

FQD6N40C N-Channel QFET[®] MOSFET 400 V, 4.5 A, 1.0 Ω

Features

- + 4.5 A, 400 V, $R_{DS(on)}$ = 1.0 Ω (Max.) @V_{GS} = 10 V, I_D = 2.25 A
- Low Gate Charge (Typ. 16 nC)
- Low Crss (Typ. 15 pF)
- 100% Avalanche Tested

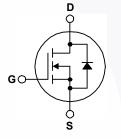
November 2013

FQD6N40C — N-Channel QFET[®] MOSFET

Description

This N-Channel enhancement mode power MOSFET is produced using Fairchild Semiconductor's proprietary planar stripe and DMOS technology. This advanced MOSFET technology has been especially tailored to reduce on-state resistance, and to provide superior switching performance and high avalanche energy strength. These devices are suitable for switched mode power supplies, active power factor correction (PFC), and electronic lamp ballasts.





Absolute Maximum Ratings T_C = 25°C unless otherwise noted.

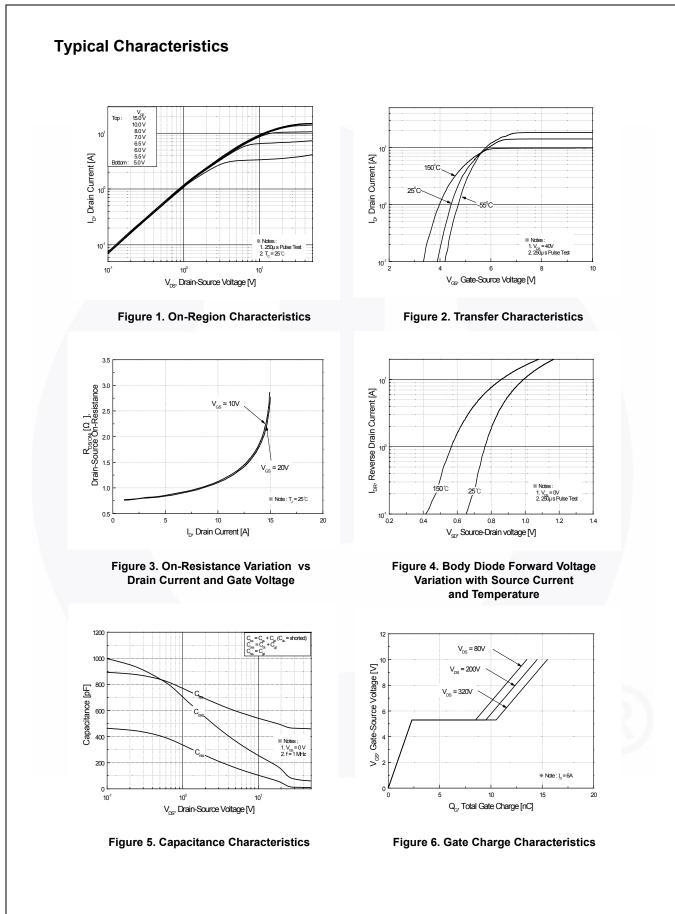
Symbol	Parameter		FQD6N40CTM	Unit
V _{DSS}	Drain-Source Voltage		400	V
I _D	Drain Current - Continuous (T _C = 25°C)		4.5	A
	- Continuous (T _C = 100°C)		2.7	А
I _{DM}	Drain Current - Pulsed	(Note 1)	18	A
V _{GSS}	Gate-Source Voltage		± 30	V
E _{AS}	Single Pulsed Avalanche Energy (Note 2)		270	mJ
I _{AR}	Avalanche Current	(Note 1)	4.5	A
E _{AR}	Repetitive Avalanche Energy	(Note 1)	4.8	mJ
dv/dt	Peak Diode Recovery dv/dt (Note 3)		4.5	V/ns
	Power Dissipation (T _A = 25°C)*		2.5	W
PD	Power Dissipation (T _C = 25°C)		48	W
	- Derate above 25°C		0.38	W/°C
T _J , T _{STG}	Operating and Storage Temperature Range		-55 to +150	°C
TL	Maximum lead temperature for soldering purposes, 1/8" from case for 5 seconds		300	°C

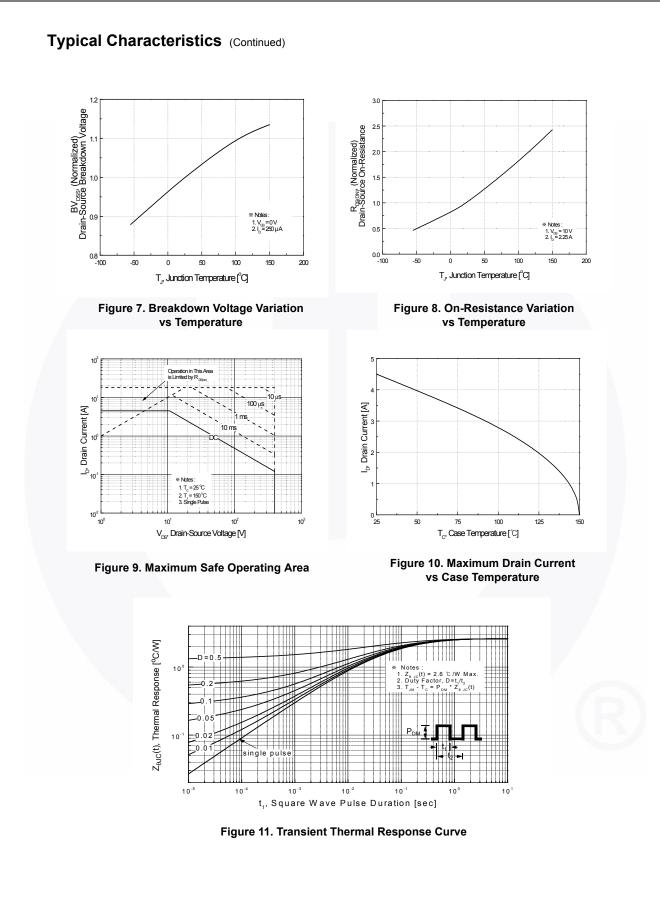
Thermal Characteristics

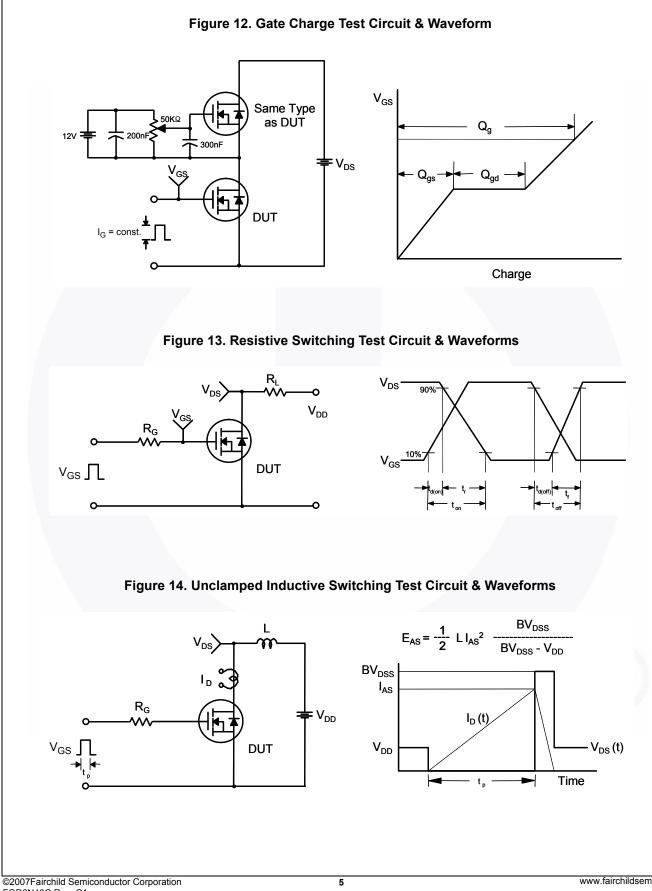
Symbol	Parameter	FQD6N40CTM	Unit
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case, Max.	2.6	
R_{\thetaJA}	Thermal Resistance, Junction-to-Ambient (minimum pad of 2 oz copper), Max.	110	°C/W
	Thermal Resistance, Junction-to-Ambient (* 1 in ² pad of 2 oz copper), Max.	50	

Device MarkingDeviceFQD6N40CFQD6N40CTM		PackageReel SizeD-PAK330 mm		Таре	Width	Qua	Quantity	
				16 mm		2500 units		
lectri	cal Char	acteristics T _c = 25°	C unless otherwise	noted.				
Symbol		Parameter	Test Conditions		Min	Тур	Мах	Unit
Off Cha	aracteristi	cs						
BV _{DSS}		ce Breakdown Voltage	V _{GS} = 0 V, I _D = 250 μA		400			V
ΔBV _{DSS} ΔT,I		Voltage Temperature	$I_D = 250 \ \mu\text{A}$, Referenced to 25°C			0.54		V/°C
J			V _{DS} = 400 V, V _G	s = 0 V			1	μA
DSS	Zero Gate	Voltage Drain Current	$V_{DS} = 320 \text{ V}, \text{ T}_{C}$				10	μΑ
GSSF	Gate-Bodv	Leakage Current, Forward	$V_{GS} = 30 \text{ V}, \text{ V}_{DS}$				100	nA
GSSR		Leakage Current, Reverse	$V_{GS} = -30 \text{ V}, \text{ V}_{DS}$				-100	nA
	racteristic					<u> </u>		
/ _{GS(th)}	1	hold Voltage	V _{DS} = V _{GS} , I _D = 250 μA		2.0		4.0	V
R _{DS(on)}	Static Drain On-Resista	-Source	V _{GS} = 10 V, I _D =			0.83	1	Ω
FS	Forward Transconductance $V_{DS} = 40 \text{ V}, I_D = 2.25 \text{ A}$			4.7		S		
	ic Charact						1	
Siss	Input Capa		V _{DS} = 25 V, V _{GS} = 0 V, f = 1.0 MHz			480	625	pF
Coss	Output Cap					80	105	pF
Srss	Reverse Tr	ansfer Capacitance				15	20	pF
Switchi	ing Chara	cteristics						
d(on)	Turn-On Delay Time		V _{DD} = 200 V, I _D :	= 6A.		13	35	ns
r	Turn-On Ri	se Time	$R_{\rm G} = 25 \Omega$			65	140	ns
d(off)	Turn-Off De	elay Time				21	55	ns
f	Turn-Off Fa	III Time		(Note 4)		38	85	ns
ζ ^g	Total Gate	Charge	V _{DS} = 320 V, I _D :	= 6A,		16	20	nC
2 _{gs}	Gate-Source	0	V _{GS} = 10 V			2.3		nC
Q _{gd}	Gate-Drain	Charge		(Note 4)		8.2		nC
Drain-S	ource Dic	de Characteristics a	nd Maximum F	Ratings				
S	Maximum (Continuous Drain-Source Di	ode Forward Curre	nt			4.5	Α
SM	Maximum Pulsed Drain-Source Diode F		Forward Current				18	Α
/ _{SD}	Drain-Sour	ce Diode Forward Voltage	V _{GS} = 0 V, I _S = 4.5 A				1.4	V
rr	Reverse Re	ecovery Time	V_{GS} = 0 V, I _S = 0	6 A,		230		ns
ر ^{در}	Reverse Re	ecovery Charge	dI _F / dt = 100 A/µ	เร		1.7		μC
TES:								
	•	h limited by maximum junction tempe						
_ = 13.7 mH	H, I _{AS} = 6 A, V _{DD}	= 50V, $R_G = 25 \Omega$, starting $T_J = 25^{\circ}C$						

FQD6N40C — N-Channel QFET[®] MOSFET







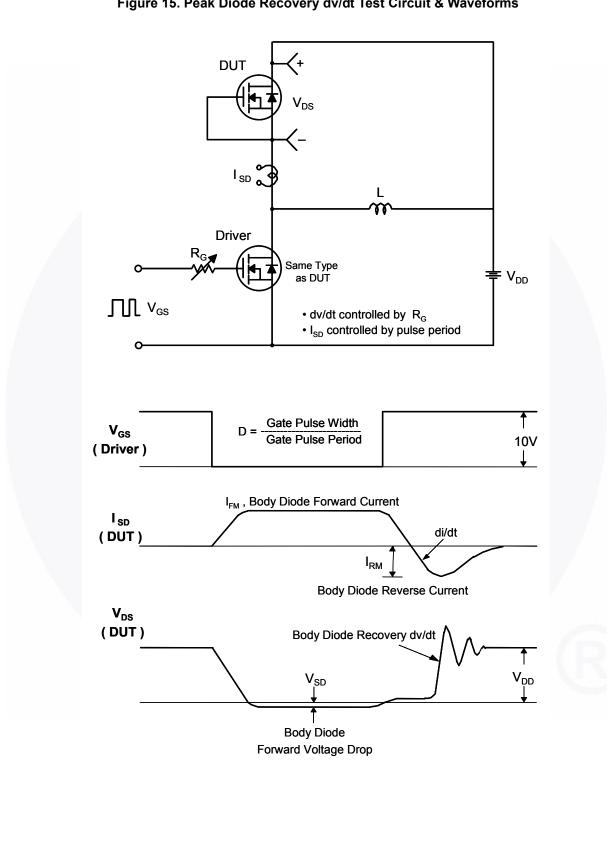
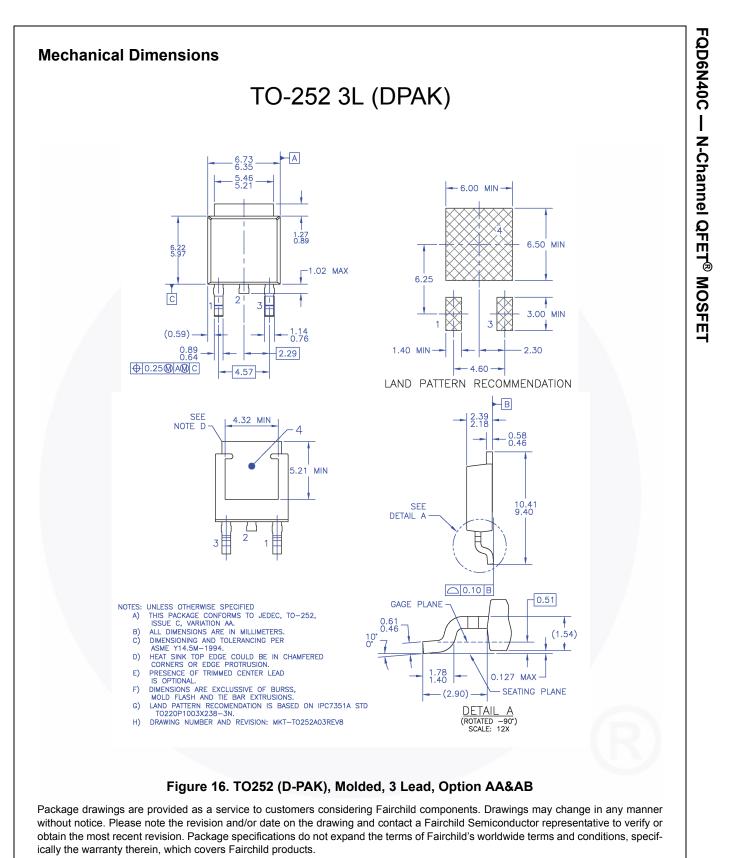


Figure 15. Peak Diode Recovery dv/dt Test Circuit & Waveforms



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Dimension in Millimeters



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