Ordering number:EN4894

# FX854

**MOSFET:P-Channel Silicon MOSFET**
**SBD:Schottky Barrier Diode**

## DC-DC Converter Applications

## Features

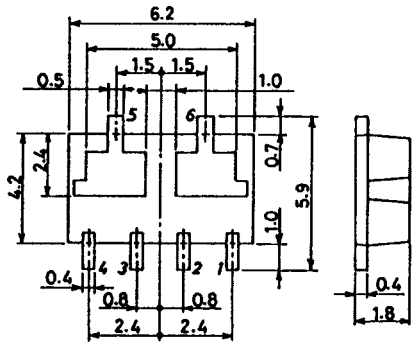
- Composite type composed of a low ON-resistance P-channel MOSFET for ultrahigh-speed switching and low-voltage driving and a fast-recovery, low forward -voltage Schottky barrier diode. Facilitates high-density mounting.
- The FX854 is formed with 2 chips, one being equivalent to the 2SJ190 and the other the SB05-05P, placed in one package.

## Package Dimensions

unit:mm

2119

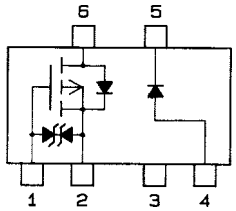
[FX854]




1:Gate
2:Source
3:No connection
4:Anode
5:Cathode
6:Drain

SANYO:XP6
(Bottom view)

## Electrical Connection




1:Gate
2:Source
3:No connection
4:Anode
5:Cathode
6:Drain

(Top view)

## Specifications

### Absolute Maximum Ratings at Ta = 25˚C

| Parameter | Symbol | Conditions | Ratings | Unit |
|---|---|---|---|---|
| [MOSFET] | | | | |
| Drain-to-Source Voltage | $V_{DSS}$ | | –60 | V |
| Gate-to-Source Voltage | $V_{GSS}$ | | ±15 | V |
| Drain Current (DC) | $I_D$ | | –1 | A |
| Drain Current (Pulse) | $I_{DP}$ | PW≤10μs, duty cycle≤1% | –4 | A |
| Allowable Power Dissipation | $P_D$ | Tc=25˚C | 6 | W |
| | $P_D$ | Mounted on ceramic board (750mm$^2$×0.8mm) | 1.5 | W |
| Channel Temperature | Tch | | 150 | ˚C |
| Storage Temperature | Tstg | | –55 to +150 | ˚C |
| [SBD] | | | | |
| Repetitive Peak Reverse Voltage | $V_{RRM}$ | | 50 | V |
| Non-repetitive Peak Reverse Surge Voltage | $V_{RSM}$ | | 55 | V |
| Average Rectified Current | $I_O$ | | 500 | mA |
| Surge Forward Current | $I_{FSM}$ | 50Hz sine wave, 1cycle | 5 | A |
| Junction Temperature | Tj | | –55 to +125 | ˚C |
| Storage Temperature | Tstg | | –55 to +125 | ˚C |

· Marking:854

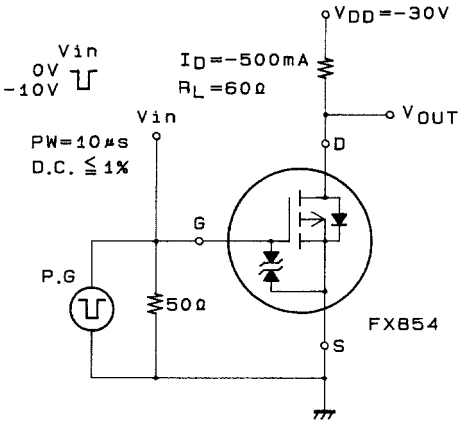
Continued on next page.

Continued from preceding page.

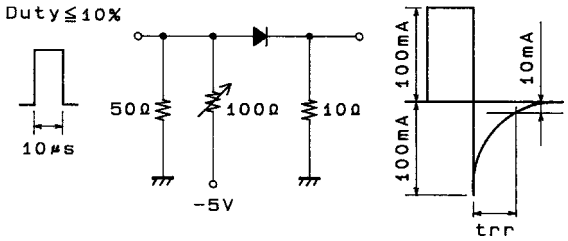
**Electrical Characteristics at Ta = 25˚C**

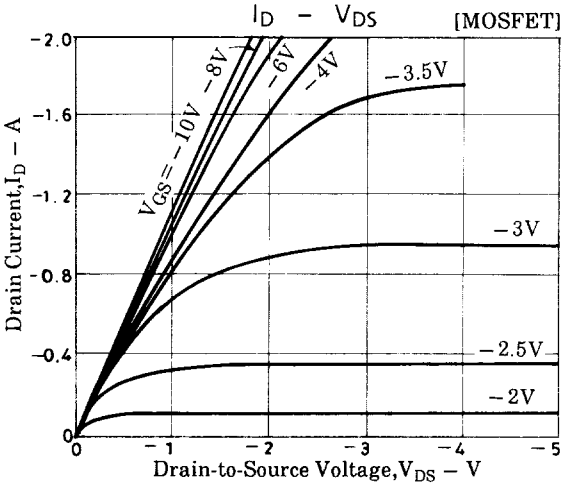
| Parameter | Symbol | Conditions | Ratings | | | Unit |
|---|---|---|---|---|---|---|
| | | | min | typ | max | |
| [MOSFET] | | | | | | |
| D-S Breakdown Voltage | $V_{(BR)DSS}$ | $I_D$=–1mA, $V_{GS}$=0 | –60 | | | V |
| Zero-Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$=–60V, $V_{GS}$=0 | | | –100 | µA |
| Gate-to-Source Leakage Current | $I_{GSS}$ | $V_{GS}$=±12V, $V_{DS}$=0 | | | ±10 | µA |
| Cutoff Voltage | $V_{GS(off)}$ | $V_{DS}$=–10V, $I_D$=–1mA | –1.0 | | –2.0 | V |
| Forward Transfer Admittance | $\|Y_{fs}\|$ | $V_{DS}$=–10V, $I_D$=–500mA | 0.6 | 1.0 | | S |
| Static Drain-to-Source ON-State Resistance | $R_{DS(on)}$ | $I_D$=–500mA, $V_{GS}$=–10V | | 0.9 | 1.2 | Ω |
| | $R_{DS(on)}$ | $I_D$=–500mA, $V_{GS}$=–4V | | 1.2 | 1.6 | Ω |
| Input Capacitance | Ciss | $V_{DS}$=–20V, f=1MHz | | 160 | | pF |
| Output Capacitance | Coss | $V_{DS}$=–20V, f=1MHz | | 60 | | pF |
| Reverse Transfer Capacitance | Crss | $V_{DS}$=–20V, f=1MHz | | 10 | | pF |
| Turn-ON Delay Time | $t_{d(on)}$ | See specified Test Circuit | | 10 | | ns |
| Rise Time | $t_r$ | See specified Test Circuit | | 13 | | ns |
| Turn-OFF Delay Time | $t_{d(off)}$ | See specified Test Circuit | | 70 | | ns |
| Fall Time | $t_f$ | See specified Test Circuit | | 30 | | ns |
| Diode Forward Voltage | $V_{SD}$ | $I_S$=–1A, $V_{GS}$=0 | | –0.9 | | V |
| [SBD] | | | | | | |
| Reverse Voltage | $V_R$ | $I_R$=200µA | 50 | | | V |
| Forward Voltage | $V_F$ | $I_F$=500mA | | | 0.55 | V |
| Reverse Current | $I_R$ | $V_R$=25V | | | 50 | µA |
| Interterminal Capacitance | C | $V_R$=10V, f=1MHz Cycle | | 18 | | pF |
| Reverse Recovery Time | trr | $I_F$=$I_R$=100mA, See specified Test CIrcuit | | | 10 | ns |
| Thermal Resistance | Rthj-a | Mounted on ceramic board (750mm²×0.8mm) | | 100 | | ˚C/W |

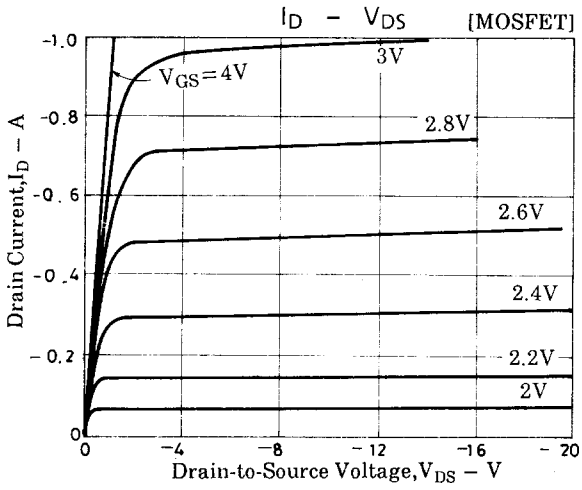
## Switching Time Test CIrcuit [MOSFET]

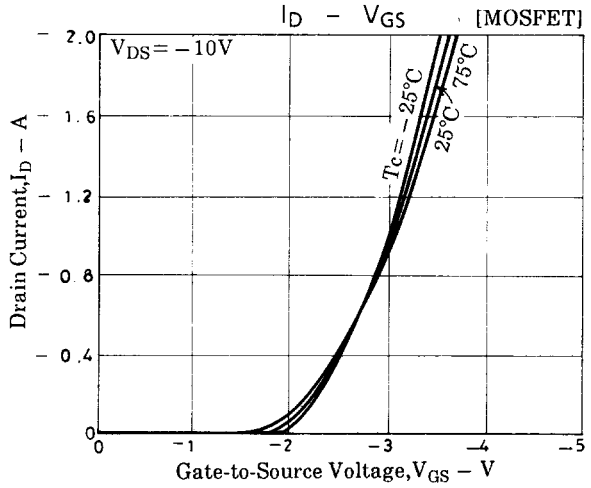


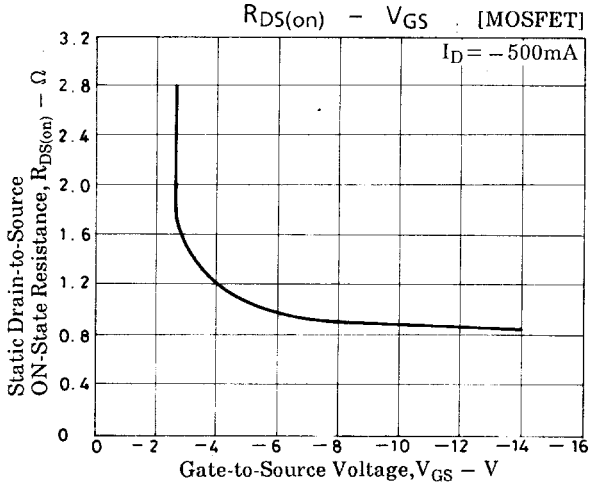

## Trr Test Circuit [SBD]

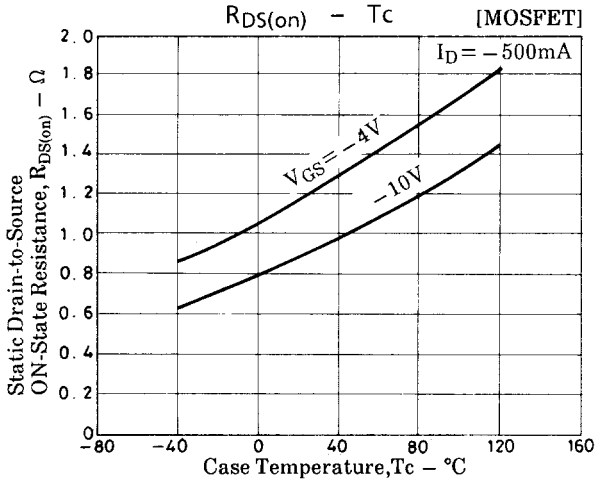


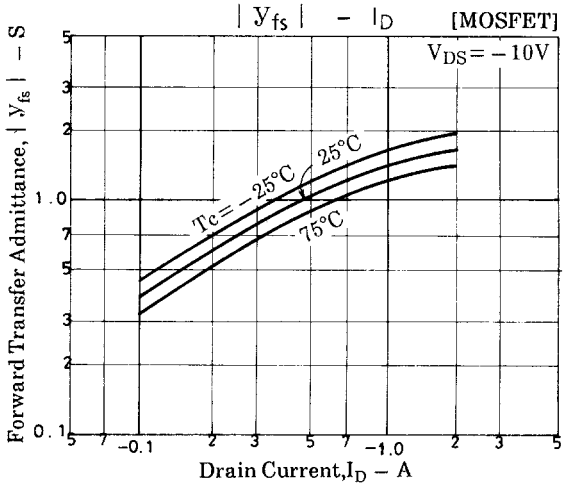



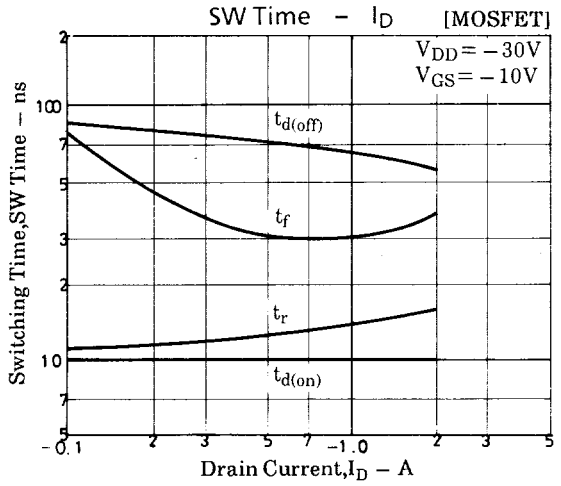



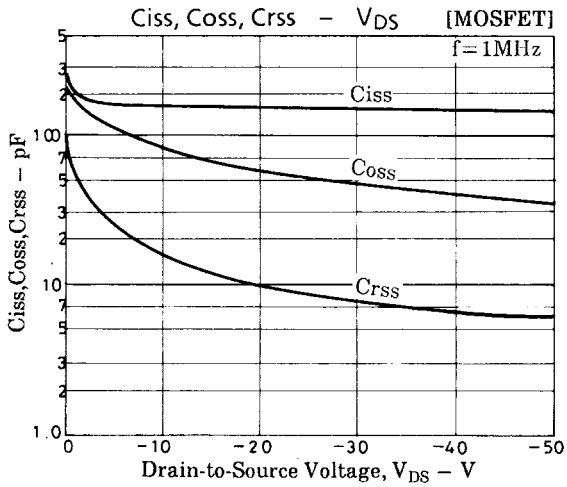

ID – VGS [MOSFET]
VDS = –10V
Tc = –25°C
25°C
75°C
Drain Current, ID – A
Gate-to-Source Voltage, VGS – V

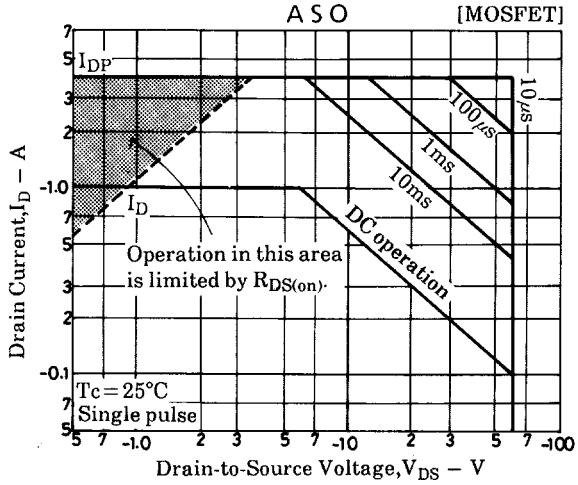

RDS(on) – VGS [MOSFET]
ID = –500mA
Static Drain-to-Source ON-State Resistance, RDS(on) – Ω
Gate-to-Source Voltage, VGS – V

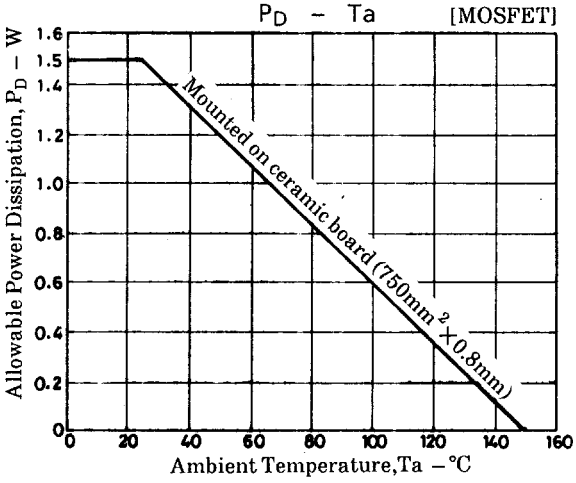

RDS(on) – Tc [MOSFET]
ID = –500mA
VGS = –4V
–10V
Static Drain-to-Source ON-State Resistance, RDS(on) – Ω
Case Temperature, Tc – °C


| yfs | – ID [MOSFET]
VDS = –10V
Tc = –25°C
25°C
75°C
Forward Transfer Admittance, | yfs | – S
Drain Current, ID – A


SW Time – ID [MOSFET]
VDD = –30V
VGS = –10V
td(off)
tf
tr
td(on)
Switching Time, SW Time – ns
Drain Current, ID – A


Ciss, Coss, Crss – VDS [MOSFET]
f = 1MHz
Ciss
Coss
Crss
Ciss, Coss, Crss – pF
Drain-to-Source Voltage, VDS – V


ASO [MOSFET]
IDP
ID
100μs
1ms
10ms
DC operation
Operation in this area is limited by RDS(on).
Tc = 25°C
Single pulse
Drain Current, ID – A
Drain-to-Source Voltage, VDS – V


PD – Ta [MOSFET]
Mounted on ceramic board (750mm² × 0.8mm)
Allowable Power Dissipation, PD – W
Ambient Temperature, Ta – °C