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November 2013

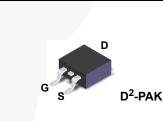
FQB19N20C N-Channel QFET[®] MOSFET 200 V, 19 A, 170 mΩ

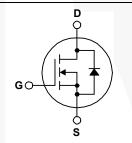
Description

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

- 19.0 A, 200 V, $R_{DS(on)}$ = 170 m Ω (Max.) @ V_{GS} = 10 V, I_D = 9.5 A
- Low Gate Charge (Typ. 40.5 nC)
- Low C_{rss} (Typ. 85 pF)
- 100% Avalanche Tested
- RoHS Compliant





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

Symbol	Parameter	FQB19N20CTM	Unit
V _{DSS}	Drain-Source Voltage	200	V
I _D	Drain Current - Continuous (T _C = 25°C)	19.0	Α
	- Continuous (T _C = 100°C)	12.1	Α
I _{DM}	Drain Current - Pulsed (Note 1)	76.0	Α
V _{GSS}	Gate-Source voltage	± 30	V
E _{AS}	Single Pulsed Avalanche Energy (Note 2)	433	mJ
I _{AR}	Avalanche Current (Note 1)	19.0	Α
E _{AR}	Repetitive Avalanche Energy (Note 1)	13.9	mJ
dv/dt	Peak Diode Recovery dv/dt (Note 3)	5.5	V/ns
P _D	Power Dissipation $(T_A = 25^{\circ}C)^*$	3.13	W
	Power Dissipation $(T_C = 25^{\circ}C)$	139	W
	- Derate above 25°C	1.11	W/°C
T _{J,} T _{STG}	Operating and Storage Temperature Range	-55 to +150	°C
Τ _L	Maximum Lead Temperature for Soldering Purpose, 300 1/8" from Case for 5 Seconds 300		°C

Thermal Characteristics

Symbol	Parameter	FQB19N20CTM	Unit
$R_{\theta JC}$	Thermal Resistance, Junction to Case, Max.		
$R_{ hetaJA}$	Thermal Resistance, Junction to Ambient (Minimum Pad of 2-oz Copper), Max.	62.5	°C/W
'` ₀ JA	Thermal Resistance, Junction to Ambient (*1 in ² Pad of 2-oz Copper), Max.	40	

Device Marking Device		Device	Package Reel Si		Tape Width		h Qu	Quantity	
FQB19	FQB19N20C FQB19N20CTM		D ² -PAK	330 mm		24 mm	80	0 units	
Electric	al Cha	racteristics T _c = 25°C ur	less otherwise noted.						
Symbol		Parameter	Condi	itions	Min	Тур	Max	Unit	
Off Charac	teristics							•	
BV _{DSS}	Drain-Source Breakdown Voltage		V _{GS} = 0 V, I _D = 250 μA		200			V	
ΔBV _{DSS} / ΔT _J	Breakdown Voltage Temperature Coefficient		$I_D = 250 \ \mu$ A, Referenced to 25°C			0.24		V/ºC	
I _{DSS}	Zero Gate	e Voltage Drain Current	V _{DS} = 200 V, V _{GS}	s = 0 V			10	μA	
			V _{DS} = 160 V, T _C = 125°C				100	μA	
I _{GSSF}	Gate-Body Leakage Current, Forward		V _{GS} = 30 V, V _{DS} = 0 V				100	nA	
I _{GSSR}	Gate-Body Leakage Current, Reverse		V _{GS} = -30 V, V _{DS} = 0 V				-100	nA	
On Charac	teristics							•	
V _{GS(th)}	Gate Threshold Voltage		$V_{DS} = V_{GS}, I_{D} = 250 \ \mu A$		2.0		4.0	V	
R _{DS(on)}	Static Drain-Source On-Resistance		V _{GS} = 10 V, I _D = 9.5 A			0.14	0.17	Ω	
9 _{FS}	Forward Transconductance		V _{DS} = 40 V, I _D = 9.5 A			10.8		S	
Dynamic C	haracteris	stics							
C _{iss}	Input Cap	put Capacitance $V_{DS} = 25 V, V_{GS} = 0 V,$		= 0 V,	-	830	1080	pF	
C _{oss}	Output Ca	apacitance	f = 1.0 MHz			195	255	pF	
C _{rss}	Reverse	Transfer Capacitance				85	110	pF	
Switching	Character	istics							
t _{d(on)}	Turn-On Delay Time		V _{DD} = 100 V, I _D = 19.0 A			10	40	ns	
t _r	Turn-On	Rise Time	R_G = 25 Ω			150	310	ns	
t _{d(off)}	Turn-Off	Delay Time				135	280	ns	
t _f	Turn-Off I	Fall Time		(Note 4)		115	240	ns	
Qg	Total Gate	e Charge	V _{DS} = 160 V, I _D =	19.0 A		40.5	53	nC	
Q _{gs}	Gate-Sou	rce Charge	V _{GS} = 10 V (Note 4)			6.0		nC	
Q _{gd}	Gate-Dra	in Charge				22.5		nC	
Drain-Sou	rce Diode (Characteristics and Maximu	m Ratings						
I _S	Maximum Continuous Drain-Source Di		iode Forward Current				19.0	Α	
I _{SM}	Maximum Pulsed Drain-Source Diode		Forward Current				76.0	Α	
V _{SD}	Drain-Source Diode Forward Voltage		V _{GS} = 0 V, I _S = 19.0 A				1.5	V	
t _{rr}	Reverse	Recovery Time	V _{GS} = 0 V, I _S = 19	9.0 A		208		ns	
Q _{rr}	Reverse	Recovery Charge	dI _F /dt =100 A/µs			1.63		μC	

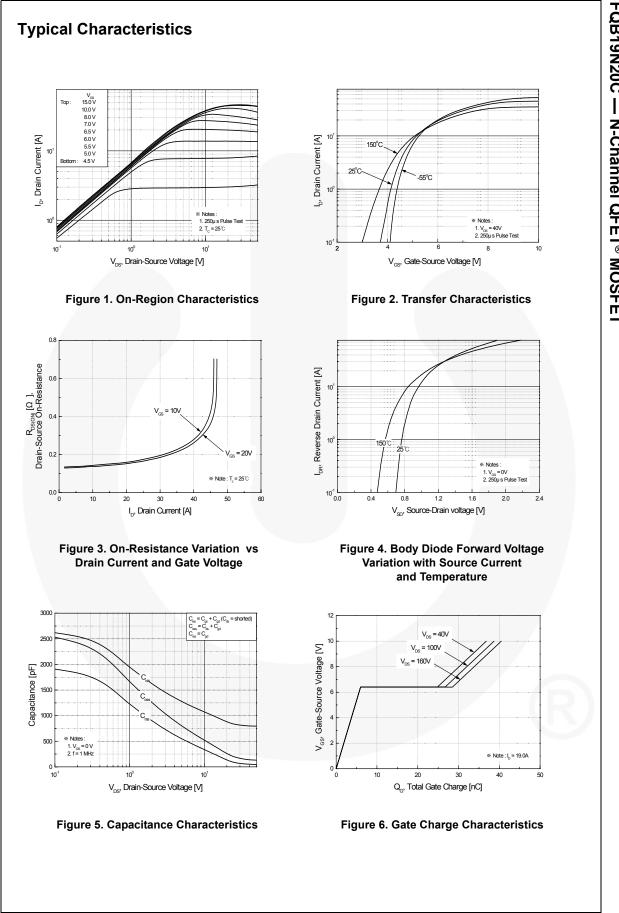
Notes:

1. Repetitive rating: pulse-width limited by maximum junction temperature.

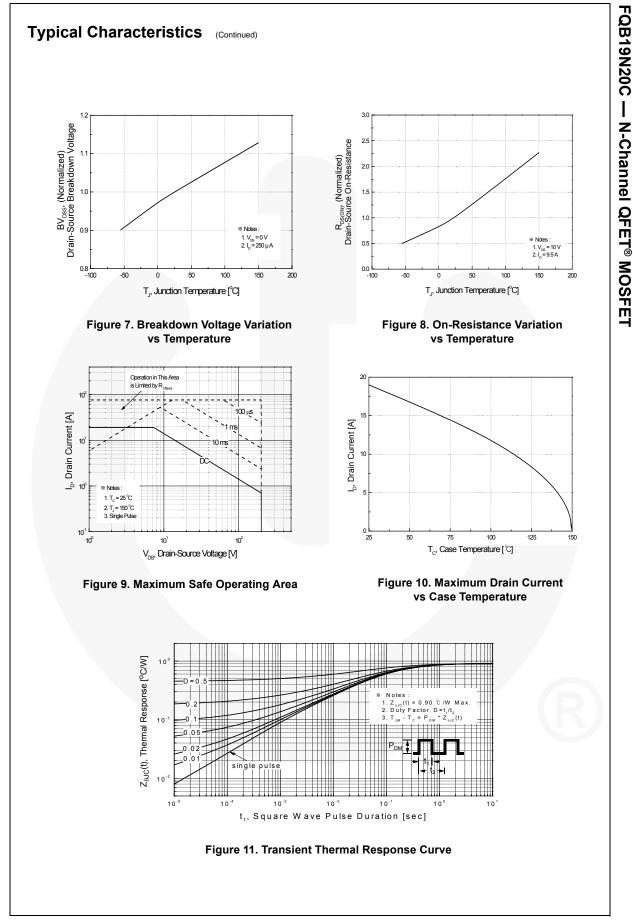
2. L = 1.8 mH, I_{AS} = 19.0 A, V_{DD} = 50 V, R_G = 25 $\Omega,$ starting T_J = 25°C.

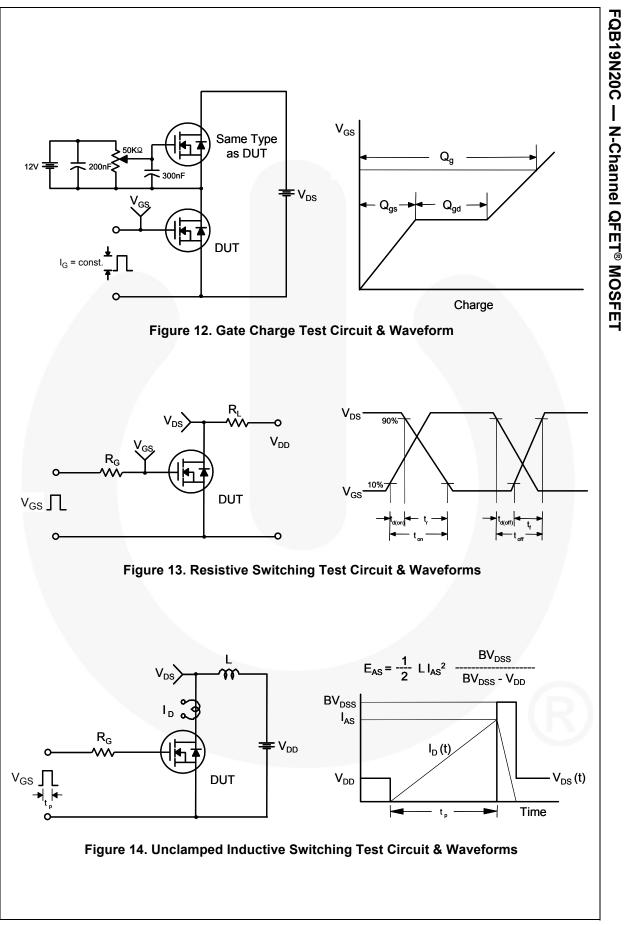
3. I_{SD} \leq 19.0 A, di/dt \leq 300 A/µs, V_{DD} \leq BV_{DSS,} starting ~ T_J = 25°C.

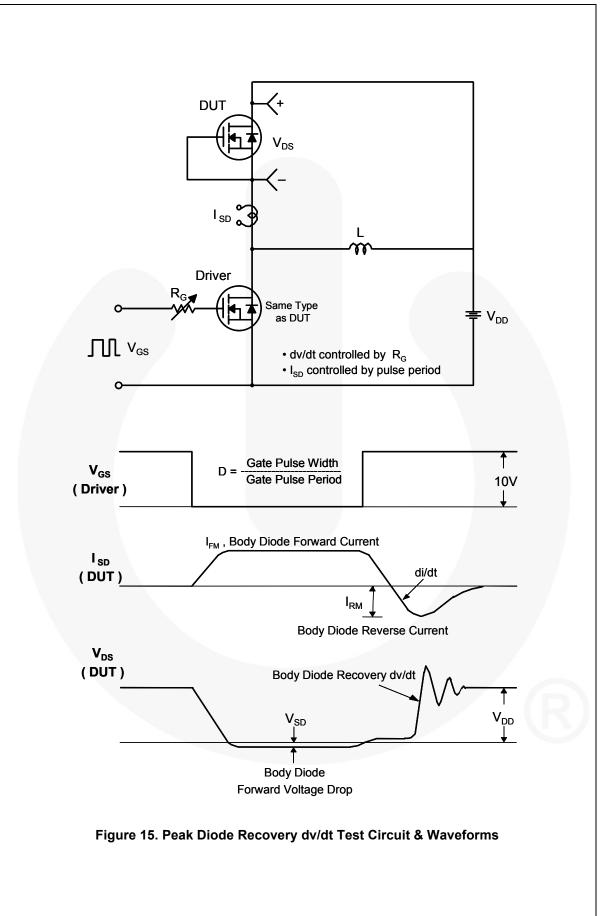
4. Essentially independent of operating temperature.



FQB19N20C — N-Channel QFET[®] MOSFET







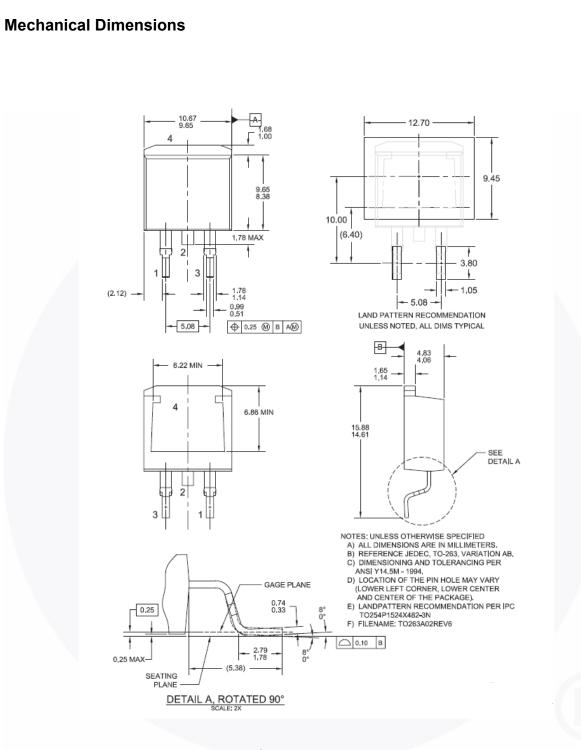


Figure 16. TO263 (D²PAK), Molded, 2-Lead, Surface Mount

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