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

PRODUCT SUMMARY				
Part Number	**$V_{(BR)DSS}$ Min (V)**	**$r_{DS(on)}$ Max (Ω)**	**$V_{GS(th)}$ (V)**	**I_D (A)**
TP0610L	−60	10 @ V_{GS} = −10 V	−1 to −2.4	−0.18
TP0610T	−60	10 @ V_{GS} = −10 V	−1 to −2.4	−0.12
VP0610L	−60	10 @ V_{GS} = −10 V	−1 to −3.5	−0.18
VP0610T	−60	10 @ V_{GS} = −10 V	−1 to −3.5	−0.12
BS250	−45	14 @ V_{GS} = −10 V	−1 to −3.5	−0.18

FEATURES

- High-Side Switching
- Low On-Resistance: 8 Ω
- Low Threshold: −1.9 V
- Fast Switching Speed: 16 ns
- Low Input Capacitance: 15 pF

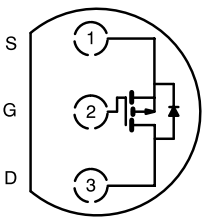
BENEFITS

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

APPLICATIONS

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

TO-226AA (TO-92)



Top View

TP0610L
VP0610L

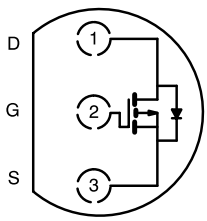
Device Marking Front View

TP0610L
"S" TP
0610L
xxll

VP0610L
"S" VP
0610L
xxll

"S" = Siliconix Logo
xxll = Date Code

TO-92-18RM (TO-18 Lead Form)



Top View

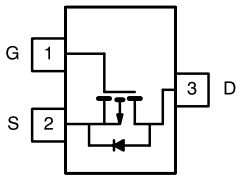
BS250

Device Marking Front View

BS250
"S" BS
250
xxll

"S" = Siliconix Logo
xxll = Date Code

TO-236 (SOT-23)



Top View

TP0610T
VP0610T

Marking Code:

TP0610T: TO*wll*
VP0610T: VOwll

w = Week Code
ll = Lot Traceability

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C UNLESS OTHERWISE NOTED)								
Parameter		**Symbol**	**TP0610L**	**TP0610T**	**VP0610L**	**VP0610T**	**BS250**	**Unit**
Drain-Source Voltage		V_{DS}	−60	−60	−60	−60	−45	V
Gate-Source Voltage		V_{GS}	±30	±30	±30	±30	±25	
Continuous Drain Current (T_J = 150°C)	T_A= 25°C	I_D	−0.18	−0.12	−0.18	−0.12	−0.18	A
	T_A= 100°C		−0.11	−0.07	−0.11	−0.07		
Pulsed Drain Current[a]		I_{DM}	−0.8	−0.4	−0.8	−0.4		
Power Dissipation	T_A= 25°C	P_D	0.8	0.36	0.8	0.36	0.83	W
	T_A= 100°C		0.32	0.14	0.32	0.14		
Thermal Resistance, Junction-to-Ambient		R_{thJA}	156	350	156	350	150	°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.

For applications information see AN804.

SPECIFICATIONS (T_A = 25°C UNLESS OTHERWISE NOTED)

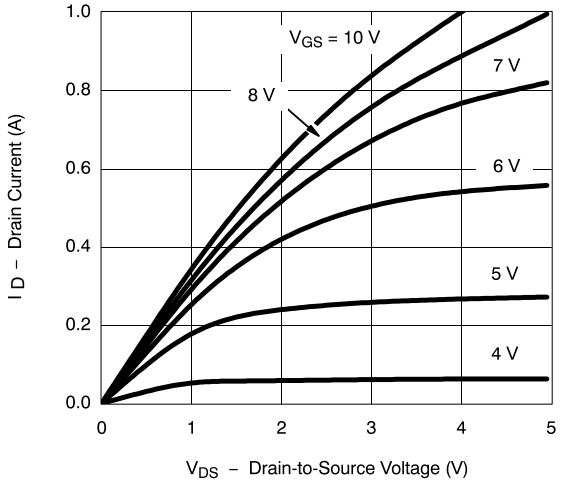
Parameter	Symbol	Test Conditions		Typ[a]	Limits TP0610L/T Min	Limits TP0610L/T Max	Limits VP0610L/T Min	Limits VP0610L/T Max	Limits BS250 Min	Limits BS250 Max	Unit
Static											
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0 V, I_D = −10 μA		−70	−60		−60				V
		V_{GS} = 0 V, I_D = −100 μA							−45		
Gate-Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = −1 mA		−1.9	−1	−2.4	−1	−3.5	−1	−3.5	
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ±20 V				±10		±10			nA
		V_{DS} = 0 V, V_{GS} = ±20 V, T_J = 125°C				±50					
		V_{DS} = 0 V, V_{GS} = ±15 V								±20	
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = −48 V, V_{GS} = 0 V				−1		−1			μA
		V_{DS} = −48 V, V_{GS} = 0 V, T_J = 125°C				−200		−200			
		V_{DS} = −25 V, V_{GS} = 0 V								−0.5	
On-State Drain Current[b]	$I_{D(on)}$	V_{DS} = −10 V, V_{GS} = −4.5 V		−180	−50						mA
		V_{DS} = −10 V, V_{GS} = −10 V	L Suffix	−750			−600				
			T Suffix				−220				
Drain-Source On-Resistance[b]	$r_{DS(on)}$	V_{GS} = −4.5 V, I_D = −25 mA		11		25					Ω
		V_{GS} = −10 V, I_D = −0.5 A	L Suffix	8		10		10			
		V_{GS} = −10 V, I_D = −0.5 A, T_J = 125°C	L Suffix	15		20		20			
		V_{GS} = −10 V, I_D = −0.2 A	T Suffix	6.5		10		10		14	
Forward Transconductance[b]	g_{fs}	V_{DS} = −10 V, I_D = −0.5 A	L Suffix	20	80						mS
		V_{DS} = −10 V, I_D = −0.1 A	T Suffix	90	60		70				
Diode Forward Voltage	V_{SD}	I_S = −0.5 A, V_{GS} = 0 V		−1.1							V
Dynamic											
Input Capacitance	C_{iss}	V_{DS} = −25 V, V_{GS} = 0 V f = 1 MHz		15		60		60			pF
Output Capacitance	C_{oss}			10		25		25			
Reverse Transfer Capacitance	C_{rss}			3		5		5			
Switching[c]											
Turn-On Time	t_{ON}	V_{DD} = −25 V, R_L = 133 Ω I_D ≅ −0.18 A, V_{GEN} = −10 V, R_g = 25 Ω		8						10	ns
Turn-Off Time	t_{OFF}			8						10	

Notes
a. For DESIGN AID ONLY, not subject to production testing.
b. Pulse test: PW ≤300 μs duty cycle ≤2%.
c. Switching time is essentially independent of operating temperature.

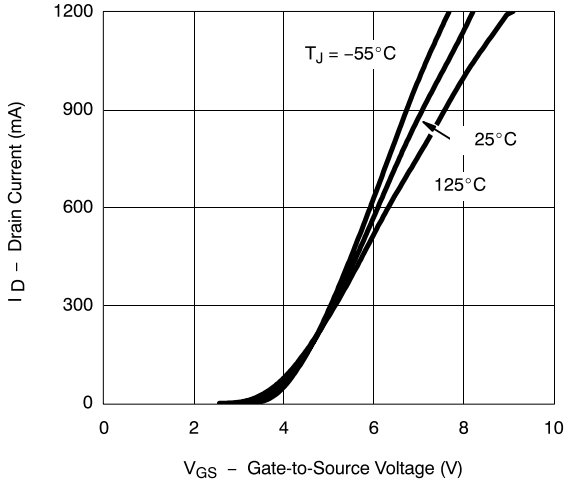
VPDS06

TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

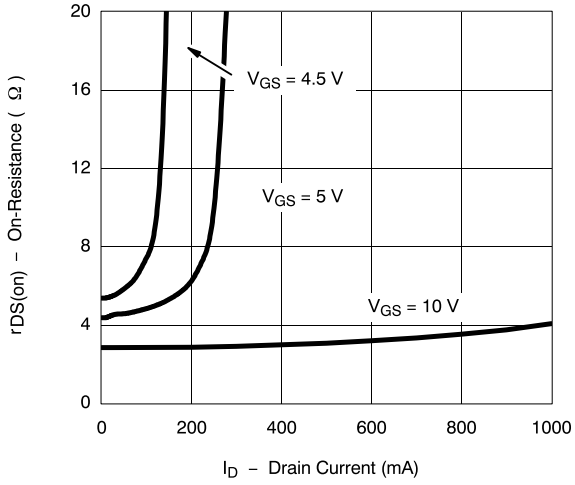
Output Characteristics



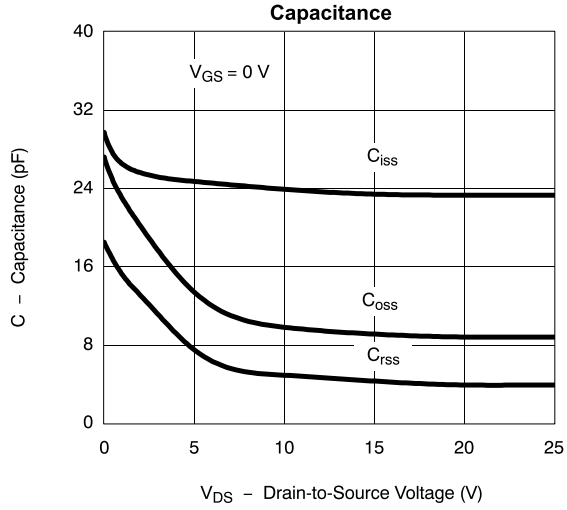
Transfer Characteristics



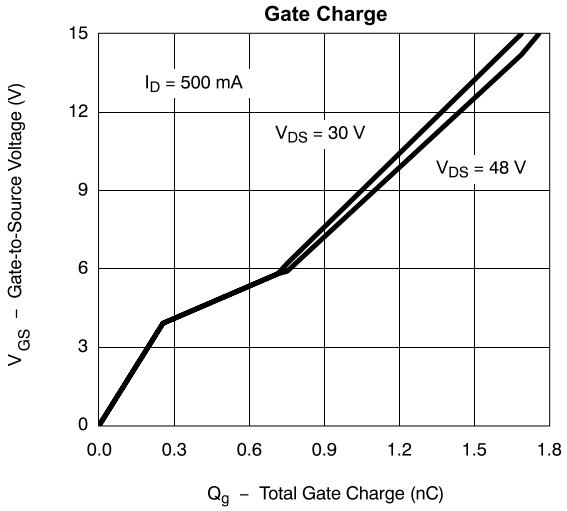
On-Resistance vs. Drain Current



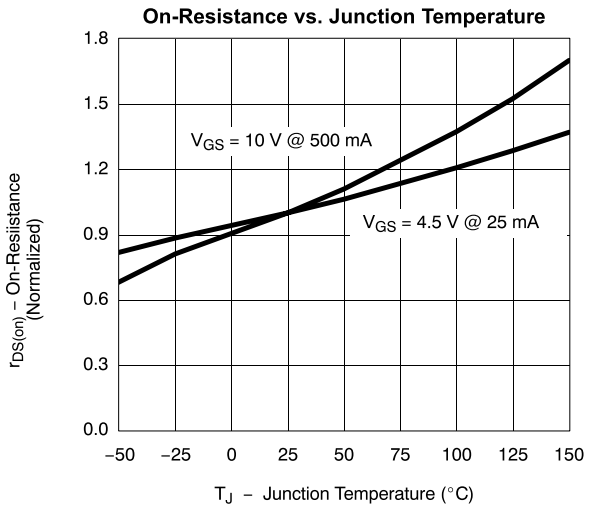
Capacitance



Gate Charge

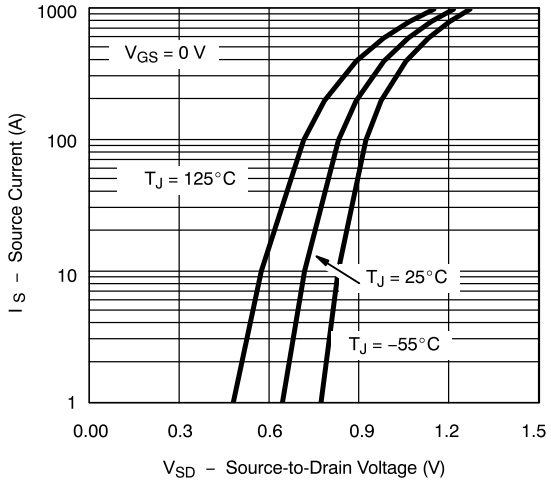


On-Resistance vs. Junction Temperature

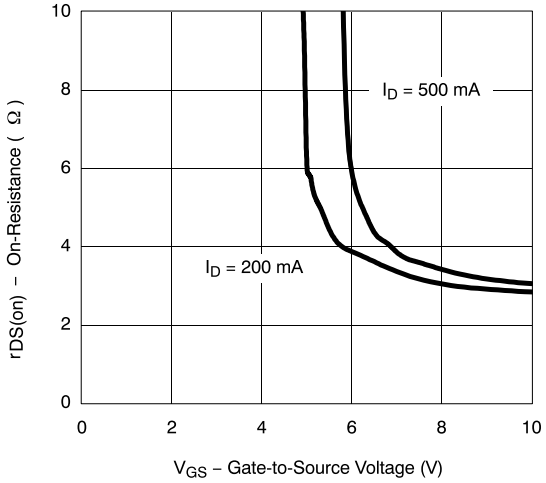


TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

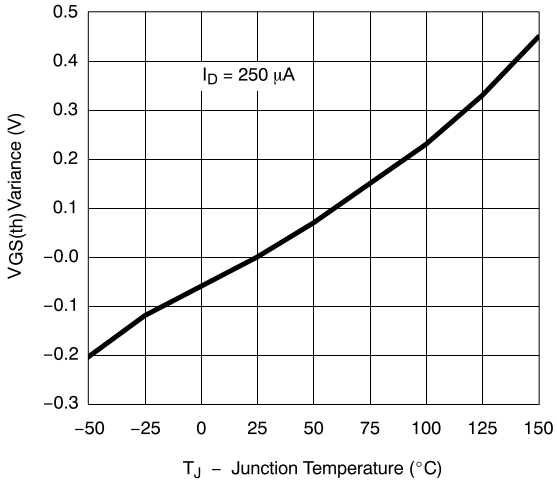
Source-Drain Diode Forward Voltage



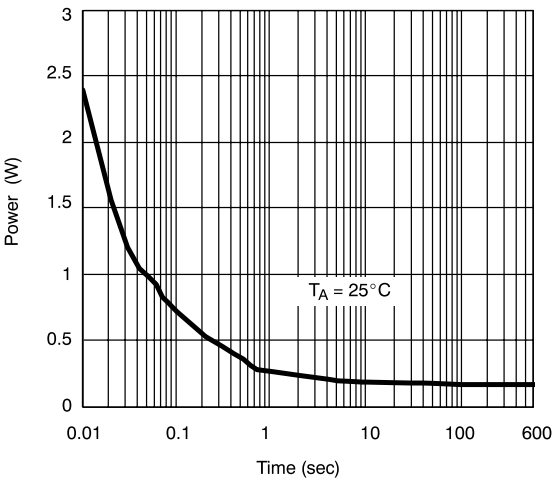
On-Resistance vs. Gate-Source Voltage



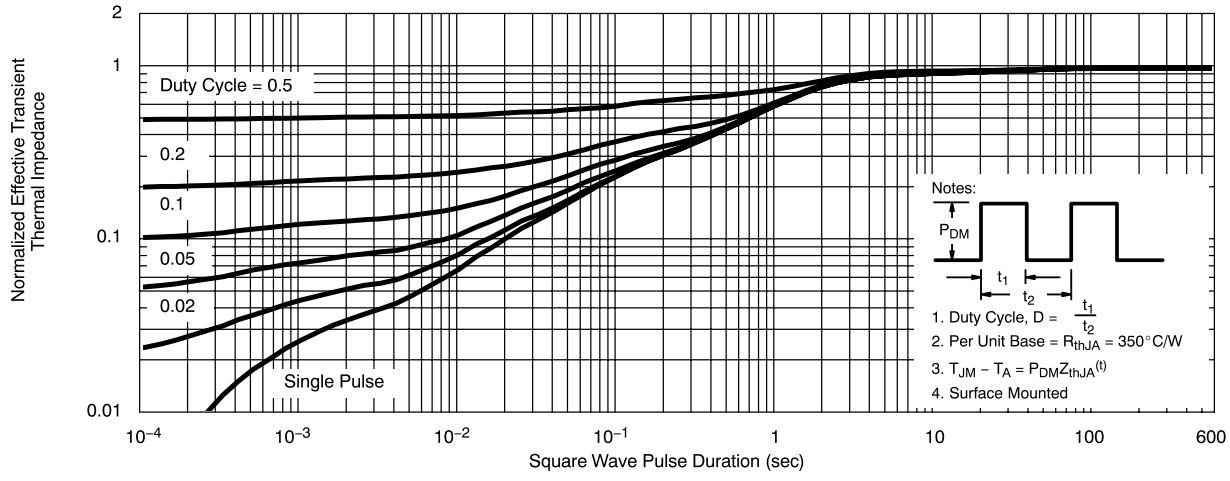
Threshold Voltage Variance Over Temperature



Single Pulse Power, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Ambient



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