

# TP0610 SERIES

## P-Channel Enhancement-Mode MOS Transistors

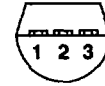
### PRODUCT SUMMARY

PART NUMBER	$V_{(BR)DSS}$ (V)	$r_{DS(ON)}$ ( $\Omega$ )	$I_D$ (A)	PACKAGE
TP0610L	-60	10	-0.18	TO-92
TP0610T	-60	10	-0.12	SOT-23

TO-92 (TO-226AA)



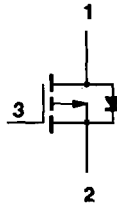
BOTTOM VIEW



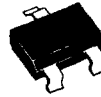
- 1 SOURCE
- 2 GATE
- 3 DRAIN

Performance Curves: VPDS06

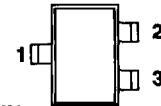
PRODUCT MARKING	
TP0610T	T50



SOT-23



TOP VIEW



- 1 DRAIN
- 2 SOURCE
- 3 GATE

### ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ Unless Otherwise Noted)

PARAMETERS/TEST CONDITIONS	SYMBOL	LIMITS		UNITS	
		TP0610L	TP0610T		
Drain-Source Voltage	$V_{DS}$	-60	-60	V	
Gate-Source Voltage	$V_{GS}$	$\pm 30$	$\pm 30$		
Continuous Drain Current	$I_D$	$T_A = 25^\circ\text{C}$	-0.18	-0.12	A
		$T_A = 100^\circ\text{C}$	-0.11	-0.07	
Pulsed Drain Current <sup>1</sup>	$I_{DM}$	-0.8	-0.4		
Maximum Power Dissipation	$P_D$	$T_A = 25^\circ\text{C}$	0.80	0.36	W
		$T_A = 100^\circ\text{C}$	0.32	0.14	
Operating Junction & Storage Temperature Range	$T_J, T_{stg}$	-55 to 150		$^\circ\text{C}$	
Lead Temperature ( $1/16"$ from case for 10 sec.)	$T_L$	300			

### THERMAL RESISTANCE RATINGS

THERMAL RESISTANCE	SYMBOL	LIMITS		UNITS
		TP0610L	TP0610T	
Junction-to-Ambient	$R_{\theta JA}$	156	350	K/W

<sup>1</sup>Pulse width limited by maximum junction temperature.

# TP0610 SERIES



SPECIFICATIONS <sup>a</sup>				LIMITS		
PARAMETER	SYMBOL	TEST CONDITIONS	TYP <sup>b</sup>	TP0610L		UNIT
				MIN	MAX	
<b>STATIC</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}, I_D = -10\ \mu\text{A}$	-70	-60		V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -1\ \text{mA}$	-1.7	-1	-2.4	
Gate-Body Leakage	$I_{GSS}$	$V_{DS} = 0\ \text{V}, V_{GS} = \pm 20\ \text{V}$ $T_J = 125^\circ\text{C}$			$\pm 10$	nA
					$\pm 50$	
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = -48\ \text{V}, V_{GS} = 0\ \text{V}$ $T_J = 125^\circ\text{C}$			-1	$\mu\text{A}$
					-200	
On-State Drain Current <sup>c</sup>	$I_{D(ON)}$	$V_{DS} = -10\ \text{V}, V_{GS} = -4.5\ \text{V}$	-80	-50		mA
Drain-Source On-Resistance <sup>c</sup>	$r_{DS(ON)}$	$V_{GS} = -4.5\ \text{V}, I_D = -25\ \text{mA}$ $V_{GS} = -10\ \text{V}, I_D = -0.5\ \text{A}$ $T_J = 125^\circ\text{C}$	11		25	$\Omega$
			8		10	
			15		20	
Forward Transconductance <sup>c</sup>	$g_{FS}$	$V_{DS} = -10\ \text{V}, I_D = -0.5\ \text{A}$	135	80		mS
Common Source Output Conductance <sup>c</sup>	$g_{OS}$	$V_{DS} = -10\ \text{V}, I_D = -0.1\ \text{A}$	400			$\mu\text{S}$
<b>DYNAMIC</b>						
Input Capacitance	$C_{iss}$	$V_{GS} = 0\ \text{V}, V_{DS} = -25\ \text{V}, f = 1\ \text{MHz}$	15		60	pF
Output Capacitance	$C_{oss}$		10		25	
Reverse Transfer Capacitance	$C_{rss}$		3		5	
<b>SWITCHING</b>						
Turn-On Time	$t_{d(ON)}$	$V_{DD} = -25\ \text{V}, R_L = 133\ \Omega, I_D = -0.18\ \text{A}$ $V_{GEM} = -10\ \text{V}, R_G = 25\ \Omega$  (Switching time is essentially independent of operating temperature)	6		10	ns
	$t_r$		10		15	
Turn-Off Time	$t_{d(OFF)}$		7		15	
	$t_f$		8		20	

**NOTES:**

- a.  $T_A = 25^\circ\text{C}$  unless otherwise noted.
- b. For design aid only, not subject to production testing.
- c. Pulse test: Pulse Width  $\leq 300\ \mu\text{sec}$ , Duty Cycle  $\leq 2\%$ .

SPECIFICATIONS <sup>a</sup>			LIMITS			
PARAMETER	SYMBOL	TEST CONDITIONS	TYP <sup>b</sup>	TP0610T		UNIT
				MIN	MAX	
<b>STATIC</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}, I_D = -10\ \mu\text{A}$	-70	-60		V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -1\ \text{mA}$	-1.7	-1	-2.4	
Gate-Body Leakage	$I_{GSS}$	$V_{DS} = 0\ \text{V}, V_{GS} = \pm 20\ \text{V}$ $T_J = 125^\circ\text{C}$			$\pm 10$	nA
					$\pm 50$	
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = -48\ \text{V}, V_{GS} = 0\ \text{V}$ $T_J = 125^\circ\text{C}$			-1	$\mu\text{A}$
					-200	
On-State Drain Current <sup>c</sup>	$I_{D(ON)}$	$V_{DS} = -10\ \text{V}, V_{GS} = -4.5\ \text{V}$	-80	-50		mA
Drain-Source On-Resistance <sup>c</sup>	$r_{DS(ON)}$	$V_{GS} = -4.5\ \text{V}, I_D = -25\ \text{mA}$ $V_{GS} = -10\ \text{V}, I_D = -0.2\ \text{A}$ $T_J = 125^\circ\text{C}$	11		25	$\Omega$
			6		10	
			12		20	
Forward Transconductance <sup>c</sup>	$g_{FS}$	$V_{DS} = -10\ \text{V}, I_D = -0.1\ \text{A}$	90	60		mS
Common Source Output Conductance <sup>c</sup>	$g_{OS}$		400			$\mu\text{S}$
<b>DYNAMIC</b>						
Input Capacitance	$C_{iss}$	$V_{GS} = 0\ \text{V}, V_{DS} = -25\ \text{V}, f = 1\ \text{MHz}$	15		60	pF
Output Capacitance	$C_{oss}$		10		25	
Reverse Transfer Capacitance	$C_{rss}$		3		5	
<b>SWITCHING</b>						
Turn-On Time	$t_{d(ON)}$	$V_{DD} = -25\ \text{V}, R_L = 133\ \Omega, I_D = -0.18\ \text{A}$ $V_{GEN} = -10\ \text{V}, R_G = 25\ \Omega$	6		10	ns
	$t_r$		10		15	
Turn-Off Time	$t_{d(OFF)}$	(Switching time is essentially independent of operating temperature)	7		15	
	$t_f$		8		20	

**NOTES:**

- a.  $T_A = 25^\circ\text{C}$  unless otherwise noted.
- b. For design aid only, not subject to production testing.
- c. Pulse test: Pulse Width  $\leq 300\ \mu\text{sec}$ , Duty Cycle  $\leq 2\%$ .