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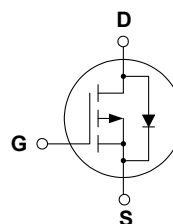
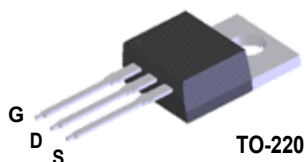
FQP17P10 **P-Channel QFET® MOSFET** **- 100 V, - 16.5 A, 190 mΩ**

Description

This P-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, audio amplifier, DC motor control, and variable switching power applications.

Features

- -16.5 A, -100 V, $R_{DS(on)} = 190 \text{ m}\Omega$ (Max.) @ $V_{GS} = -10 \text{ V}$, $I_D = -8.25 \text{ A}$
- Low Gate Charge (Typ. 30 nC)
- Low C_{rss} (Typ. 100 pF)
- 100% Avalanche Tested
- 175°C Maximum Junction Temperature Rating



Absolute Maximum Ratings $T_C = 25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter		FQP17P10	Unit
V _{DSS}	Drain-Source Voltage		-100	V
I _D	Drain Current	- Continuous (T _C = 25°C)	-16.5	A
		- Continuous (T _C = 100°C)	-11.7	A
I _{DM}	Drain Current	- Pulsed (Note 1)	-66	A
V _{GSS}	Gate-Source Voltage		± 30	V
E _{AS}	Single Pulsed Avalanche Energy (Note 2)		580	mJ
I _{AR}	Avalanche Current (Note 1)		-16.5	A
E _{AR}	Repetitive Avalanche Energy (Note 1)		10	mJ
dv/dt	Peak Diode Recovery dv/dt (Note 3)		-6.0	V/ns
P _D	Power Dissipation (T _C = 25°C)		100	W
	- Derate above 25°C		0.67	W/°C
T _J , T _{STG}	Operating and Storage Temperature Range		-55 to +175	°C
T _L	Maximum lead temperature for soldering purposes, 1/8" from case for 5 seconds		300	°C

Thermal Characteristics

Symbol	Parameter	FQP17P10	Unit
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case, Max.	1.5	$^\circ\text{C/W}$
$R_{\theta CS}$	Thermal Resistance, Case-to-Sink, Typ.	0.5	$^\circ\text{C/W}$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient, Max.	62.5	$^\circ\text{C/W}$

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

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
Off Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} = 0 V, I _D = -250 μA	-100	--	--	V
ΔBV _{DSS} / ΔT _J	Breakdown Voltage Temperature Coefficient	I _D = -250 μA, Referenced to 25°C	--	-0.1	--	V/°C
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = -100 V, V _{GS} = 0 V	--	--	-1	μA
		V _{DS} = -80 V, T _C = 150°C	--	--	-10	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 Characteristics						
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = -250 μA	-2.0	--	-4.0	V
R _{DS(on)}	Static Drain-Source On-Resistance	V _{GS} = -10 V, I _D = -8.25 A	--	0.14	0.19	Ω
g _{FS}	Forward Transconductance	V _{DS} = -40 V, I _D = -8.25 A	--	9.9	--	S
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} = -25 V, V _{GS} = 0 V, f = 1.0 MHz	--	850	1100	pF
C _{oss}	Output Capacitance		--	310	400	pF
C _{rss}	Reverse Transfer Capacitance		--	100	130	pF
Switching Characteristics						
t _{d(on)}	Turn-On Delay Time	V _{DD} = -50 V, I _D = -16.5 A, R _G = 25 Ω (Note 4)	--	17	45	ns
t _r	Turn-On Rise Time		--	200	410	ns
t _{d(off)}	Turn-Off Delay Time		--	45	100	ns
t _f	Turn-Off Fall Time		--	100	210	ns
Q _g	Total Gate Charge	V _{DS} = -80 V, I _D = -16.5 A, V _{GS} = -10 V (Note 4)	--	30	39	nC
Q _{gs}	Gate-Source Charge		--	4.8	--	nC
Q _{gd}	Gate-Drain Charge		--	17	--	nC
Drain-Source Diode Characteristics and Maximum Ratings						
I _S	Maximum Continuous Drain-Source Diode Forward Current		--	--	-16.5	A
I _{SM}	Maximum Pulsed Drain-Source Diode Forward Current		--	--	-66	A
V _{SD}	Drain-Source Diode Forward Voltage	V _{GS} = 0 V, I _S = -16.5 A	--	--	-4.0	V
t _{rr}	Reverse Recovery Time	V _{GS} = 0 V, I _S = -16.5 A,	--	120	--	ns
Q _{rr}	Reverse Recovery Charge	dI _F / dt = 100 A/μs	--	0.52	--	μC

Notes:

1. Repetitive Rating ; Pulse width limited by maximum junction temperature
2. $L = 3.2\text{ mH}$, $I_{AS} = -16.5\text{ A}$, $V_{DD} = -25\text{ V}$, $R_G = 25\text{ }\Omega$, Starting $T_J = 25^\circ\text{C}$
3. $I_{SD} \leq -16.5\text{ A}$, $dI/dt \leq 300\text{ A}/\mu\text{s}$, $V_{DD} \leq BV_{DSS}$, Starting $T_J = 25^\circ\text{C}$
4. Essentially independent of operating temperature

Typical Characteristics

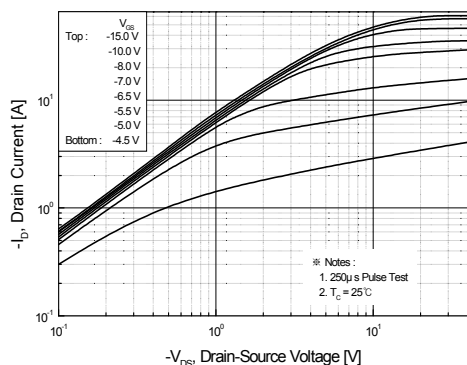


Figure 1. On-Region Characteristics

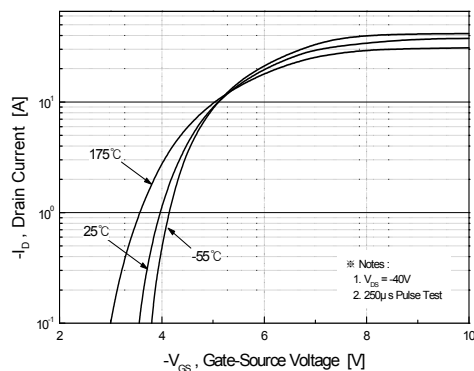


Figure 2. Transfer Characteristics

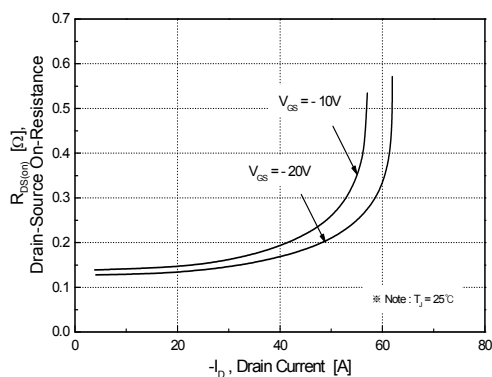


Figure 3. On-Resistance Variation vs. Drain Current and Gate Voltage

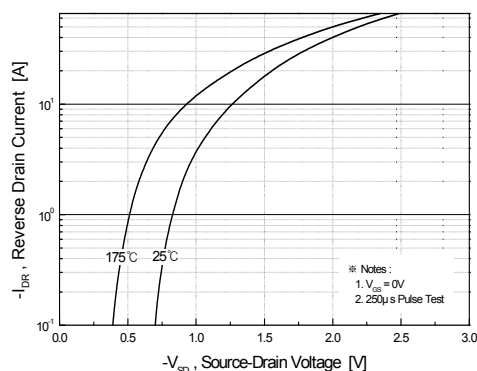


Figure 4. Body Diode Forward Voltage Variation vs. Source Current and Temperature

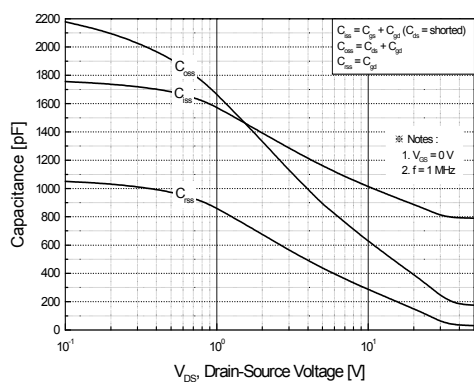


Figure 5. Capacitance Characteristics

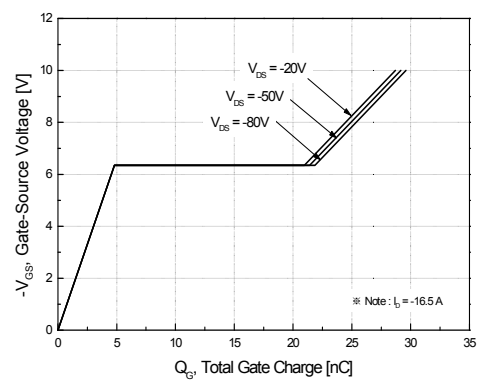


Figure 6. Gate Charge Characteristics

Dimensions in Millimeters

Typical Characteristics (Continued)

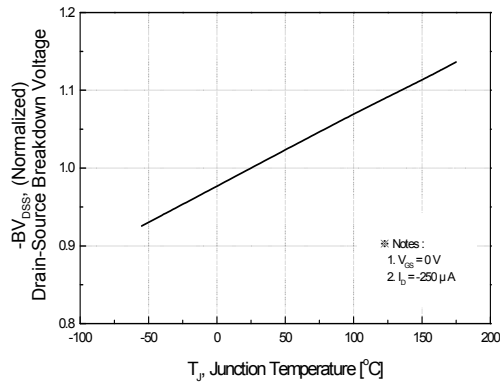


Figure 7. Breakdown Voltage Variation vs. Temperature

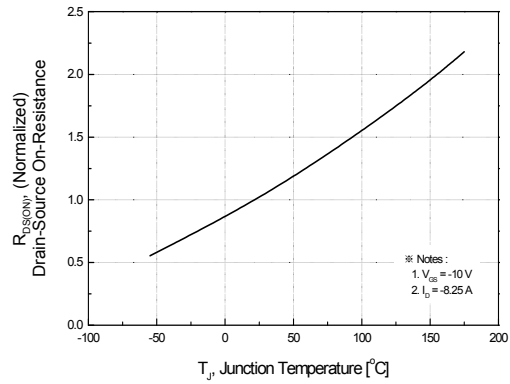


Figure 8. On-Resistance Variation vs. Temperature

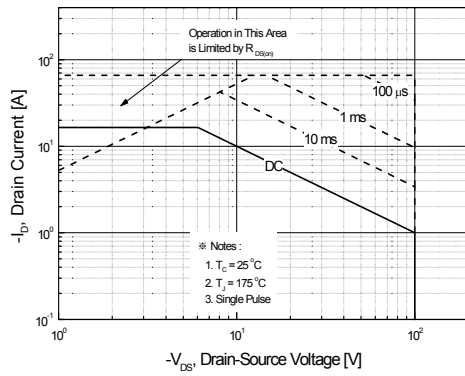


Figure 9. Maximum Safe Operating Area

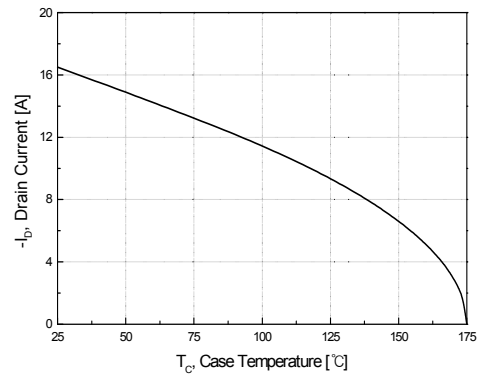


Figure 10. Maximum Drain Current vs. Case Temperature

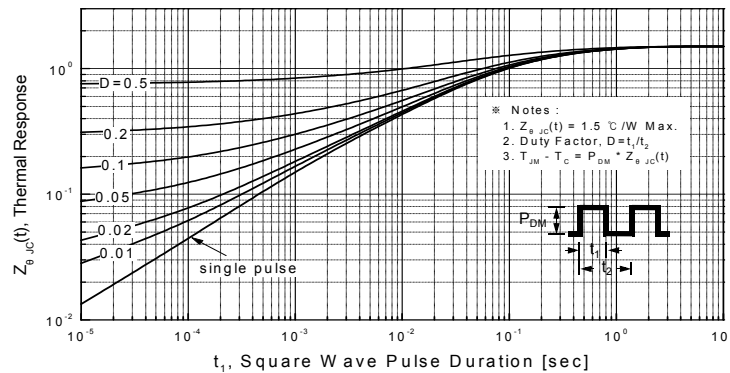
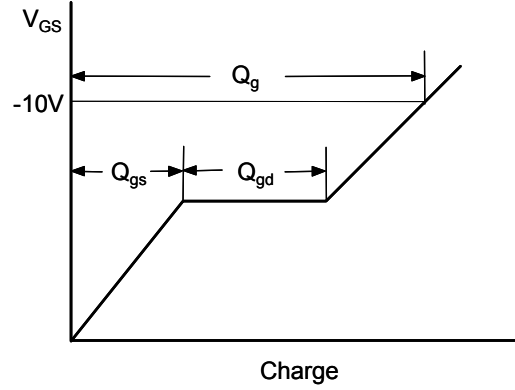
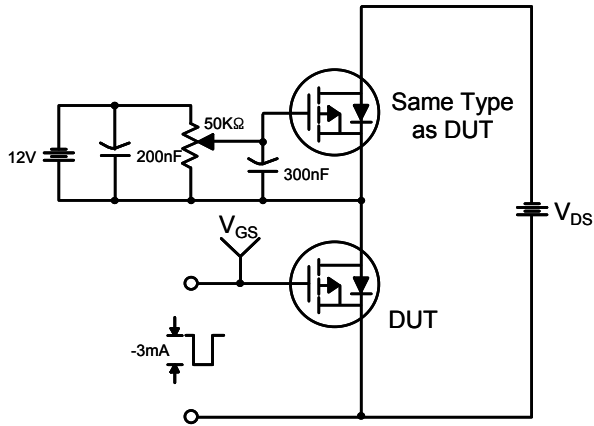
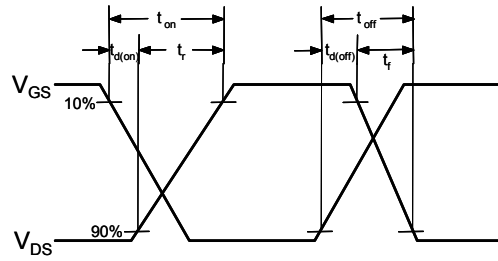
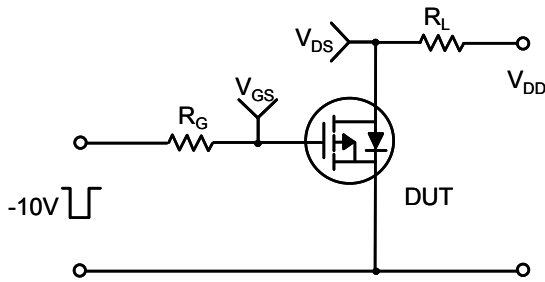


Figure 11. Transient Thermal Response Curve

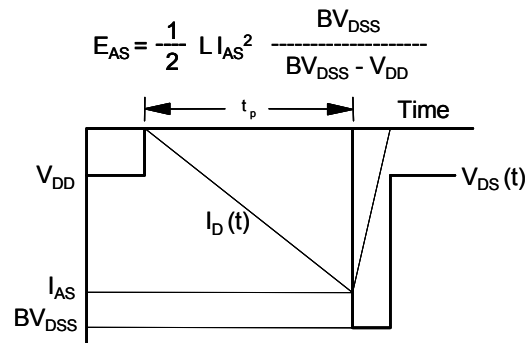
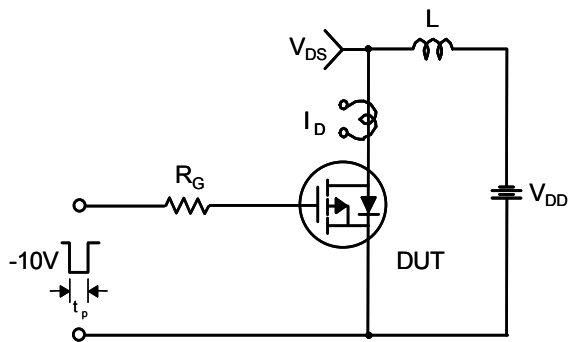
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching Test Circuit & Waveforms



Dimensions in Millimeters

Technical drawing of a TO-220B package showing three views: front, side, and end view. The front view includes dimensions for pin spacing (1.91, 2.54, 5.08), pin diameter (1.78, 1.14, 1.02, 0.38), and body dimensions (10.67, 9.65, 3.43, 2.54, 16.51, 14.22). It also shows a circular feature with a diameter of 4.09 and a tolerance of 3.50. The side view shows a height of 4.83 (3.56) and a width of 6.86 (5.84). The end view shows a width of 8.89 (6.86) and a height of 13.40 (12.19). Tolerances and material specifications are indicated by feature control frames.

NOTES: UNLESS OTHERWISE SPECIFIED
 A) REFERENCE JEDEC, TO-220, ISSUE K, VARIATION AB, DATED APRIL, 2002.
 B) ALL DIMENSIONS ARE IN MILLIMETERS.
 C) DIMENSIONING AND TOLERANCING PER ANSI Y14.5 - 1973
 D) LOCATION OF THE PIN HOLE MAY VARY (LOWER LEFT CORNER, LOWER CENTER AND CENTER OF THE PACKAGE)
 E) DOES NOT COMPLY JEDEC STANDARD VALUE.
 F) "A1" DIMENSIONS REPRESENT LIKE BELOW:
 SINGLE GAUGE = 0.51 - 0.61
 DUAL GAUGE = 1.14 - 1.40
 G) DRAWING FILE NAME: TO220B03REV6

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