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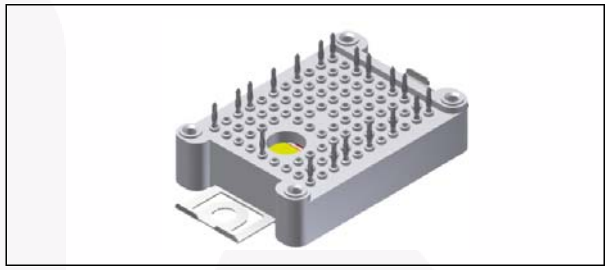
2015 年 4 月

FPF1C2P5BF07A
用于 PV 应用的 F1 模块解决方案

概述

Fairchild 的新型 DC-DC 模块设计用于需要更紧凑型设计的功率平台。另外，压装技术提供简单、可靠的安装。该模块已针对需要高效率和稳健型设计的应用诸如太阳能逆变器而优化。



封装代码 F1

电气特性

- 高效率
- 低导通损耗和开关损耗
- 低 $R_{DS(ON)}$：90 mΩ 最大。
- 快速恢复体二极管
- 内置热敏电阻，实现温度监控

机械特性

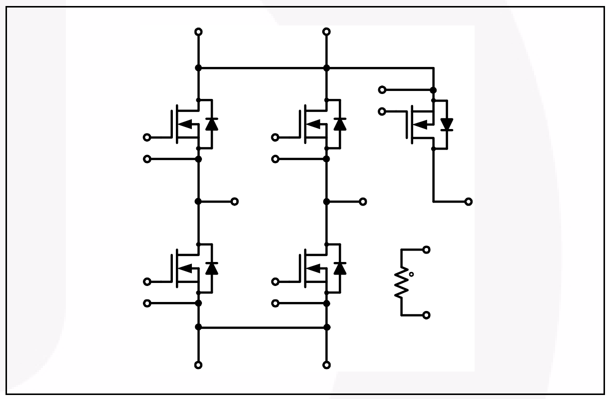
- 结构紧凑 F1 封装
- 压装接触技术

应用

- 太阳能变频器

认证

- UL approved (E209204)



内部电路图

最大绝对额定值 T_C = 25°C，除非另有说明。

符号	描述		额定值	单位
V_{DSS}	漏极－源极电压		650	V
V_{GSS}	栅极－源极电压		± 20	V
I_D	连续漏极电流	@ T_C = 25°C	36	A
		@ T_C = 80°C	27	A
I_{DM}	脉冲漏极电流	受限于最大结温。	156	A
I_S	连续源漏极二极管正向电流		36	A
I_{SM}	漏源极二极管最大正向脉冲电流		156	A
P_D	最大功耗	@ T_C = 25°C	250	W
T_J	工作结温		-40 至 +150	°C

最大绝对额定值 T_C = 25°C，除非另有说明。（续）

符号	描述		额定值	单位
功率模块				
T_{STG}	存储温度		-40 至 +125	°C
V_{ISO}	绝缘电压	@ 交流 1 分钟	2500	V
绝缘材料	内部绝缘材料		Al_2O_3	
F_{MOUNT}	紧固力		20 至 50	N
重量		典型值	22	g
爬电距离	端子到散热片		11.5	mm
	端子到端子		6.3	mm
电气间隙	端子到散热片		10.0	mm
	端子到端子		5.0	mm

封装标识与定购信息

器件	器件标识	封装	包装类型	数量 / 托盘
FPF1C2P5BF07A	FPF1C2P5BF07A	F1	托盘	22

电气特性 T_C = 25°C，除非另有说明。

符号	参数	工作条件	最小值	典型值	最大值	单位
关断特性						
BV_{DSS}	漏极一源极击穿电压	V_{GS} = 0 V, I_D = 1 mA	650	-	-	V
I_{DSS}	零栅极电压漏极电流	V_{DS} = 650 V, V_{GS}= 0 V	-	-	25	μA
I_{GSS}	栅极一体漏电流，正向	V_{GS} = 20 V, V_{DS}= 0 V	-	-	2.5	μA
导通特性						
$V_{GS(th)}$	栅极一源极阈值电压	V_{GS} = V_{DS}, I_D= 250 μA	-	3.8	-	V
$R_{DS(ON)}$	静态漏源极导通电阻	I_D = 27 A, V_{GS} = 10 V	-	-	90	mΩ
		I_D = 27 A, V_{GS} = 10 V @T_C = 125°C	-	135	-	mΩ
		I_D = 47 A, V_{GS} = 10 V	-	76	-	mΩ
开关特性						
$t_{d(on)}$	导通延迟时间	V_{CC} = 380 V I_D = 27 A V_{GS} = 10 V $R_{G(ON)}$ = 51 Ω $R_{G(OFF)}$ = 3 Ω 感性负载 T_C = 25 °C	-	192	-	ns
t_r	上升时间		-	75	-	ns
$t_{d(off)}$	关断延迟时间		-	140	-	ns
t_f	下降时间		-	13	-	ns
E_{ON}	开通损耗每个脉冲		-	2.29	-	mJ
E_{OFF}	关断损耗每个脉冲		-	58	-	μJ
$t_{d(on)}$	导通延迟时间	V_{CC} = 380 V I_D = 27 A V_{GS} = 10 V $R_{G(ON)}$ = 51 Ω $R_{G(OFF)}$ = 3 Ω 感性负载 T_C = 125 °C	-	159	-	ns
t_r	上升时间		-	82	-	ns
$t_{d(off)}$	关断延迟时间		-	156	-	ns
t_f	下降时间		-	13	-	ns
E_{ON}	开通损耗每个脉冲		-	4.06	-	mJ
E_{OFF}	关断损耗每个脉冲		-	65	-	μJ
$Q_{g(total)}$	总栅极电荷	V_{DS} = 380 V, V_{GS} = 0V...+10 V, ID = 27 A	-	155	-	nC
$R_{\theta}JC$	结点 — 壳体的热阻	每个芯片	-	-	0.5	°C/W
开关特性体二极管						
V_{SD}	源极 — 漏极二极管正向电压	I_{SD} = 27 A, V_{GS} = 0 V	-	-	1.5	V
		I_{SD} = 47 A, V_{GS} = 0 V	-	1.3	-	V
t_{rr}	反向恢复时间	I_{SD} = 27 A dI_F/dt = 364 A/μs	-	109		ns
I_{rr}	反向恢复电流		-	39	-	A
Q_{rr}	反向恢复电荷		-	2000	-	nC
t_{rr}	反向恢复时间	I_{SD} = 27 A dI_F/dt = 320 A/μs @T_C = 125°C	-	179		ns
I_{rr}	反向恢复电流		-	55	-	A
Q_{rr}	反向恢复电荷		-	4802	-	nC
NTC						
R_{NTC}	额定电阻	T_C = 25°C	-	10	-	kΩ
		T_C = 100°C	-	936	-	W
	容差	T_C = 25°C	-3	-	+3	%
P_D	功耗	T_C = 25°C	-	-	20	mW
$B_{值}$	B- 常数	$B_{25/50}$	-	3450	-	K
		$B_{25/100}$	-	3513	-	K

典型性能特征

图 1. 通态特性

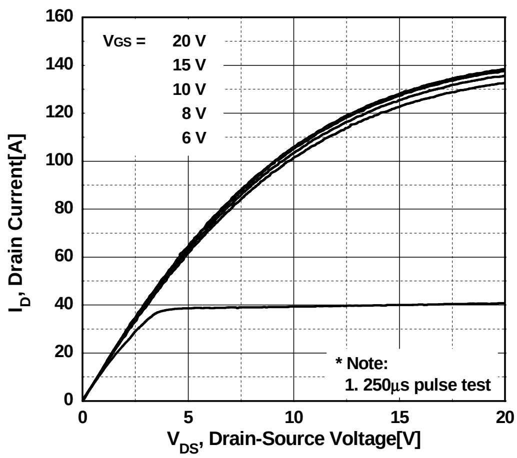


图 2. 通态电阻变化 Vs. 漏极电流和栅极电压

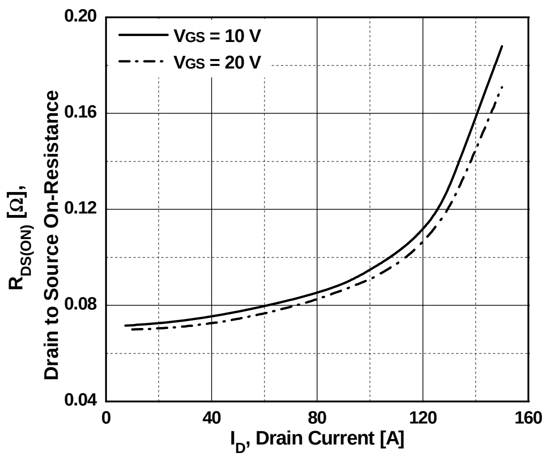


图 3. 通态电阻变化 Vs. 温度

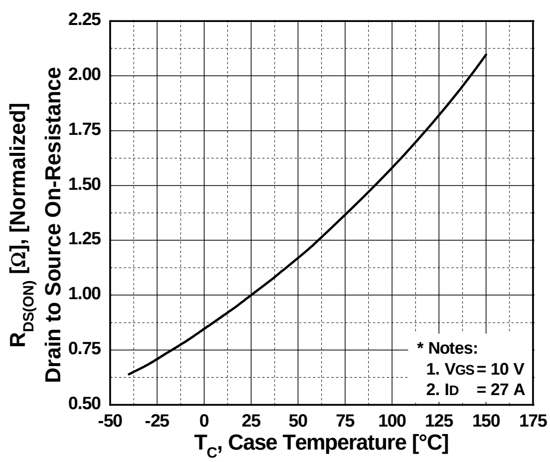


图 4. 体二极管正向电压变化 Vs. 源电流和温度

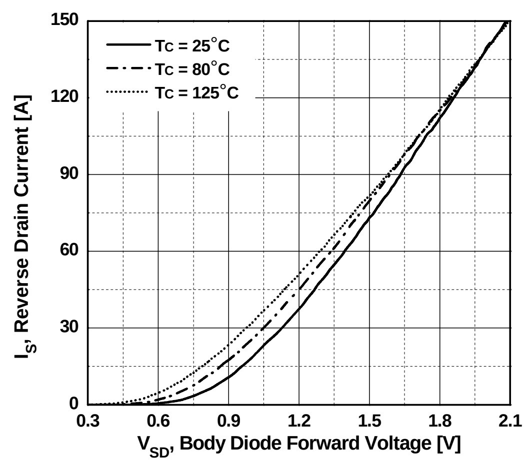


图 5. 关断损耗 Vs. 漏极电流

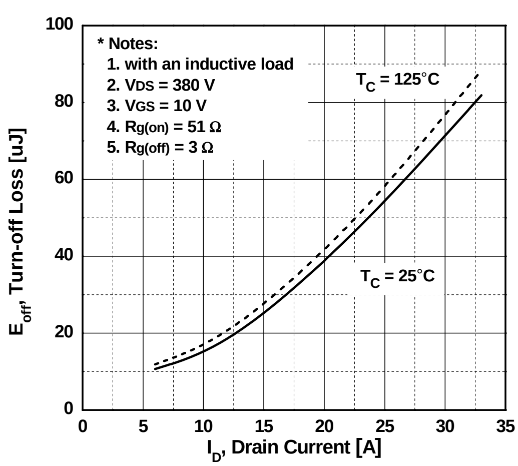
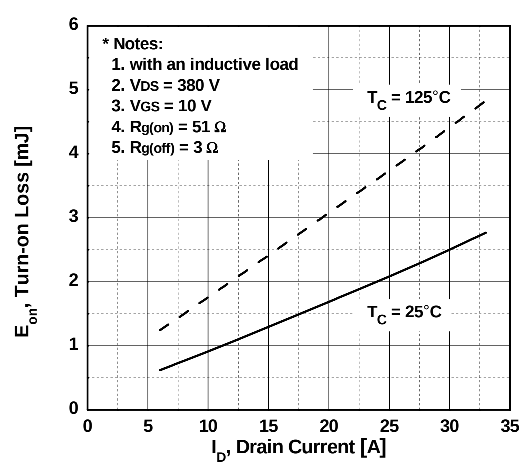


图 6. 开通损耗 Vs. 漏极电流



典型性能特征（接上页）

图 7. 关断损耗 Vs. 关断栅极电阻值

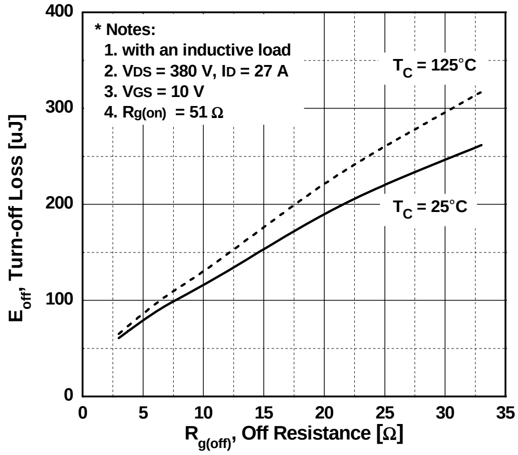


图 8. 瞬态热响应曲线

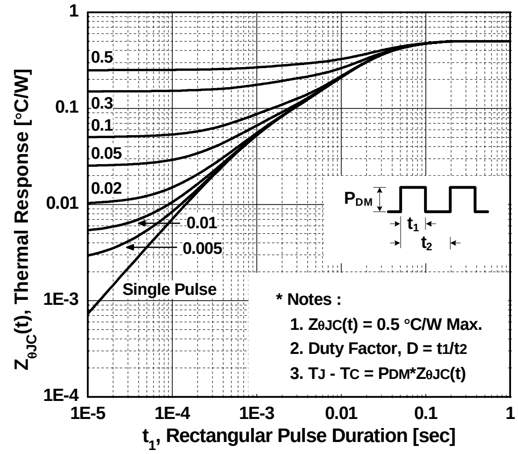
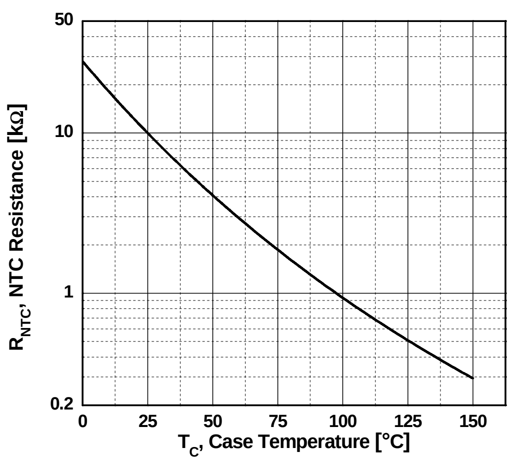
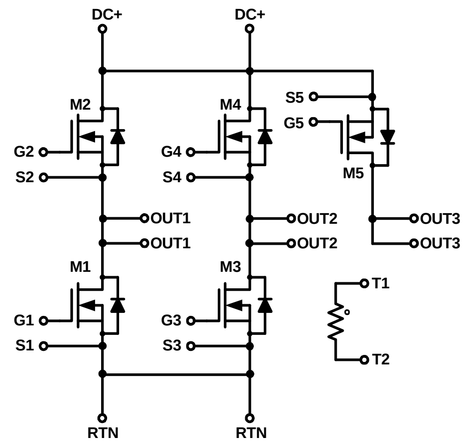


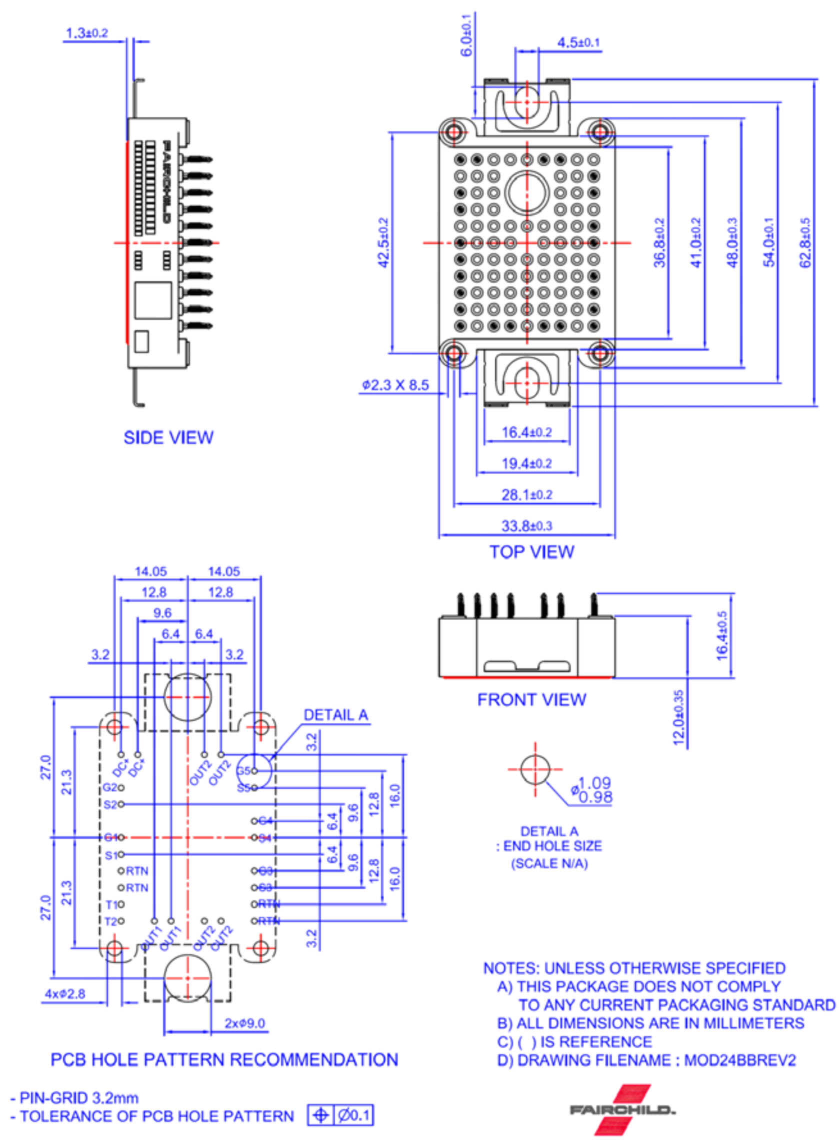
图 9. 典型 NTC 阻值 vs 温度



内部电路图


DC+
DC+
M2
M4
S5
G5
M5
G2
S2
G4
S4
OUT1
OUT1
OUT2
OUT2
OUT3
OUT3
M1
M3
T1
G1
S1
G3
S3
T2
RTN
RTN

封装轮廓图


SIDE VIEW
TOP VIEW
FRONT VIEW
DETAIL A
: END HOLE SIZE
(SCALE N/A)
PCB HOLE PATTERN RECOMMENDATION
- PIN-GRID 3.2mm
- TOLERANCE OF PCB HOLE PATTERN Ø0.1
NOTES: UNLESS OTHERWISE SPECIFIED
A) THIS PACKAGE DOES NOT COMPLY
TO ANY CURRENT PACKAGING STANDARD
B) ALL DIMENSIONS ARE IN MILLIMETERS
C) ( ) IS REFERENCE
D) DRAWING FILENAME : MOD24BBREV2

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Definition of Terms

Datasheet Identification	Product Status	Definition
Advance Information	Formative / In Design	Datasheet contains the design specifications for product development. Specifications may change in any manner without notice.
Preliminary	First Production	Datasheet contains preliminary data; supplementary data will be published at a later date. Fairchild Semiconductor reserves the right to make changes at any time without notice to improve design.
No Identification Needed	Full Production	Datasheet contains final specifications. Fairchild Semiconductor reserves the right to make changes at any time without notice to improve the design.
Obsolete	Not In Production	Datasheet contains specifications on a product that is discontinued by Fairchild Semiconductor. The datasheet is for reference information only.

Rev. I66

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