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Please note: As part of the Fairchild Semiconductor integration, some of the Fairchild orderable part numbers will need to change in order to meet ON Semiconductor's system requirements. Since the ON Semiconductor product management systems do not have the ability to manage part nomenclature that utilizes an underscore (_), the underscore (_) in the Fairchild part numbers will be changed to a dash (-). This document may contain device numbers with an underscore (_). Please check the ON Semiconductor website to verify the updated device numbers. The most current and up-to-date ordering information can be found at www.onsemi.com. Please email any questions regarding the system integration to Fairchild <a href="general-regarding-numbers-n

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April 2016

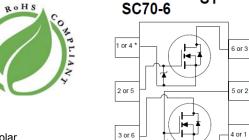
FDG6301N F085

Dual N-Channel, Digital FET

Features

- 25 V, 0.22 A continuous, 0.65 A peak.
- $R_{DS(ON)} = 4 \Omega @ V_{GS} = 4.5 V$,
- $R_{DS(ON)} = 5 \Omega @ V_{GS} = 2.7 V.$
- Very low level gate drive requirements allowing directoperation in 3 V circuits (V_{GS(th)} < 1.5 V).
- Gate-Source Zener for ESD ruggedness (>6kV Human Body Model).
- Compact industry standard SC70-6 surface mount package.
- Qualified to AEC Q101
- RoHS Compliant





S2

G1

G2

Applications

■ Low voltage applications as a replacement for bipolar digital transistors and small signal MOSFETs

MOSFET Maximum Ratings T_A = 25°C unless otherwise noted

Symbol	Parameter	Ratings	Units
V _{DSS}	Drain to Source Voltage	25	V
V _{GS}	Gate to Source Voltage	8	V
I _D	Drain Current Continuous	0.22	^
	Pulsed	0.65	Α
P _D	Power Dissipation	0.3	W
T _J , T _{STG}	Operating and Storage Temperature	-55 to +150	°C
ESD	Electrostatic Discharge Rating MIL-STD-883D Human Body Model(100 pF / 1500 W)	6.0	kV
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	415	°C/W

Package Marking and Ordering Information

Device Marking	Device	Package	Reel Size	Tape Width	Quantity
FDG6301N	FDG6301N_F085	SC70-6	7"	8mm	3000 units

- 1: R_{0JA} is the sum of the junction-to-case and case-to-ambient thermal resistance, where the case thermal reference is defined as the solder mounting surface of the drain pins. $R_{\theta JC}$ is guaranteed by design, while $R_{\theta JA}$ is determined by the board design. $R_{\theta JA}$ = 415 $^{\circ}$ C/W on minimum pad mounting on FR-4 board in still air
- 2: A suffix as "...F085P" has been temporarily introduced in order to manage a double source strategy as Fairchild has officially announced
- 3: Pulse Test: Pulse Width < 300µs, Duty Cycle < 2.0%.

Units

Max

Тур

Electrical Characteristics $T_A = 25^{\circ}C$ unless otherwise noted

Parameter

Off Characteristics								
B _{VDSS}	Drain to Source Breakdown Voltage	$I_D = 250 \mu A, V_{GS} = 0 V$	25	-	-	V		
	Zero Gate Voltage Drain Current	V _{DS} = 20V,	-	-	1 10	μА		
IDSS	Zero Gate voltage Drain Current	$V_{GS} = 0V$ $T_J = 55^{\circ}C$	-	-				
I _{GSS}	Gate to Source Leakage Current	V _{GS} = ±8V	-	-	±100	nA		

Test Conditions

Min

On Characteristics

Symbol

$V_{GS(th)}$	Gate to Source Threshold Voltage	$V_{GS} = V_{DS}, I_{D} = 250 \mu A$	0.65	0.85	1.5	V	
r _{DS(on)}			$I_D = 0.22A, V_{GS} = 4.5V$	-	2.6	4	
	Drain to Source On Resistance	$I_D = 0.19A, V_{GS} = 2.7V$	-	3.7	5	Ω	
	'DS(on)	Drain to Source On Resistance	$I_D = 0.22A, V_{GS} = 4.5V$ $T_J = 125$ °C	-	5.3	7	32
I _{D(on)}	On-State Drain Current	V _{GS} = 4.5V, V _{DS} = 5V	0.22	-	-		
9 _{FS}	Forward Transconductance	I _D = 0.22A, V _{DS} = 5V	-	0.2	-	S	

Dynamic Characteristics

C _{iss}	Input Capacitance	V _{DS} = 10V, V _{GS} = 0V, f = 1MHz		-	9.5	-	pF
Coss	Output Capacitance			-	6	-	pF
C _{rss}	Reverse Transfer Capacitance			-	1.3	-	pF
$Q_{g(TOT)}$	Total Gate Charge at -4.5V	$V_{GS} = 0 \text{ to } 4.5V$	\/ - 5\/	-	0.29	0.4	nC
Q_{gs}	Gate to Source Gate Charge		$V_{DD} = 5V$ $I_{D} = 0.22A$	-	0.12	-	nC
Q_{gd}	Gate to Drain "Miller" Charge		1D - 0.22A	-	0.03	-	nC

Switching Characteristics

t _{d(on)}	Turn-On Delay Time	V_{DD} = 5V, I_{D} = 0.5A V_{GS} = 4.5V, R_{GEN} = 50 Ω	-	5	10	ns
t _r	Rise Time		-	4.5	10	ns
t _{d(off)}	Turn-Off Delay Time		-	4	8	ns
t _f	Fall Time		-	3.2	7	ns

Drain-Source Diode Characteristics

I _S	Maximum Continuous Source Current		-	-	0.25	Α
V_{SD}	Source to Drain Diode Voltage	$I_{SD} = 0.25A, V_{GS} = 0V$	-	0.8	1.2	V

Typical Characteristics

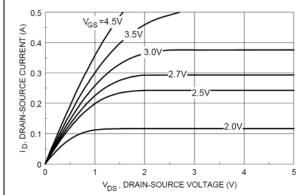


Figure 1. On-Region Characteristics.

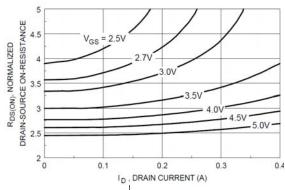


Figure 2. On-Resistance Variation with Drain Current and Gate Voltage.

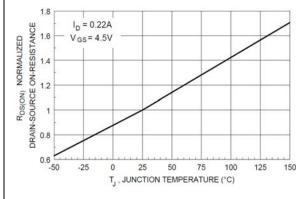


Figure 3. On-Resistance Variation with Temperature.

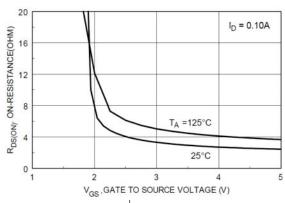


Figure 4. On-Resistance Variation with Gate-to-Source Voltage.

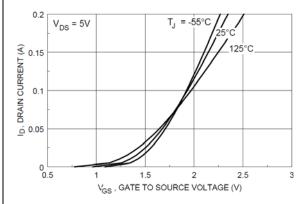


Figure 5. Transfer Characteristics.

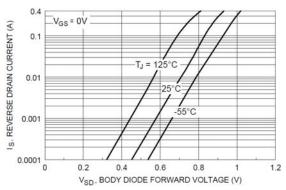
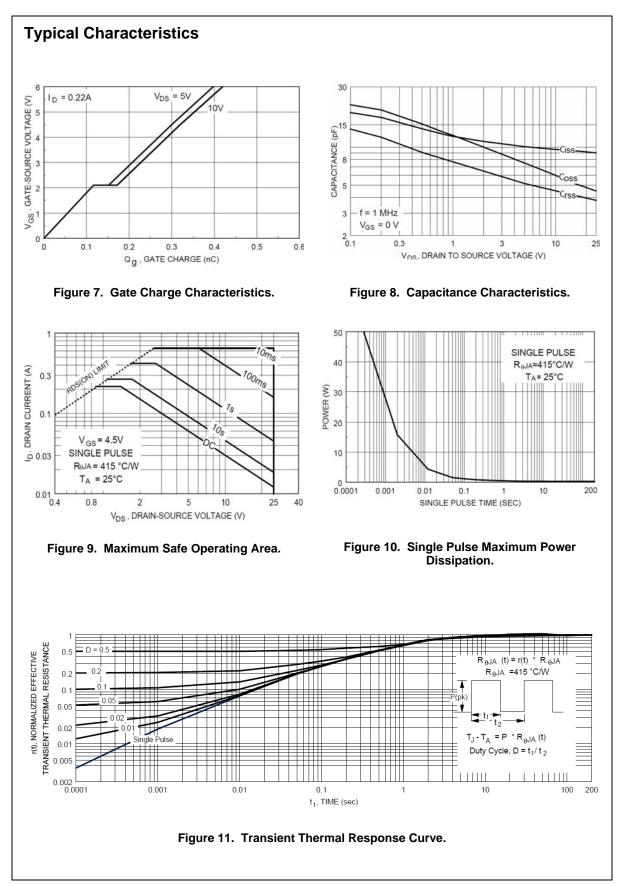
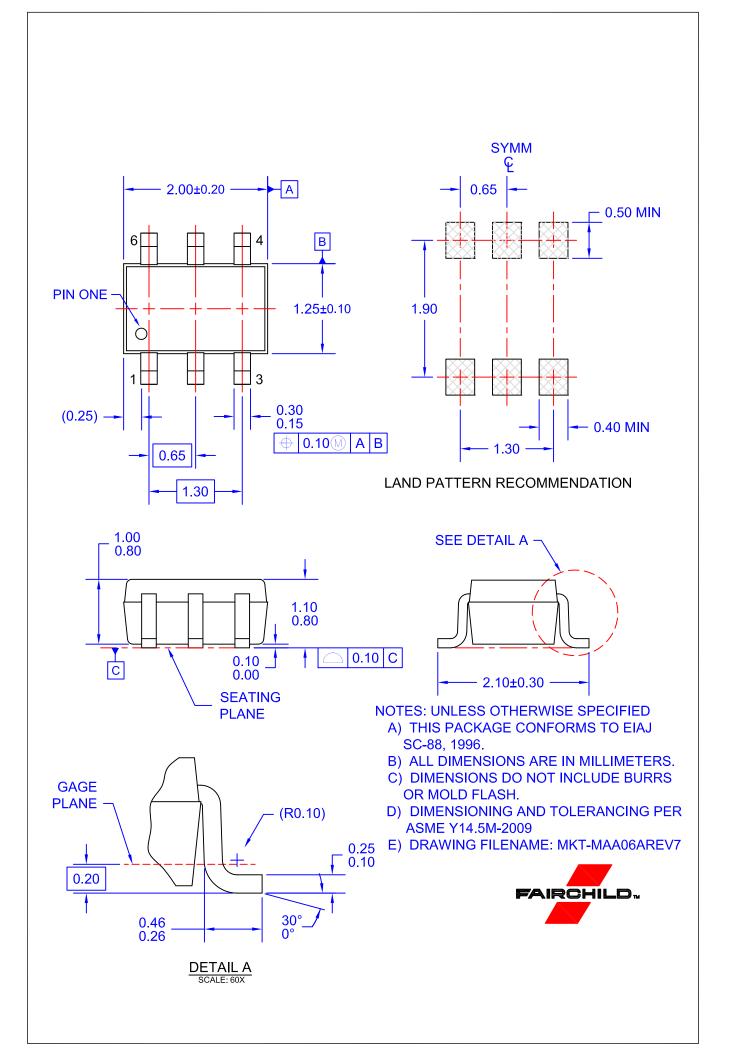


Figure 6. Body Diode Forward Voltage Variation with Source Current and Temperature.





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