February 1999



FDC6506P

Dual P-Channel Logic Level PowerTrench[™] MOSFET

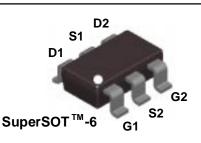
General Description

These P-Channel logic level MOSFETs are produced using Fairchild Semiconductor's advanced PowerTrench process that has been especially tailored to minimize on-state resistance and yet maintain low gate charge for superior switching performance.

These devices have been designed to offer exceptional power dissipation in a very small footprint for applications where the bigger more expensive SO-8 and TSSOP-8 packages are impractical.

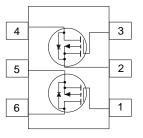
Applications

- Load switch
- Battery protection
- Power management



Features

- -1.8 A, -30 V. $R_{DS(on)} = 0.170 \ \Omega \ @ V_{GS} = -10 \ V$ $R_{DS(on)} = 0.280 \ \Omega \ @ V_{GS} = -4.5 \ V$
- Low gate charge (2.3nC typical).
- Fast switching speed.
- High performance trench technology for extremely low $\rm R_{\rm DS(ON)}.$
- SuperSOTTM-6 package: small footprint (72% smaller than standard SO-8); low profile (1mm thick).



Absolute Maximum Ratings T_A = 25°C unless otherwise noted

Symbol	Parameter		Ratings	Units
V _{DSS}	Drain-Source Voltage		-30	V
V _{GSS}	Gate-Source Voltage		<u>+</u> 20	V
ID	Drain Current - Continuous - Pulsed	(Note 1a)	- <u>1.8</u> -10	Α
P _D	Power Dissipation for Single Operation	(Note 1a)	0.96	W
		(Note 1b)	0.9	
		(Note 1c)	0.7	
T _J , T _{stg}	Operating and Storage Junction Temperature Range		-55 to +150	°C

Thermal Characteristics

R _{ÐJA}	Thermal Resistance, Junction-to-Ambient	(Note 1a)	130	°C/W
R _θ JC	Thermal Resistance, Junction-to-Case	(Note 1)	60	∘C/W

Package Outlines and Ordering Information

Device Marking	Device	Reel Size	Tape Width	Quantity
.506	FDC6506P	7"	8mm	3000 units

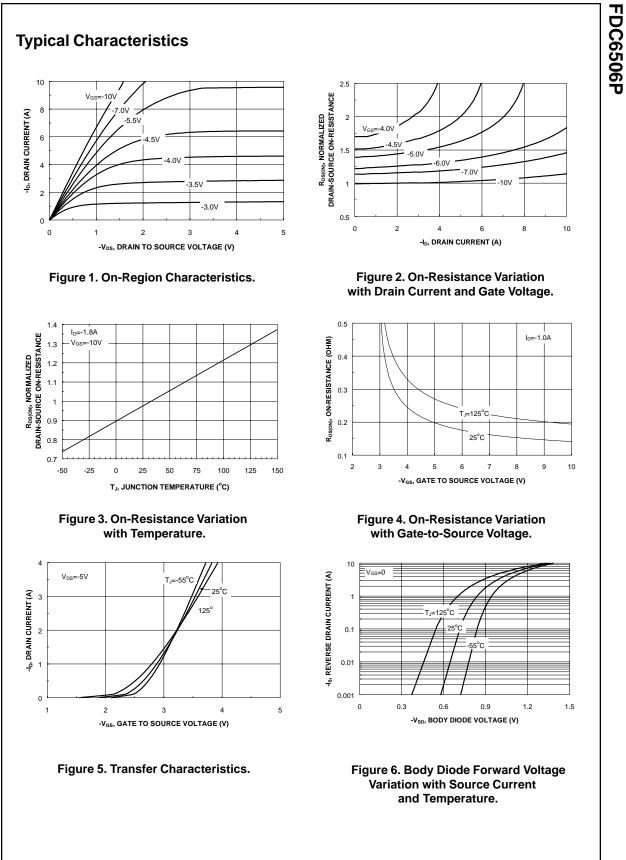
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acteristics Drain-Source Breakdown Voltage Breakdown Voltage Temperature Coefficient Zero Gate Voltage Drain Current	$V_{GS} = 0 V, I_D = -250 \mu A$				
Drain-Source Breakdown Voltage Breakdown Voltage Temperature Coefficient	$V_{} = 0 V_{} = -250 A$				
Coefficient	$v_{GS} = 0 v, i_D = -2.00 \mu \Lambda$	-30			V
Zero Gate Voltage Drain Current	$I_D = -250 \mu A$, Referenced to 25°C		-20		mV/∘C
	$V_{DS} = -24 \text{ V}, V_{GS} = 0 \text{ V}$			-1	μA
Gate-Body Leakage Current, Forward	$V_{GS} = 20 \text{ V}, V_{DS} = 0 \text{ V}$			100	nA
Gate-Body Leakage Current, Reverse	$V_{GS} = -20 \text{ V}, V_{DS} = 0 \text{ V}$			-100	nA
acteristics (Note 2)					
Gate Threshold Voltage	$V_{DS} = V_{GS}, I_{D} = -250 \ \mu A$	-1	-1.8	-3	V
Gate Threshold Voltage Temperature Coefficient	$I_D = -250 \ \mu$ A, Referenced to 25°C		4		mV/∘C
Static Drain-Source On-Resistance	$V_{GS} = -10 \text{ V}, \text{ I}_D = -1.8 \text{ A}$ $V_{GS} = -10 \text{ V}, \text{ I}_D = -1.8 \text{ A} @ 125^{\circ}\text{C}$ $V_{GS} = -4.5 \text{ V}, \text{ I}_D = -1.4 \text{ A}$		0.14 0.20 0.22	0.17 0.27 0.28	Ω
On-State Drain Current	$V_{GS} = -10 \text{ V}, V_{DS} = -5 \text{ V}$	-10			А
Forward Transconductance	$V_{DS} = -5 V, I_D = -1.8 A$		3		S
Characteristics					
Input Capacitance	$V_{DS} = -15 V, V_{GS} = 0 V,$		190		pF
Output Capacitance	f = 1.0 MHz		70		pF
Reverse Transfer Capacitance			30		pF
a Charactoristics (Note 2)	·				
-	$V_{DD} = -15 \text{ V}, I_D = -1 \text{ A},$		7	14	ns
	$V_{GS} = -4.5 \text{ V}, \text{ R}_{GEN} = 6 \Omega$		8		ns
Turn-Off Delay Time			14	25	ns
Turn-Off Fall Time			2	6	ns
	$V_{DS} = -5 V, I_{D} = -1.8 A,$		2.3	3.5	nC
Total Gate Charge			4		-
Total Gate Charge Gate-Source Charge	V _{GS} = -10 V		1		nC
° °	V _{GS} = -10 V		0.8		nC nC
Gate-Source Charge Gate-Drain Charge					
Gate-Source Charge	d Maximum Ratings			-0.8	
	Gate Threshold Voltage Temperature Coefficient Static Drain-Source On-Resistance On-State Drain Current Forward Transconductance Characteristics Input Capacitance Output Capacitance Reverse Transfer Capacitance g Characteristics (Note 2) Turn-On Delay Time Turn-On Rise Time Turn-Off Delay Time	Gate Threshold Voltage $V_{DS} = V_{GS}$, $I_D = -250 \ \mu A$ Gate Threshold Voltage Temperature Coefficient $I_D = -250 \ \mu A$, Referenced to $25^{\circ}C$ Static Drain-Source $V_{GS} = -10 \ V$, $I_D = -1.8 \ A$ On-Resistance $V_{GS} = -10 \ V$, $I_D = -1.8 \ A$ On-State Drain Current $V_{GS} = -10 \ V$, $V_{DS} = -5 \ V$ Forward Transconductance $V_{DS} = -5 \ V$, $I_D = -1.8 \ A$ CharacteristicsInput Capacitance $V_{DS} = -5 \ V$, $I_D = -1.8 \ A$ CharacteristicsInput CapacitanceQ Characteristics (Note 2)Turn-On Delay Time $V_{DD} = -15 \ V$, $I_D = -1 \ A$, $V_{GS} = -4.5 \ V$, $R_{GEN} = 6 \ \Omega$	Gate Threshold Voltage $V_{DS} = V_{GS}$, $I_D = -250 \ \mu A$ -1Gate Threshold Voltage Temperature Coefficient $I_D = -250 \ \mu A$, Referenced to $25^{\circ}C$ -1Static Drain-Source $V_{GS} = -10 \ V$, $I_D = -1.8 \ A$ $V_{GS} = -10 \ V$, $I_D = -1.8 \ A$ -1On-Resistance $V_{GS} = -10 \ V$, $I_D = -1.8 \ A$ $Q_{GS} = -10 \ V$, $I_D = -1.8 \ A$ -1On-State Drain Current $V_{GS} = -10 \ V$, $V_{DS} = -5 \ V$ -10Forward Transconductance $V_{DS} = -5 \ V$, $I_D = -1.8 \ A$ -10 Characteristics $V_{DS} = -5 \ V$, $I_D = -1.8 \ A$ -10Input Capacitance $V_{DS} = -5 \ V$, $I_D = -1.8 \ A$ -10 Geharacteristics $V_{DS} = -5 \ V$, $I_D = -1.8 \ A$ -10 Geharacteristics $V_{DS} = -15 \ V$, $V_{GS} = 0 \ V$, f = 1.0 MHz-10 Geharacteristics $V_{DD} = -15 \ V$, $I_D = -1 \ A$, $V_{GS} = -4.5 \ V$, $R_{GEN} = 6 \ \Omega$ -10Turn-On Rise Time $V_{DS} = -4.5 \ V$, $R_{GEN} = 6 \ \Omega$ -10	$\begin{tabular}{ c c c c c } \hline Gate Threshold Voltage & V_{DS} = V_{GS}, I_D = -250 \ \mu A & -1 & -1.8 \\ \hline Gate Threshold Voltage Temperature Coefficient & I_D = -250 \ \mu A, Referenced to 25^{\circ}C & 4 \\ \hline I_D = -250 \ \mu A, Referenced to 25^{\circ}C & 0.14 \\ \hline Static Drain-Source & V_{GS} = -10 \ V, I_D = -1.8 \ A & 0.14 \\ \hline On-Resistance & V_{GS} = -10 \ V, I_D = -1.8 \ A & 0.20 \\ \hline V_{GS} = -4.5 \ V, I_D = -1.8 \ A & 0.22 \\ \hline On-State Drain Current & V_{GS} = -10 \ V, V_{DS} = -5 \ V & -10 \\ \hline Forward Transconductance & V_{DS} = -5 \ V, I_D = -1.8 \ A & 3 \\ \hline \mbox{Characteristics} & & & & & & & & & & & & & & & & & & \\ \hline Input Capacitance & V_{DS} = -5 \ V, I_D = -1.8 \ A & & & & & & & & & & & & & & & & & &$	$\begin{array}{c c c c c c c c c c c c c c c c c c c $

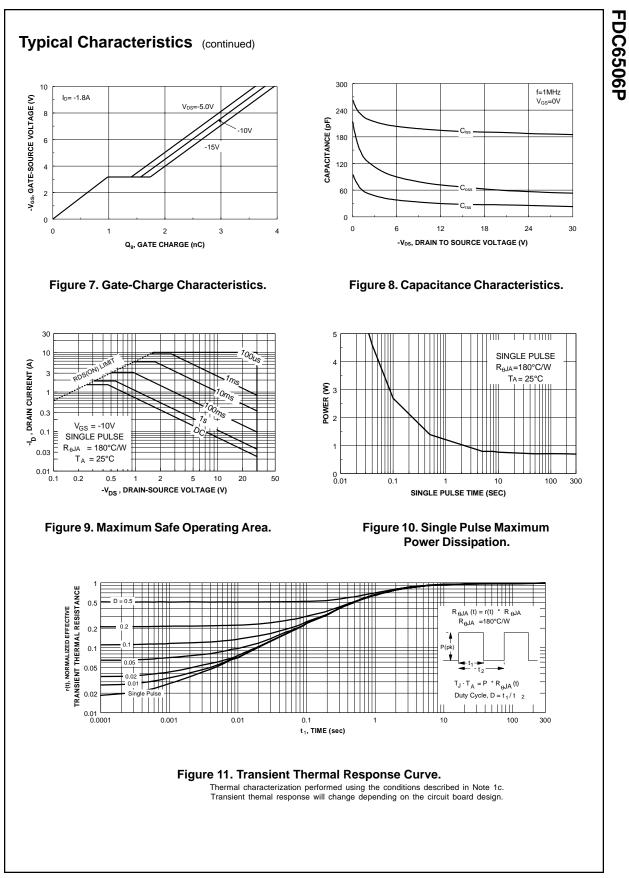
Scale 1 : 1 on letter size paper

2. Pulse Test: Pulse Width $\leq 300~\mu s,$ Duty Cycle $\leq 2.0\%$

FDC6506P



FDC6506P Rev. C



FDC6506P Rev. C

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