$V_{\text{DS}} = -10 \text{ V}, V_{\text{GS}} = -4.5 \text{ V}$	-50			
		$V_{\text{DS}} = -10 \text{ V}, V_{\text{GS}} = -10 \text{ V}$	-600			
Drain-Source On-Resistance ^a	$r_{\text{DS}(\text{on})}$	$V_{\text{GS}} = -4.5 \text{ V}, I_D = -25 \text{ mA}$		5.5	10	
		$V_{\text{GS}} = -10 \text{ V}, I_D = -500 \text{ mA}$		3.1	6	
		$V_{\text{GS}} = -10 \text{ V}, I_D = -500 \text{ mA}, T_J = 125^\circ\text{C}$		4.7	9	
Forward Transconductance ^a	g_{fs}	$V_{\text{DS}} = -10 \text{ V}, I_D = -100 \text{ mA}$		180		mS
Diode Forward Voltage ^a	V_{SD}	$I_S = -200 \text{ mA}, V_{\text{GS}} = 0 \text{ V}$		-0.9	-1.4	V
Dynamic^b						
Total Gate Charge	Q_g	$V_{\text{DS}} = -30 \text{ V}, V_{\text{GS}} = -15 \text{ V}, I_D \approx -500 \text{ mA}$		1.7	3	
Gate-Source Charge	Q_{gs}			0.26		
Gate-Drain Charge	Q_{gd}			0.46		
Gate Resistance	R_g			285		Ω
Turn-On Time	$t_{\text{d}(\text{on})}$	$V_{\text{DD}} = -25 \text{ V}, R_L = 150 \Omega$ $I_D \approx -150 \text{ mA}, V_{\text{GEN}} = -10 \text{ V}$ $R_g = 10 \Omega$		2.4	5	
	t_r			15.5	25	
Turn-Off Time	$t_{\text{d}(\text{off})}$			21	35	
	t_f			12.5	20	

Notes

- a. Pulse test: $PW \leq 300 \text{ ms}$ duty cycle $\leq 2\%$.
- b. Guaranteed by design, not subject to production testing.

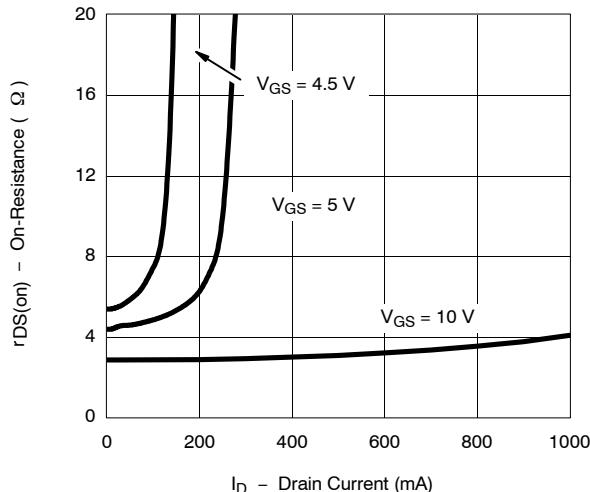
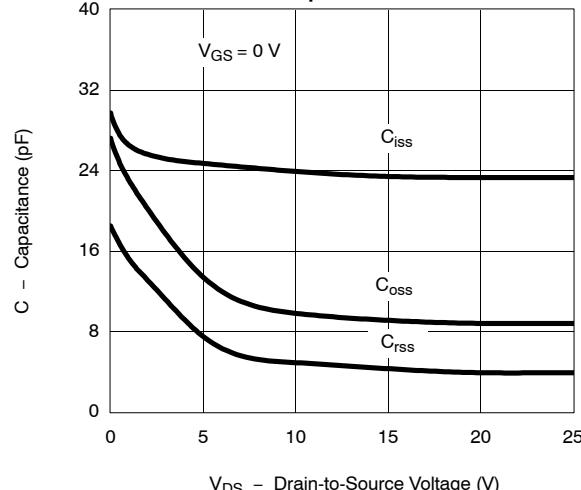
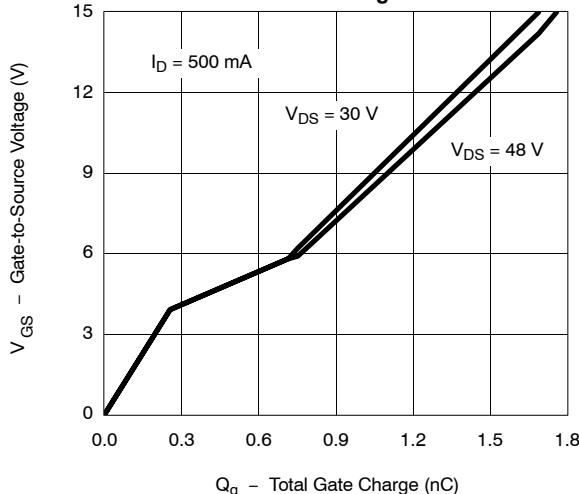
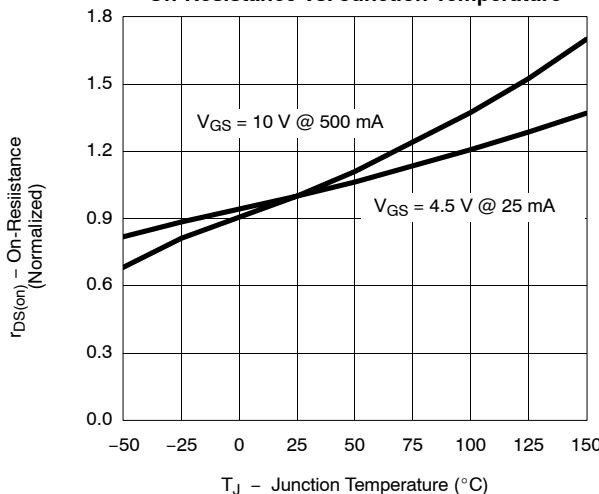
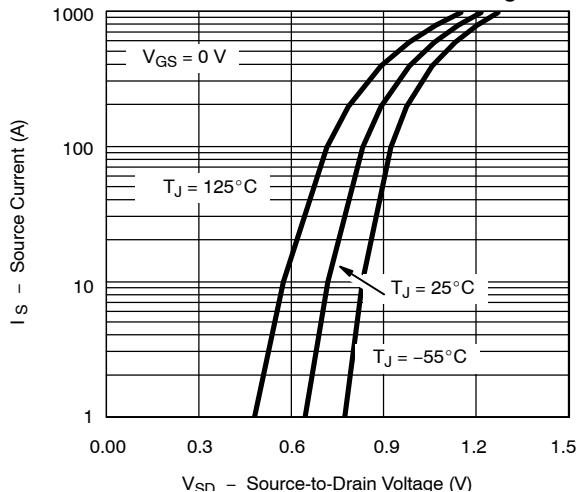
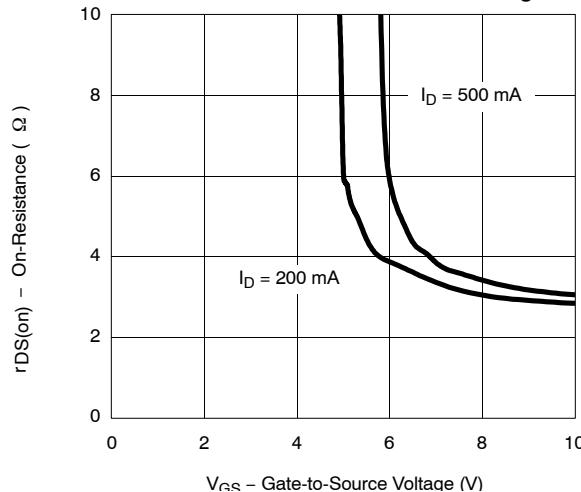
TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

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

Output Characteristics**Transfer Characteristics**

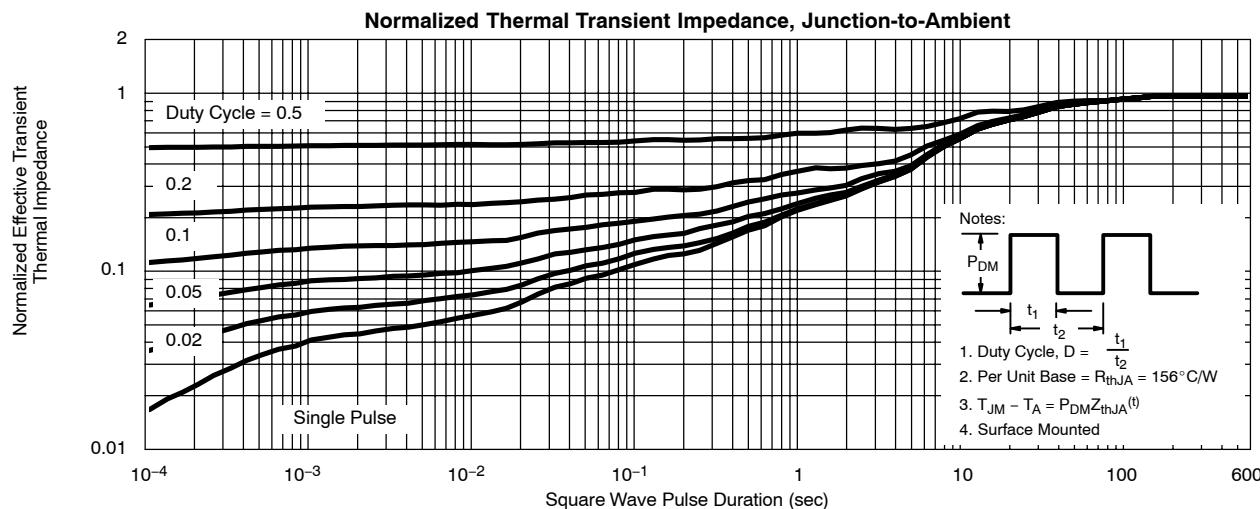
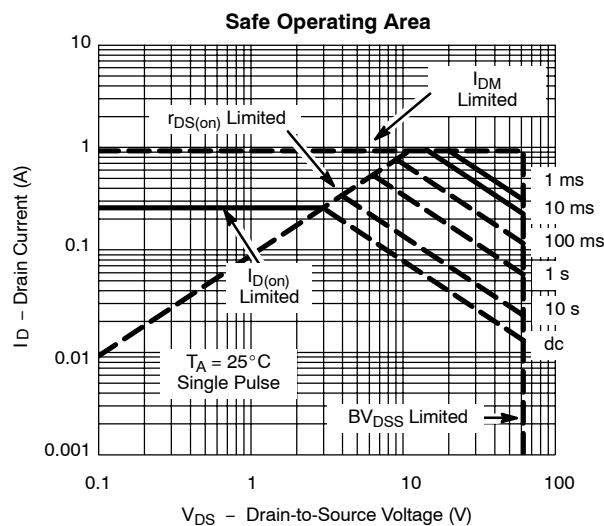
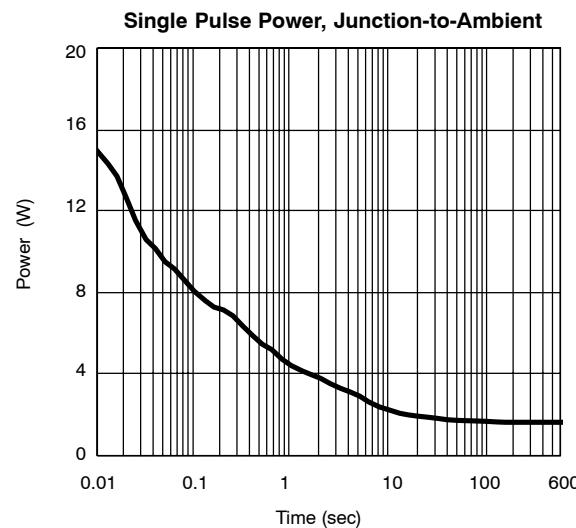
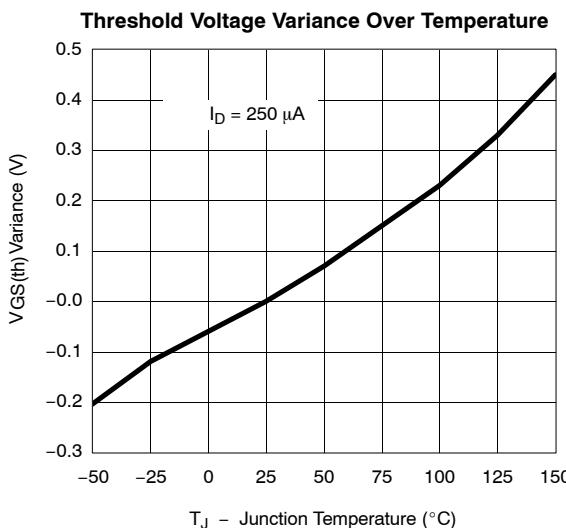
TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

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

On-Resistance vs. Drain Current

Capacitance

Gate Charge

On-Resistance vs. Junction Temperature

Source-Drain Diode Forward Voltage

On-Resistance vs. Gate-Source Voltage


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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