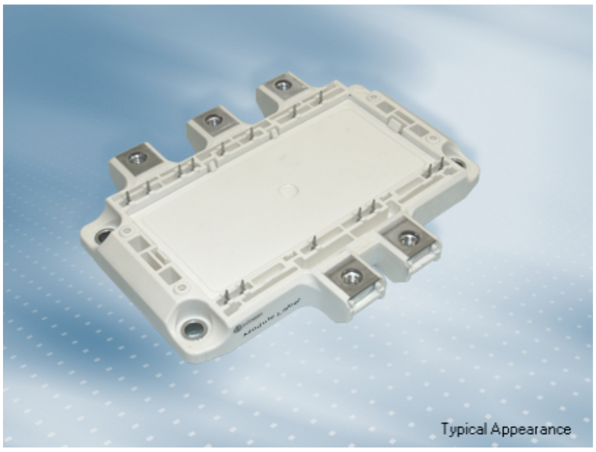
技术信息 / Technical Information

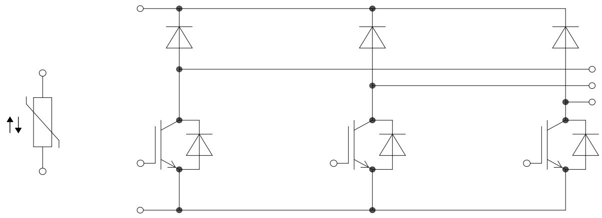
IGBT-模块
IGBT-modules

# FD300R07PE4_B6

EconoPACK™4 模块 采用第四代沟槽栅/场终止IGBT4和发射极控制二极管 带有温度检测NTC
EconoPACK™4 module with trench/fieldstop IGBT4 and Emitter Controlled Diode and NTC

**初步数据 / Preliminary Data**



$V_{CES}$ = 650V
$I_{C\ nom}$ = 300A / $I_{CRM}$ = 600A

### 典型应用
- 高频开关应用
- 斩波应用
- 电机传动
- UPS系统

### Typical Applications
- High Frequency Switching Application
- Chopper Applications
- Motor Drives
- UPS Systems

### 电气特性
- 增加阻断电压至650V
- 提高工作结温 $T_{vj\ op}$
- 沟槽栅IGBT4
- $T_{vj\ op}$ = 150°C
- $V_{CEsat}$ 带正温度系数

### Electrical Features
- Increased blocking voltage capability to 650V
- Extended Operation Temperature $T_{vj\ op}$
- Trench IGBT 4
- $T_{vj\ op}$ = 150°C
- $V_{CEsat}$ with positive Temperature Coefficient

### 机械特性
- 4 kV 交流 1分钟 绝缘
- 高机械坚固性
- 集成NTC温度传感器
- 绝缘的基板
- 标封装

### Mechanical Features
- 4 kV AC 1min Insulation
- High mechanical robustness
- Integrated NTC temperature sensor
- Isolated Base Plate
- Standard Housing

## Module Label Code

**Barcode Code 128**

00000123456000000000000

**DMX - Code**

| Content of the Code | Digit |
|---|---|
| Module Serial Number | 1 - 5 |
| Module Material Number | 6 - 11 |
| Production Order Number | 12 - 19 |
| Datecode (Production Year) | 20 - 21 |
| Datecode (Production Week) | 22 - 23 |

| | | |
|---|---|---|
| prepared by: AA | date of publication: 2013-11-11 | |
| approved by: MK | revision: 2.2 | UL approved (E83335) |

初步数据
Preliminary Data

## IGBT, 制动-斩波器 / IGBT, Brake-Chopper

### 最大额定值 / Maximum Rated Values

| | | | | |
|---|---|---|---|---|
| 集电极 - 发射极电压<br>Collector-emitter voltage | $T_{vj}$ = 25°C | $V_{CES}$ | 650 | V |
| 连续集电极直流电流<br>Continuous DC collector current | $T_C$ = 70°C, $T_{vj\,max}$ = 175°C | $I_{C\,nom}$ | 300 | A |
| 集电极重复峰值电流<br>Repetitive peak collector current | $t_P$ = 1 ms | $I_{CRM}$ | 600 | A |
| 总功率损耗<br>Total power dissipation | $T_C$ = 25°C, $T_{vj\,max}$ = 175°C | $P_{tot}$ | 940 | W |
| 栅极 - 发射极峰值电压<br>Gate-emitter peak voltage | | $V_{GES}$ | +/-20 | V |

### 特征值 / Characteristic Values

| | | | | min. | typ. | max. | |
|---|---|---|---|---|---|---|---|
| 集电极 - 发射极饱和电压<br>Collector-emitter saturation voltage | $I_C$ = 300 A, $V_{GE}$ = 15 V<br>$I_C$ = 300 A, $V_{GE}$ = 15 V<br>$I_C$ = 300 A, $V_{GE}$ = 15 V | $T_{vj}$ = 25°C<br>$T_{vj}$ = 125°C<br>$T_{vj}$ = 150°C | $V_{CE\,sat}$ | | 1,55<br>1,70<br>1,75 | 1,95 | V<br>V<br>V |
| 栅极阈值电压<br>Gate threshold voltage | $I_C$ = 4,80 mA, $V_{CE}$ = $V_{GE}$, $T_{vj}$ = 25°C | | $V_{GEth}$ | 5,0 | 5,8 | 6,5 | V |
| 栅极电荷<br>Gate charge | $V_{GE}$ = -15 V ... +15 V | | $Q_G$ | | 3,20 | | µC |
| 内部栅极电阻<br>Internal gate resistor | $T_{vj}$ = 25°C | | $R_{Gint}$ | | 1,0 | | Ω |
| 输入电容<br>Input capacitance | f = 1 MHz, $T_{vj}$ = 25°C, $V_{CE}$ = 25 V, $V_{GE}$ = 0 V | | $C_{ies}$ | | 18,5 | | nF |
| 反向传输电容<br>Reverse transfer capacitance | f = 1 MHz, $T_{vj}$ = 25°C, $V_{CE}$ = 25 V, $V_{GE}$ = 0 V | | $C_{res}$ | | 0,57 | | nF |
| 集电极-发射极截止电流<br>Collector-emitter cut-off current | $V_{CE}$ = 650 V, $V_{GE}$ = 0 V, $T_{vj}$ = 25°C | | $I_{CES}$ | | | 1,0 | mA |
| 栅极-发射极漏电流<br>Gate-emitter leakage current | $V_{CE}$ = 0 V, $V_{GE}$ = 20 V, $T_{vj}$ = 25°C | | $I_{GES}$ | | | 400 | nA |
| 开通延迟时间(电感负载)<br>Turn-on delay time, inductive load | $I_C$ = 300 A, $V_{CE}$ = 300 V<br>$V_{GE}$ = ±15 V<br>$R_{Gon}$ = 2,0 Ω | $T_{vj}$ = 25°C<br>$T_{vj}$ = 125°C<br>$T_{vj}$ = 150°C | $t_{d\,on}$ | | 0,06<br>0,09<br>0,10 | | µs<br>µs<br>µs |
| 上升时间(电感负载)<br>Rise time, inductive load | $I_C$ = 300 A, $V_{CE}$ = 300 V<br>$V_{GE}$ = ±15 V<br>$R_{Gon}$ = 2,0 Ω | $T_{vj}$ = 25°C<br>$T_{vj}$ = 125°C<br>$T_{vj}$ = 150°C | $t_r$ | | 0,04<br>0,06<br>0,07 | | µs<br>µs<br>µs |
| 关断延迟时间(电感负载)<br>Turn-off delay time, inductive load | $I_C$ = 300 A, $V_{CE}$ = 300 V<br>$V_{GE}$ = ±15 V<br>$R_{Goff}$ = 2,0 Ω | $T_{vj}$ = 25°C<br>$T_{vj}$ = 125°C<br>$T_{vj}$ = 150°C | $t_{d\,off}$ | | 0,37<br>0,39<br>0,40 | | µs<br>µs<br>µs |
| 下降时间(电感负载)<br>Fall time, inductive load | $I_C$ = 300 A, $V_{CE}$ = 300 V<br>$V_{GE}$ = ±15 V<br>$R_{Goff}$ = 2,0 Ω | $T_{vj}$ = 25°C<br>$T_{vj}$ = 125°C<br>$T_{vj}$ = 150°C | $t_f$ | | 0,11<br>0,24<br>0,26 | | µs<br>µs<br>µs |
| 开通损耗能量 (每脉冲)<br>Turn-on energy loss per pulse | $I_C$ = 300 A, $V_{CE}$ = 300 V, $L_S$ = 30 nH<br>$V_{GE}$ = ±15 V, di/dt = 4800 A/µs ($T_{vj}$ = 150°C)<br>$R_{Gon}$ = 2,0 Ω | $T_{vj}$ = 25°C<br>$T_{vj}$ = 125°C<br>$T_{vj}$ = 150°C | $E_{on}$ | | 2,20<br>3,30<br>3,85 | | mJ<br>mJ<br>mJ |
| 关断损耗能量 (每脉冲 )<br>Turn-off energy loss per pulse | $I_C$ = 300 A, $V_{CE}$ = 300 V, $L_S$ = 30 nH<br>$V_{GE}$ = ±15 V, du/dt = 3050 V/µs ($T_{vj}$ = 150°C)<br>$R_{Goff}$ = 2,0 Ω | $T_{vj}$ = 25°C<br>$T_{vj}$ = 125°C<br>$T_{vj}$ = 150°C | $E_{off}$ | | 12,5<br>15,5<br>16,5 | | mJ<br>mJ<br>mJ |
| 短路数据<br>SC data | $V_{GE} \leq$ 15 V, $V_{CC}$ = 360 V<br>$V_{CEmax}$ = $V_{CES}$ -$L_{sCE}$ ·di/dt | $t_P \leq$ 10 µs, $T_{vj}$ = 25°C<br>$t_P \leq$ 10 µs, $T_{vj}$ = 150°C | $I_{SC}$ | | 1500<br>1200 | | A<br>A |
| 结 - 外壳热阻<br>Thermal resistance, junction to case | 每个 IGBT / per IGBT | | $R_{thJC}$ | | | 0,16 | K/W |
| 外壳 - 散热器热阻<br>Thermal resistance, case to heatsink | 每个 IGBT / per IGBT<br>$\lambda_{Paste}$ = 1 W/(m·K) / $\lambda_{grease}$ = 1 W/(m·K) | | $R_{thCH}$ | | 0,093 | | K/W |
| 在开关状态下温度<br>Temperature under switching conditions | | | $T_{vj\,op}$ | -40 | | 150 | °C |

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