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### October 2013

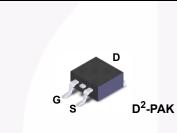
## FQB34N20L N-Channel QFET<sup>®</sup> MOSFET 200 V, 31 A, 75 mΩ

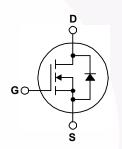
## Description

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.

## Features

- + 31 A, 200 V,  $R_{DS(on)}$  = 75 m $\Omega$  (max.) @  $V_{GS}$  = 10 V,  $I_{D}$  = 15.5 A
- Low Gate Charge (Typ. 55 nC)
- Low Crss (Typ. 52 pF)
- 100% Avalanche Tested
- Low level gate drive requirement allowing direct opration from logic drivers
- RoHS Compliant





## Absolute Maximum Ratings T<sub>c</sub> = 25°C unless otherwise noted

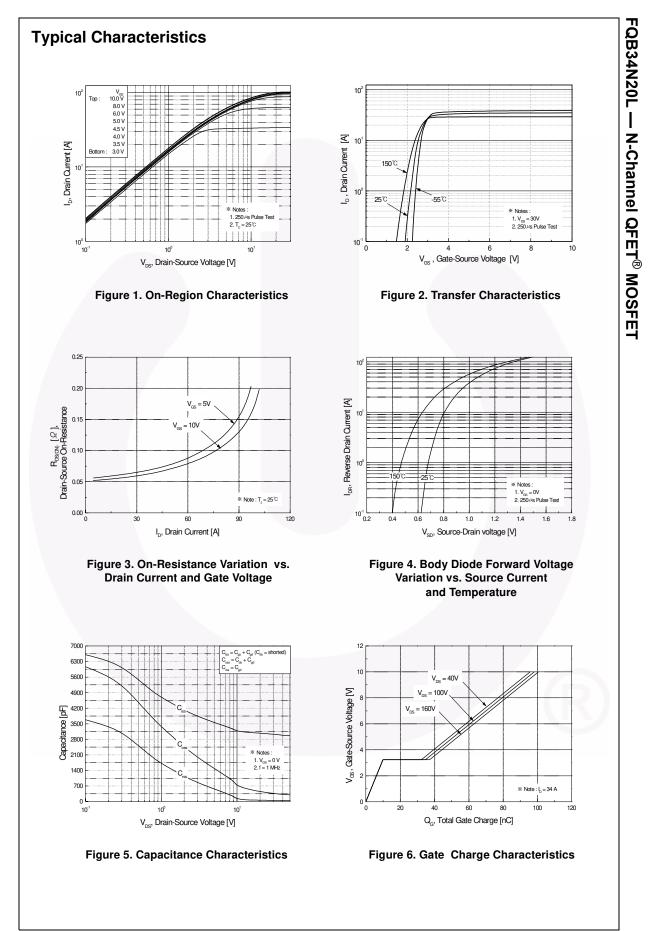
Symbol	Parameter		FQB34N20LTM	Unit
V <sub>DSS</sub>	Drain-Source Voltage		200	V
I <sub>D</sub>	Drain Current - Continuous (T <sub>C</sub> = 25°	°C)	31	A
	- Continuous (T <sub>C</sub> = 100	D°C)	20	A
I <sub>DM</sub>	Drain Current - Pulsed	(Note 1)	124	A
V <sub>GSS</sub>	Gate-Source Voltage		± 20	V
E <sub>AS</sub>	Single Pulsed Avalanche Energy	(Note 2)	640	mJ
I <sub>AR</sub>	Avalanche Current	(Note 1)	31	A
E <sub>AR</sub>	Repetitive Avalanche Energy	(Note 1)	18	mJ
dv/dt	Peak Diode Recovery dv/dt	(Note 3)	5.5	V/ns
P <sub>D</sub>	Power Dissipation $(T_A = 25^{\circ}C)^{*}$		3.13	W
	Power Dissipation $(T_C = 25^{\circ}C)$		180	W
	- Derate above 25°C		1.43	W/°C
T <sub>J</sub> , T <sub>STG</sub>	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

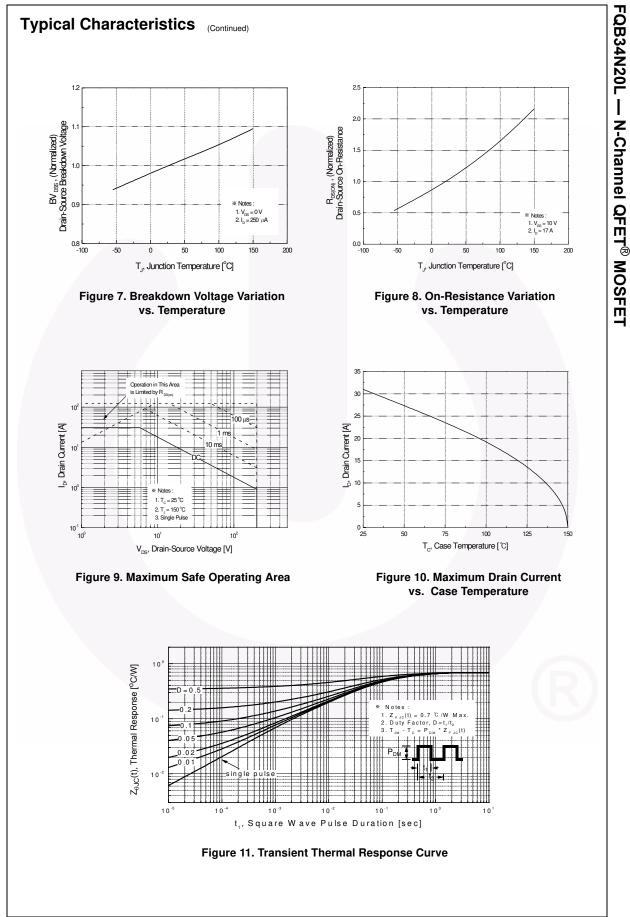
## **Thermal Characteristics**

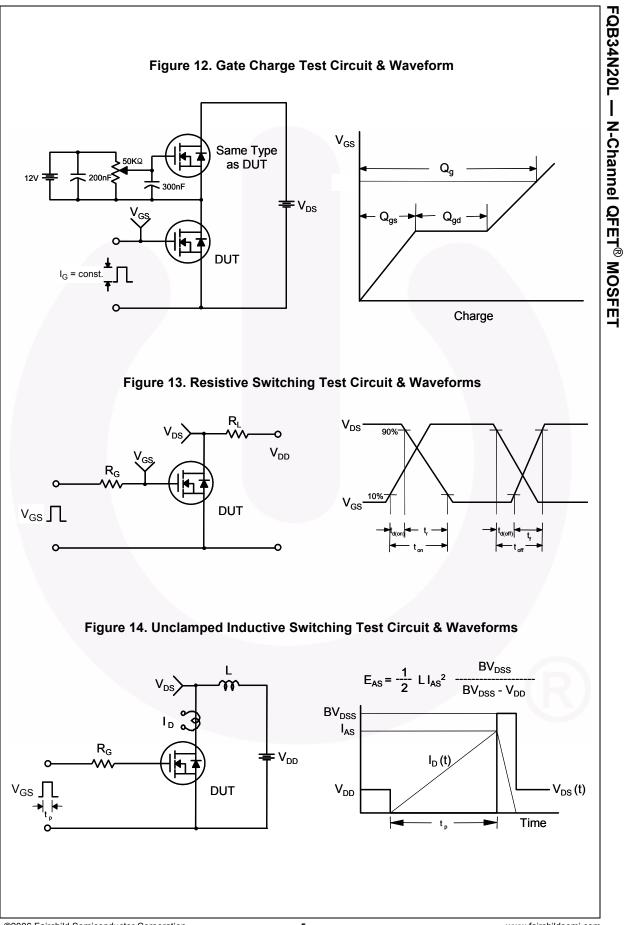
Symbol	Parameter	FQB34N20LTM	Unit
$R_{ ext{ heta}JC}$	Thermal Resistance, Junction to Case, Max.	0.7	
$R_{\thetaJA}$	Thermal Resistance, Junction to Ambient (minimum pad of 2 oz copper), Max.	62.5	°C/W
	Thermal Resistance, Junction to Ambient (* 1 in <sup>2</sup> pad of 2 oz copper), Max.	40	

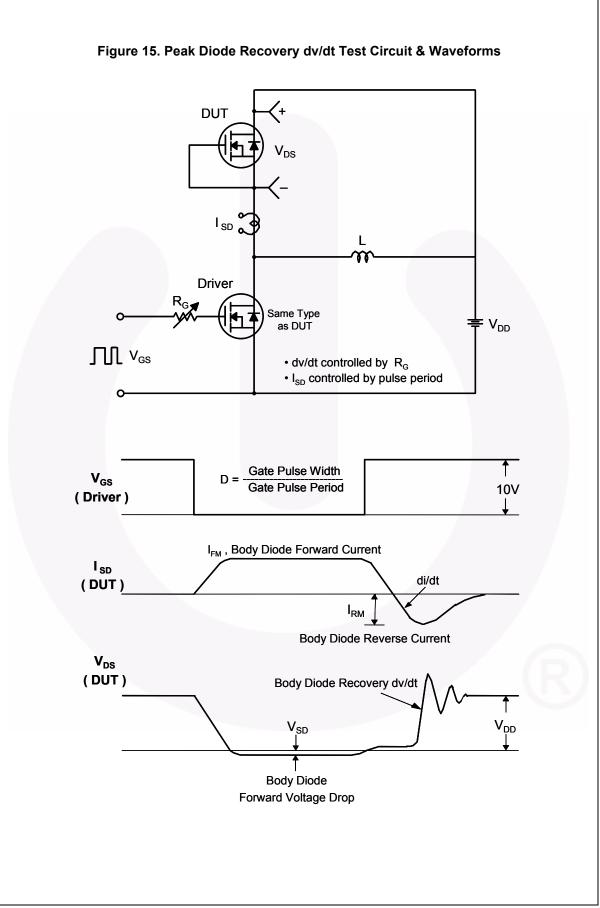
Device MarkingDeviceFQB34N20LFQB34N20LTM			Package D2-PAK	Reel Size 330mm		Tape Wi 24mm		Quantity 800
lectri	cal Char	racteristics T <sub>c</sub> = 25°C	unless otherwise noted					
Symbol		Parameter	Test Co	nditions	Min	Тур	Max	Unit
	rootorioti	inn						
BV <sub>DSS</sub>	Drain-Sou		V <sub>GS</sub> = 0 V, I <sub>D</sub> = 2	250	200			V
ABV <sub>DSS</sub>	Broakdown Voltago Tomporaturo							
$\Delta T_{J}$	Coefficient	0 1	$I_D = 250 \ \mu A$ , Referenced to 25°C			0.16		V/°C
I <sub>DSS</sub>	Zero Gate Voltage Drain Current		V <sub>DS</sub> = 200 V, V <sub>G</sub>	<sub>S</sub> = 0 V			1	μA
			$V_{DS} = 160 \text{ V}, \text{ T}_{C}$	-			10	μA
GSSF	Gate-Body	/ Leakage Current, Forward	$V_{GS} = 20 \text{ V}, \text{ V}_{DS}$	= 0 V			100	nA
GSSR	Gate-Body	/ Leakage Current, Reverse	$V_{GS} = -20 V, V_{DS}$	<sub>S</sub> = 0 V			-100	nA
	aracteristi			050 4		1		
V <sub>GS(th)</sub>		shold Voltage	$V_{DS} = V_{GS}, I_D =$		1.0		2.0	V
R <sub>DS(on)</sub>	Static Drai On-Resista		$V_{GS} = 10 \text{ V}, \text{ I}_{D} = 15.5 \text{ A}$ $V_{GS} = 5 \text{ V}, \text{ I}_{D} = 15.5 \text{ A}$			0.057 0.060	0.075	$\Omega$
9 <sub>FS</sub>		ransconductance	$V_{\rm DS} = 30 \text{ V}, \text{ I}_{\rm D} = 1000 \text{ V}$			41		S
C <sub>iss</sub> C <sub>oss</sub> C <sub>rss</sub>	Input Capa Output Ca Reverse T		V <sub>DS</sub> = 25 V, V <sub>GS</sub> f = 1.0 MHz	= 0 V,	 	3000 400 52	3900 520 67	pF pF pF
Switchi	ina Chara	cteristics						
		elay Time				45	100	ns
t <sub>d(on)</sub>	Turn-On D Turn-On R	elay Time	V <sub>DD</sub> = 100 V, I <sub>D</sub>	= 34 A,		45 520	100 1050	ns
t <sub>d(on)</sub> t <sub>r</sub>	Turn-On D	elay Time tise Time	$V_{DD} = 100 \text{ V}, \text{ I}_D =$ $R_G = 25 \Omega$	= 34 A,				
t <sub>d(on)</sub> t <sub>r</sub> t <sub>d(off)</sub>	Turn-On D Turn-On R	elay Time iise Time elay Time		= 34 A, (Note 4)		520	1050	ns
t <sub>d(on)</sub> t <sub>r</sub> t <sub>d(off)</sub>	Turn-On D Turn-On R Turn-Off D	elay Time dise Time delay Time all Time	R <sub>G</sub> = 25 Ω	(Note 4)		520 170	1050 350	ns ns
<sup>t</sup> d(on) tr <sup>t</sup> d(off) tf Qg	Turn-On D Turn-On R Turn-Off D Turn-Off F	elay Time bise Time elay Time all Time Charge		(Note 4)	 	520 170 370	1050 350 750	ns ns ns
	Turn-On D Turn-On R Turn-Off D Turn-Off F Total Gate	elay Time ise Time elay Time all Time Charge ce Charge	R <sub>G</sub> = 25 Ω V <sub>DS</sub> = 160 V, I <sub>D</sub> :	(Note 4)		520 170 370 55	1050 350 750 72	ns ns ns nC
t <sub>d(on)</sub> t <sub>r</sub> t <sub>d(off)</sub> t <sub>f</sub> Q <sub>g</sub> Q <sub>gs</sub> Q <sub>gd</sub>	Turn-On D Turn-On R Turn-Off D Turn-Off F Total Gate Gate-Sour Gate-Drain	elay Time itise Time elay Time all Time Charge ce Charge n Charge	$R_{G} = 25 \Omega$ V <sub>DS</sub> = 160 V, I <sub>D</sub> = V <sub>GS</sub> = 5 V	(Note 4) = 34 A, (Note 4)	   	520 170 370 55 9.9	1050 350 750 72 	ns ns nS nC nC
t <sub>d(on)</sub> t <sub>r</sub> t <sub>d(off)</sub> t <sub>f</sub> Q <sub>g</sub> Q <sub>gs</sub> Q <sub>gd</sub> <b>Drain-S</b>	Turn-On D Turn-On R Turn-Off D Turn-Off F Total Gate Gate-Sour Gate-Drair	elay Time dise Time elay Time all Time Charge ce Charge n Charge ode Characteristics al	$R_{G} = 25 \Omega$ V <sub>DS</sub> = 160 V, I <sub>D</sub> = V <sub>GS</sub> = 5 V	(Note 4) = 34 A, (Note 4) Ratings	   	520 170 370 55 9.9	1050 350 750 72  	ns ns nC nC nC
t <sub>d(on)</sub> t <sub>r</sub> t <sub>d(off)</sub> t <sub>f</sub> Q <sub>gs</sub> Q <sub>gd</sub> <b>Drain-S</b>	Turn-On D Turn-On R Turn-Off D Turn-Off F Total Gate Gate-Sour Gate-Drain Gate-Drain Maximum	elay Time iise Time elay Time all Time Charge ce Charge n Charge ode Characteristics al Continuous Drain-Source Did	$R_G = 25 \Omega$ $V_{DS} = 160 V, I_D =$ $V_{GS} = 5 V$ The Maximum F and Maximum F	(Note 4) = 34 A, (Note 4) Ratings		520 170 370 55 9.9 27	1050 350 750   31	ns ns nC nC nC A
<sup>t</sup> d(on) tr td(off) tf Qg Qgs Qgd <b>Drain-S</b>	Turn-On D Turn-On R Turn-Off D Turn-Off F Total Gate Gate-Sour Gate-Drair Source Dia Maximum Maximum	elay Time iise Time elay Time all Time Charge ce Charge n Charge <b>ode Characteristics a</b> Continuous Drain-Source Dio Pulsed Drain-Source Diode F	$R_G = 25 \Omega$ $V_{DS} = 160 V, I_D =$ $V_{GS} = 5 V$ <b>nd Maximum F</b> orde Forward Current	(Note 4) = 34 A, (Note 4) Ratings nt	        	520 170 370 55 9.9 27 	1050 350 750   31 124	ns ns nC nC nC A A
td(on) tr dd(off) tf Qg Qg Qgd <b>Drain-S</b> Is Is VSD	Turn-On D Turn-On R Turn-Off D Turn-Off F Total Gate Gate-Sour Gate-Drair Source Did Maximum Maximum Drain-Sour	elay Time iise Time elay Time all Time Charge ce Charge n Charge <b>ode Characteristics al</b> Continuous Drain-Source Dio Pulsed Drain-Source Diode F rce Diode Forward Voltage	$R_{G} = 25 \Omega$ $V_{DS} = 160 V, I_{D} =$ $V_{GS} = 5 V$ $Maximum F$ $Maxim F$	(Note 4) = 34 A, (Note 4) Ratings nt	     	520 170 370 55 9.9 27   	1050 350 750   31 124 1.5	ns ns nC nC nC A A V
t <sub>d(on)</sub> t <sub>r</sub> t <sub>d(off)</sub> t <sub>f</sub> Q <sub>gs</sub> Q <sub>gd</sub> <b>Drain-S</b>	Turn-On D Turn-On R Turn-Off D Turn-Off F Total Gate Gate-Sour Gate-Drair Cource Dia Maximum Maximum Drain-Sour Reverse R	elay Time iise Time elay Time all Time Charge ce Charge n Charge <b>ode Characteristics a</b> Continuous Drain-Source Dio Pulsed Drain-Source Diode F	$R_G = 25 \Omega$ $V_{DS} = 160 V, I_D =$ $V_{GS} = 5 V$ <b>nd Maximum F</b> orde Forward Current	(Note 4) = 34 A, (Note 4) Ratings nt 11 A 4 A,	        	520 170 370 55 9.9 27 	1050 350 750   31 124	nsnsnCnCnCA

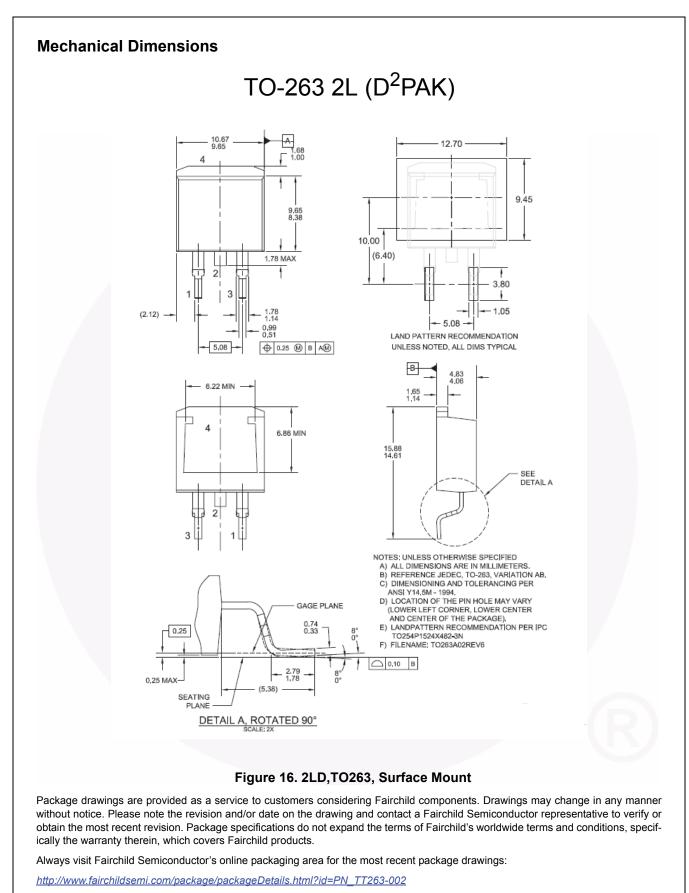
FQB34N20L — N-Channel QFET<sup>®</sup> MOSFET











**Dimension in Millimeters** 



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