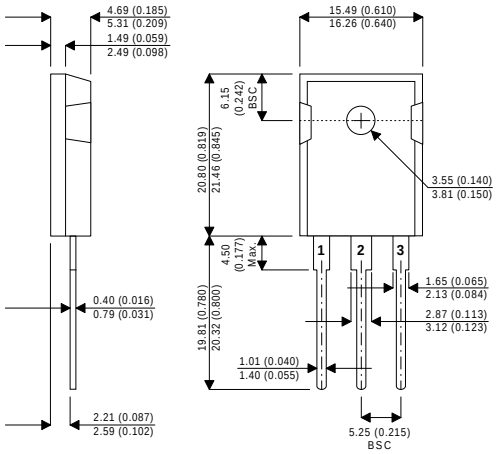
SEME LAB

# BFC45

# 4TH GENERATION MOSFET

TO247–AD Package Outline.

Dimensions in mm (inches)




## N–CHANNEL ENHANCEMENT MODE HIGH VOLTAGE POWER MOSFETS

$V_{DSS}$ 800V

$I_{D(cont)}$ 9.0A

$R_{DS(on)}$ 1.25Ω

**Terminal 1** Gate **Terminal 2** Drain
**Terminal 3** Source

## ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C unless otherwise stated)

| | | | |
|---|---|---|---|
| $V_{DSS}$ | Drain – Source Voltage | 800 | V |
| $I_D$ | Continuous Drain Current | 9.0 | A |
| $I_{DM}$ | Pulsed Drain Current [1] | 36 | A |
| $V_{GS}$ | Gate – Source Voltage | ±30 | V |
| $P_D$ | Total Power Dissipation @ $T_{case}$ = 25°C | 240 | W |
| $T_J$ , $T_{STG}$ | Operating and Storage Junction Temperature Range | –55 to 150 | °C |
| $T_L$ | Lead Temperature : 0.063” from Case for 10 Sec. | 300 | |

## STATIC ELECTRICAL RATINGS ($T_{case}$ = 25°C unless otherwise stated)

| | Characteristic | Test Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{DSS}$ | Drain – Source Breakdown Voltage | $V_{GS}$ = 0V , $I_D$ = 250µA | 800 | | | V |
| $I_{DSS}$ | Zero Gate Voltage Drain Current ($V_{GS}$ = 0V) | $V_{DS}$ = $V_{DSS}$ | | | 250 | µA |
| | | $V_{DS}$ = 0.8$V_{DSS}$ , $T_C$ = 125°C | | | 1000 | |
| $I_{GSS}$ | Gate – Source Leakage Current | $V_{GS}$ = ±30V , $V_{DS}$ = 0V | | | ±100 | nA |
| $V_{GS(TH)}$ | Gate Threshold Voltage | $V_{DS}$ = $V_{GS}$ , $I_D$ = 1.0mA | 2 | | 4 | V |
| $I_{D(ON)}$ | On State Drain Current [2] | $V_{DS}$ > $I_{D(ON)}$ x $R_{DS(ON)}$ Max $V_{GS}$ = 10V | 9 | | | A |
| $R_{DS(ON)}$ | Drain – Source On State Resistance [2] | $V_{GS}$ = 10V , $I_D$ = 0.5 $I_D$ [Cont.] | | | 1.25 | Ω |

1) Repetitive Rating: Pulse Width limited by maximum junction temperature.

2) Pulse Test: Pulse Width < 380µS , Duty Cycle < 2%

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Prelim. 4/94

## DYNAMIC CHARACTERISTICS

| | Characteristic | Test Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $C_{iss}$ | Input Capacitance | $V_{GS}$ = 0V | | 1500 | 1800 | pF |
| $C_{oss}$ | Output Capacitance | $V_{DS}$ = 25V | | 235 | 330 | |
| $C_{rss}$ | Reverse Transfer Capacitance | f = 1MHz | | 85 | 127 | |
| $Q_g$ | Total Gate Charge[3] | $V_{GS}$ = 10V | | 68 | 105 | nC |
| $Q_{gs}$ | Gate – Source Charge | $V_{DD}$ = 0.5 $V_{DSS}$ | | 7.6 | 11 | |
| $Q_{gd}$ | Gate – Drain (“Miller”) Charge | $I_D$ = $I_D$ [Cont.] @ 25°C | | 33 | 49 | |
| $t_{d(on)}$ | Turn–on Delay Time | $V_{GS}$ = 15V | | 13 | 26 | ns |
| $t_r$ | Rise Time | $V_{DD}$ = 0.5 $V_{DSS}$ | | 15 | 29 | |
| $t_{d(off)}$ | Turn-off Delay Time | $I_D$ = $I_D$ [Cont.] @ 25°C | | 54 | 81 | |
| $t_f$ | Fall Time | $R_G$ = 1.8Ω | | 20 | 39 | |

## SOURCE – DRAIN DIODE RATINGS AND CHARACTERISTICS

| | Characteristic | Test Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $I_S$ | Continuous Source Current | (Body Diode) | | | 9.0 | A |
| $I_{SM}$ | Pulsed Source Current[1] | (Body Diode) | | | 36 | |
| $V_{SD}$ | Diode Forward Voltage[2] | $V_{GS}$ = 0V , $I_S$ = – $I_D$ [Cont.] | | | 1.3 | V |
| $t_{rr}$ | Reverse Recovery Time | $I_S$ = – $I_D$ [Cont.] , $dI_s$ / dt = 100A/µs | 240 | 480 | 960 | ns |
| $Q_{rr}$ | Reverse Recovery Charge | | 1.7 | 3.4 | 7 | µC |

## SAFE OPERATING AREA CHARACTERISTICS

| | Characteristic | Test Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| SOA1 | Safe Operating Area | $V_{DS}$ = 0.4$V_{DSS}$ , t = 1 Sec.<br>$I_{DS}$ = $P_D$ / 0.4$V_{DSS}$ | 240 | | | W |
| SOA2 | Safe Operating Area | $V_{DS}$ = $P_D$ / $I_D$ [Cont.]<br>$I_{DS}$ = $I_D$ [Cont.] , t = 1 Sec. | 240 | | | W |
| $I_{LM}$ | Inductive Current Clamped | | 36 | | | A |

## THERMAL CHARACTERISTICS

| | Characteristic | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|
| $R_{\theta JC}$ | Junction to Case | | | 0.51 | °C/W |
| $R_{\theta JA}$ | Junction to Ambient | | | 40 | |

1) Repetitive Rating: Pulse Width limited by maximum junction temperature.

2) Pulse Test: Pulse Width < 380µS , Duty Cycle < 2%

3) See MIL–STD–750 Method 3471

CAUTION — Electrostatic Sensitive Devices. Anti-Static Procedures Must Be Followed.