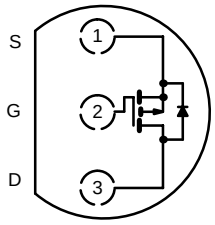
P-Ch Enhancement-Mode MOSFET Transistors

TP0610L VP0610L BS250
TP0610T VP0610T

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

- High-Side Switching
- Low On-Resistance: 8 Ω
- Low Threshold: –1.9 V
- Fast Switching Speed: 16 ns
- Low Input Capacitance: 15 pF
- Ease in Driving Switches
- Low Offset (Error) Voltage
- Low-Voltage Operation
- High-Speed Switching
- Easily Driven Without Buffer
- Drivers: Relays, Solenoids, Lamps, Hammers, Displays, Memories, Transistors, etc.
- Battery Operated Systems
- Power Supply, Converter Circuits
- Motor Control

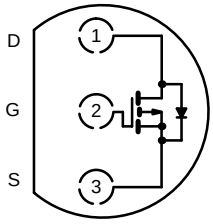
TO-226AA
(TO-92)



Top View

TP0610L
VP0610L

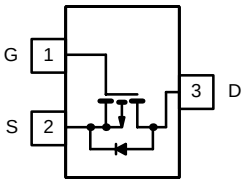
TO-92-18RM
(TO-18 Lead Form)



Top View

BS250

TO-236
(SOT-23)



Top View

TP0610T (T0)*
VP0610T (V0)*

*Marking Code for TO-236

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		
Maximum Junction-to-Ambient		R_{thJA}	156	350	156	350	150	°C/W
Operating Junction & Storage Temperature Range		T_J, T_{stg}	–55 to 150					°C

Notes
A. Pulse width limited by maximum junction temperature.

Updates to this data sheet may be obtained via facsimile by calling Siliconix FaxBack, 1-408-970-5600. Please request FaxBack document #70209. Applications information may also be obtained via FaxBack, request document #70611.

SPECIFICATIONS[A]

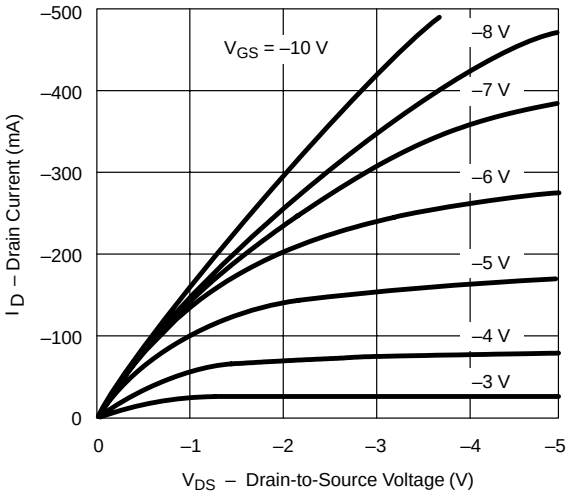
PARAMETER	SYMBOL	TEST CONDITIONS		TYP[B]	LIMITS TP0610L/T MIN	TP0610L/T MAX	VP0610L/T MIN	VP0610L/T MAX	BS250 MIN	BS250 MAX	UNIT
STATIC											
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0 V, I_D = –10 μA		–70	–60		–60				V
		V_{GS} = 0 V, I_D = –100 μA							–45		
Gate-Threshold Voltage	$V_{GS(th)}$	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
			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
			T_J = 125°C			–200		–200			
		V_{DS} = –25 V, V_{GS} = 0 V								–0.5	
On-State Drain Current[C]	$I_{D(on)}$	V_{DS} = –10 V, V_{GS} = –4.5 V		–180	–50						mA
		V_{DS} = –10 V, V_{GS} = –10 V	L	–750			–600				
			T				–220				
Drain-Source On-Resistance[C]	$r_{DS(on)}$	V_{GS} = –4.5 V, I_D = –25 mA		11		25					Ω
		V_{GS} = –10 V, I_D = –0.5 A	L	8		10		10			
			T_J = 125°C	15		20		20			
		V_{GS} = –10 V, I_D = –0.2 A	T	6.5		10		10		14	
Forward Transconductance[C]	g_{fs}	V_{DS} = –10 V, I_D = –0.5 A	L	125	80		80				mS
		V_{DS} = –10 V, I_D = –0.1 A	T	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[D]											
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
	$t_{d(on)}$			6		10		10			
	t_r			10		15		15			
Turn-Off Time	t_{OFF}			8						10	
	$t_{d(off)}$			7		15		15			
	t_f			8		20		20			

Notes
A. T_A = 25°C unless otherwise noted.
B. For DESIGN AID ONLY, not subject to production testing.
C. Pulse test: PW ≤ 300 μs duty cycle ≤ 2%.
D. Switching time is essentially independent of operating temperature.

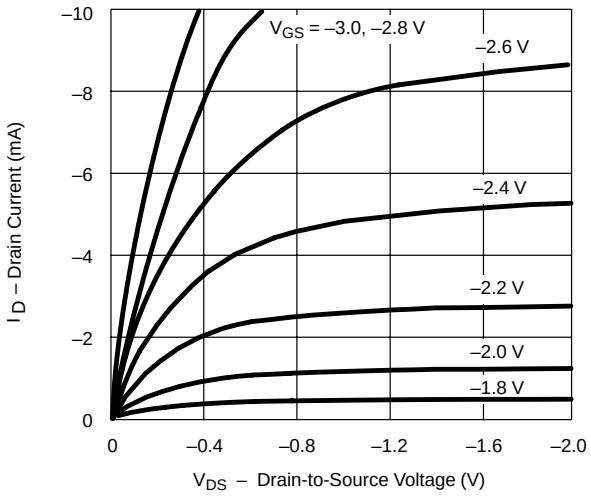
VPDS06

TYPICAL CHARACTERISTICS (25°C UNLESS OTHERWISE NOTED)

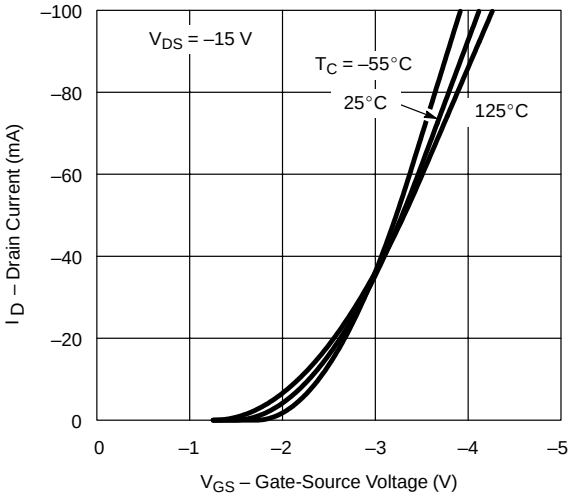
Ohmic Region Characteristics



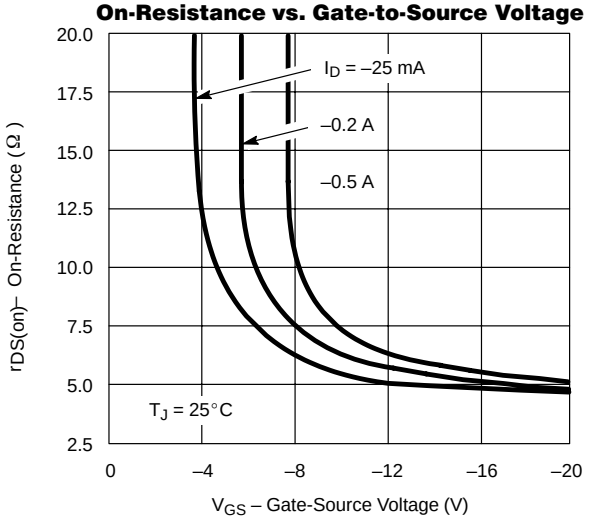
Output Characteristics for Low Gate Drive



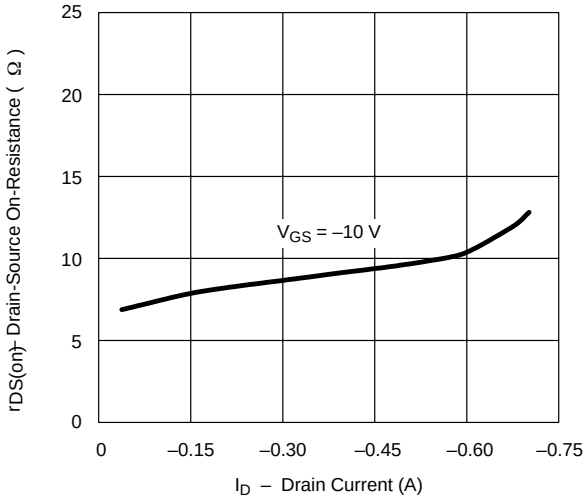
Transfer Characteristics



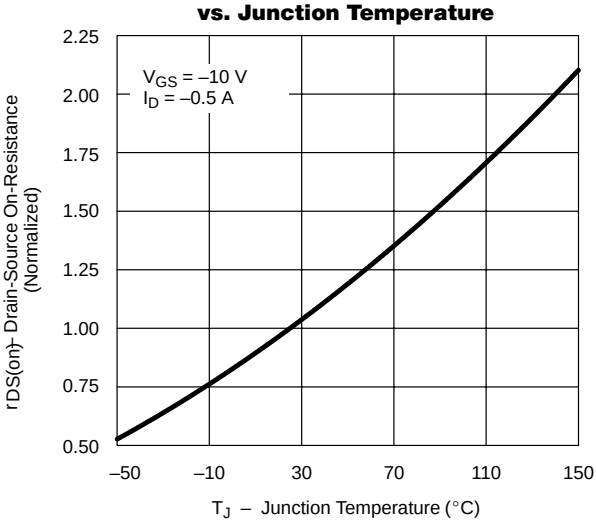
On-Resistance vs. Gate-to-Source Voltage



On-Resistance vs. Drain Current

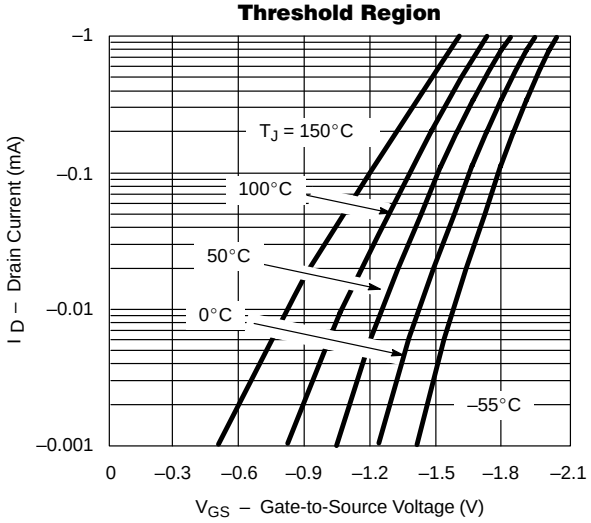


Normalized On-Resistance vs. Junction Temperature

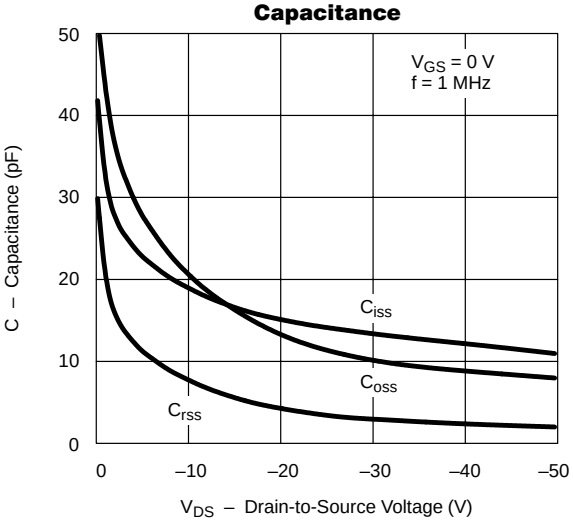


TYPICAL CHARACTERISTICS (25°C UNLESS OTHERWISE NOTED) (CONT'D)

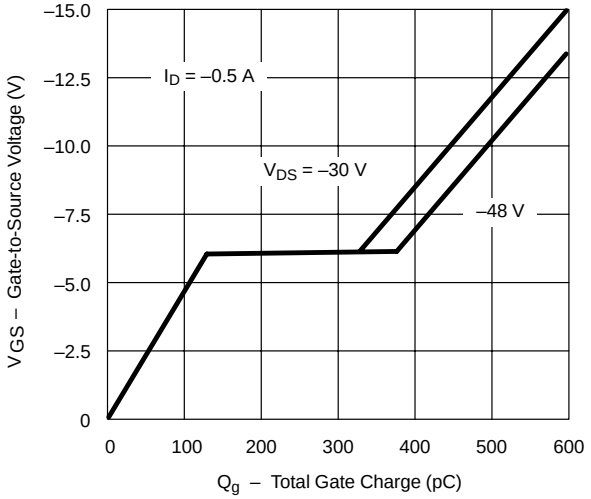
Threshold Region



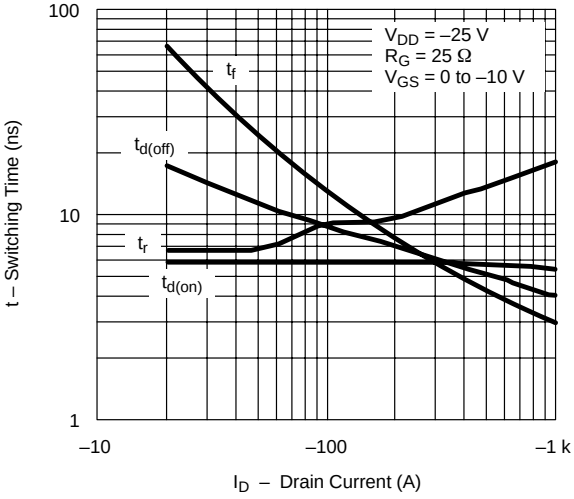
Capacitance



Gate Charge



Load Condition Effects on Switching



Normalized Effective Transient Thermal Impedance, Junction-to-Ambient (TO-226AA)