



SANYO Semiconductors

DATA SHEET

# BFL4004 — N-Channel Silicon MOSFET

## General-Purpose Switching Device Applications

### Features

- ON-resistance  $R_{DS(on)}=1.9\Omega$  (typ.)
- Input capacitance  $C_{iss}=710pF$  (typ.)
- 10V drive

### Specifications

Absolute Maximum Ratings at  $T_a=25^\circ C$

Parameter	Symbol	Conditions	Ratings	Unit
Drain-to-Source Voltage	$V_{DSS}$		800	V
Gate-to-Source Voltage	$V_{GSS}$		$\pm 30$	V
Drain Current (DC)	$I_{Dc}^{*1}$	Limited only by maximum temperature $T_{ch}=150^\circ C$	6.5	A
	$I_{Dpack}^{*2}$	$T_c=25^\circ C$ (SANYO's ideal heat dissipation condition)*3	4.3	A
Drain Current (Pulse)	$I_{DP}$	$PW \leq 10\mu s$ , duty cycle $\leq 1\%$	13	A
Allowable Power Dissipation	$P_D$		2.0	W
		$T_c=25^\circ C$ (SANYO's ideal heat dissipation condition)*3	36	W
Channel Temperature	$T_{ch}$		150	$^\circ C$
Storage Temperature	$T_{stg}$		-55 to +150	$^\circ C$
Avalanche Energy (Single Pulse) *4	$E_{AS}$		241	mJ
Avalanche Current *5	$I_{AV}$		6.5	A

Note : \*1 Shows chip capability

\*2 Package limited

\*3 SANYO's condition is radiation from backside.

The method is applying silicone grease to the backside of the device and attaching the device to water-cooled radiator made of aluminium.

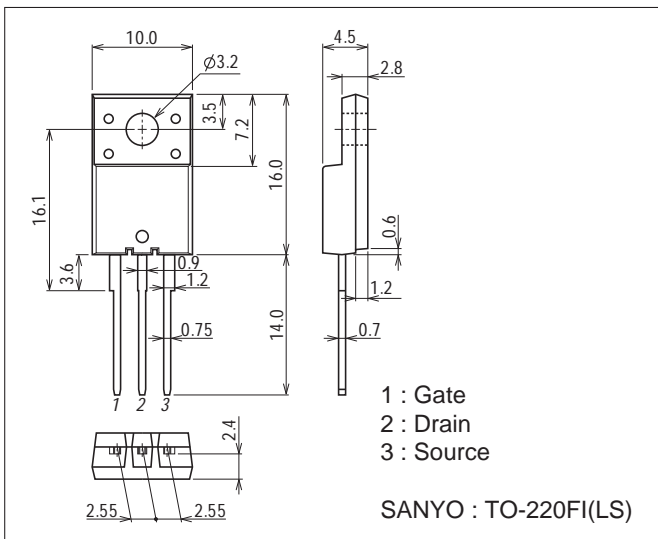
\*4  $V_{DD}=99V$ ,  $L=10mH$ ,  $I_{AV}=6.5A$  (Fig.1)

\*5  $L \leq 10mH$ , single pulse

### Package Dimensions

unit : mm (typ)

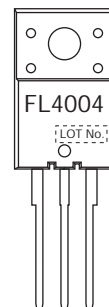
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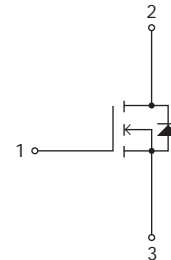
### Product & Package Information

- Package : TO-220FI(LS)
- JEITA, JEDEC : SC-67, SOT-186A, TO-220F
- Minimum Packing Quantity : 100 pcs./bag or 50pcs./magazine

### Marking



### Electrical Connection



Electrical Characteristics at Ta=25°C

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	$I_D=10mA, V_{GS}=0V$	800			V
Zero-Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=640V, V_{GS}=0V$			1.0	mA
Gate-to-Source Leakage Current	$I_{GSS}$	$V_{GS}=\pm 30V, V_{DS}=0V$			$\pm 100$	nA
Cutoff Voltage	$V_{GS(off)}$	$V_{DS}=10V, I_D=1mA$	2.0		4.0	V
Forward Transfer Admittance	$ y_{fs} $	$V_{DS}=20V, I_D=3.25A$	1.7	3.4		S
Static Drain-to-Source On-State Resistance	$R_{DS(on)}$	$I_D=3.25A, V_{GS}=10V$		1.9	2.5	$\Omega$
Input Capacitance	$C_{iss}$	$V_{DS}=30V, f=1MHz$		710		pF
Output Capacitance	$C_{oss}$	$V_{DS}=30V, f=1MHz$		120		pF
Reverse Transfer Capacitance	$C_{rss}$	$V_{DS}=30V, f=1MHz$		42		pF
Turn-ON Delay Time	$t_{d(on)}$	See Fig.2		17		ns
Rise Time	$t_r$	See Fig.2		44		ns
Turn-OFF Delay Time	$t_{d(off)}$	See Fig.2		130		ns
Fall Time	$t_f$	See Fig.2		44		ns
Total Gate Charge	$Q_g$	$V_{DS}=200V, V_{GS}=10V, I_D=6.5A$		36		nC
Gate-to-Source Charge	$Q_{gs}$	$V_{DS}=200V, V_{GS}=10V, I_D=6.5A$		6.2		nC
Gate-to-Drain "Miller" Charge	$Q_{gd}$	$V_{DS}=200V, V_{GS}=10V, I_D=6.5A$		18		nC
Diode Forward Voltage	$V_{SD}$	$I_S=6.5A, V_{GS}=0V$		0.85	1.2	V
Reverse Recovery Time	$t_{rr}$	See Fig.3		780		ns
Reverse Recovery Charge	$Q_{rr}$	$I_S=6.5A, V_{GS}=0V, di/dt=100A/\mu s$		5400		nC

Fig.1 Avalanche Resistance Test Circuit

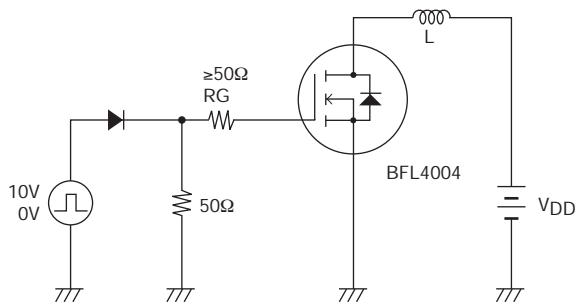


Fig.2 Switching Time Test Circuit

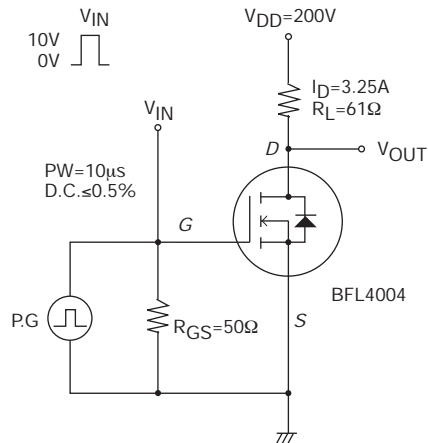
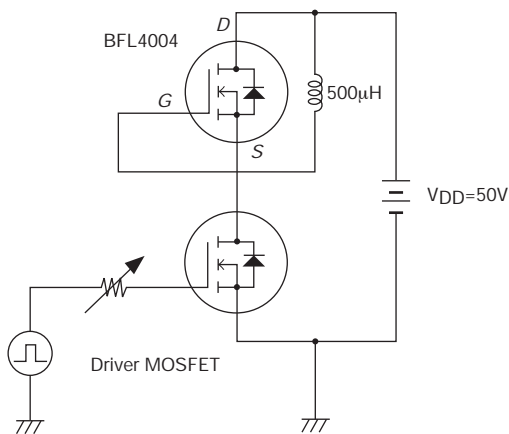
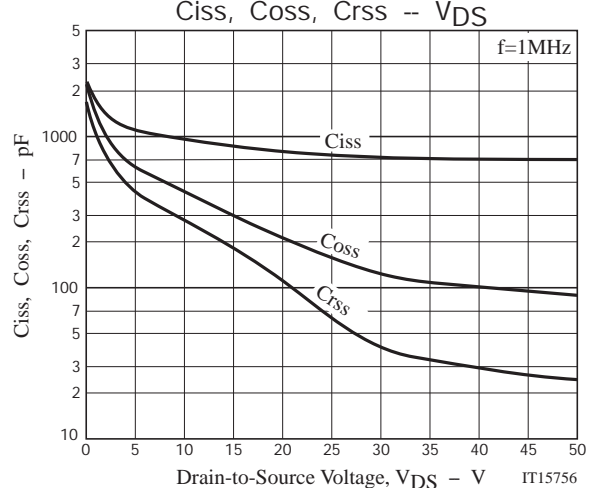
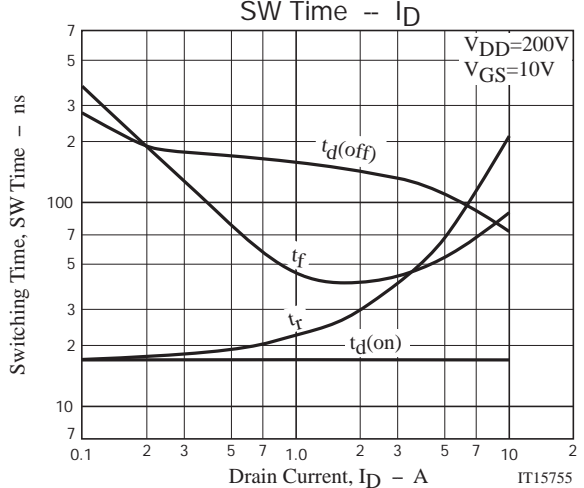
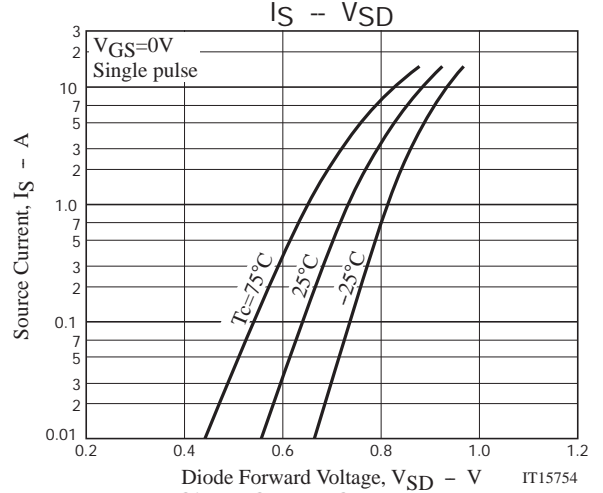
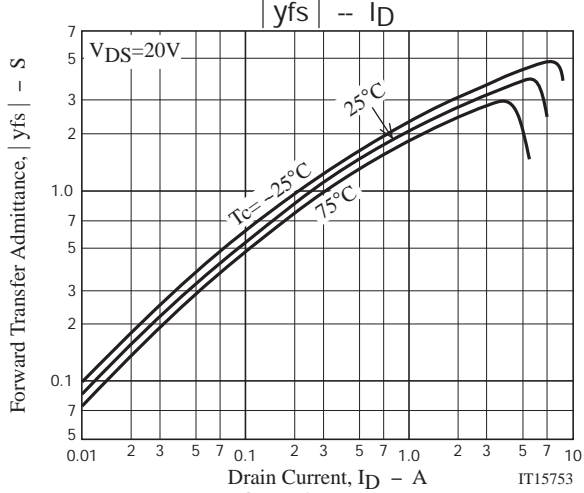
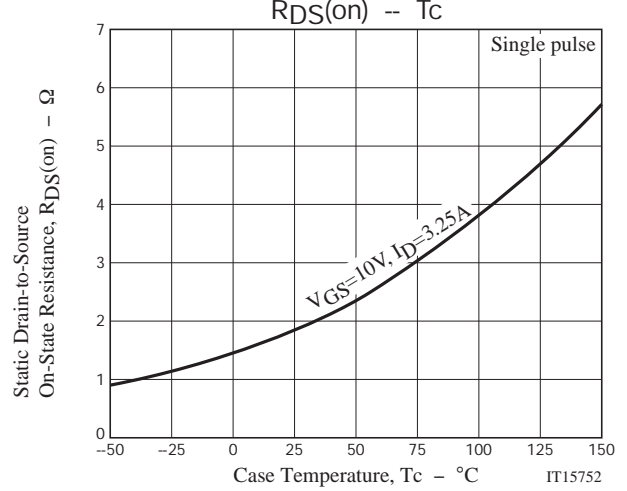
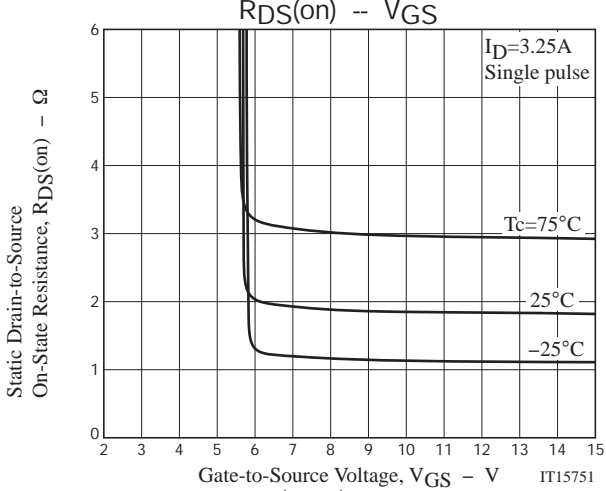
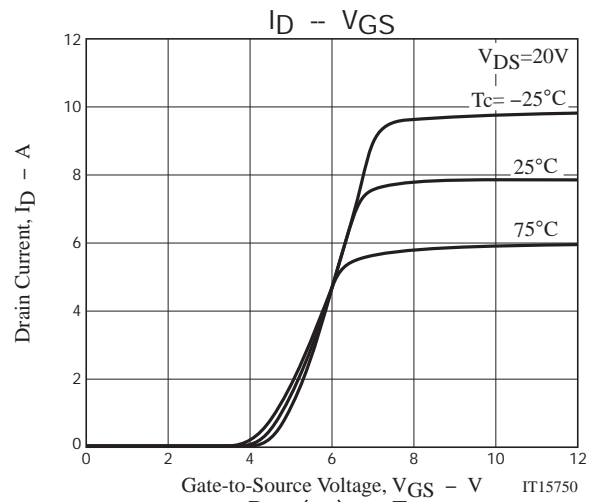
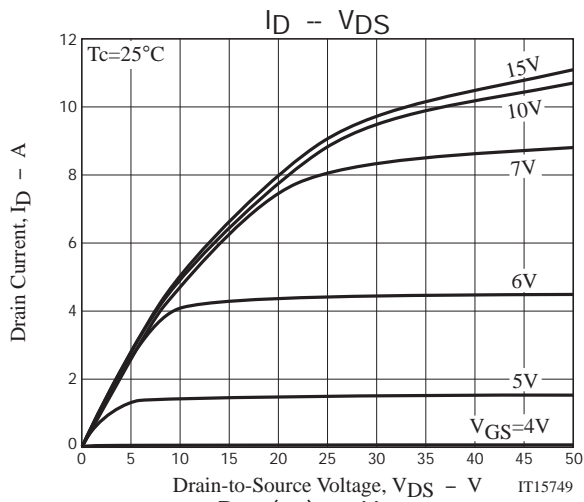
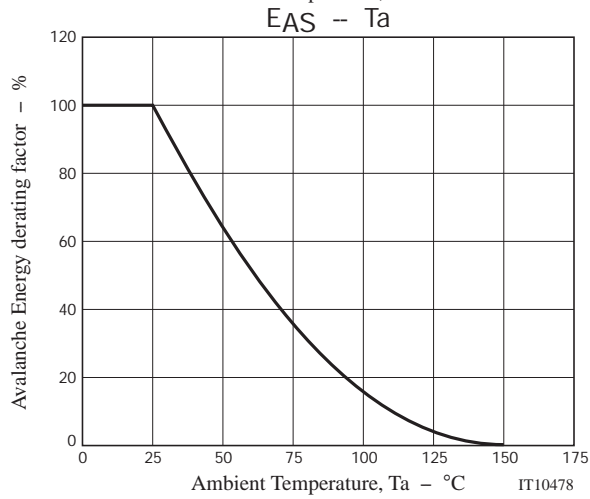
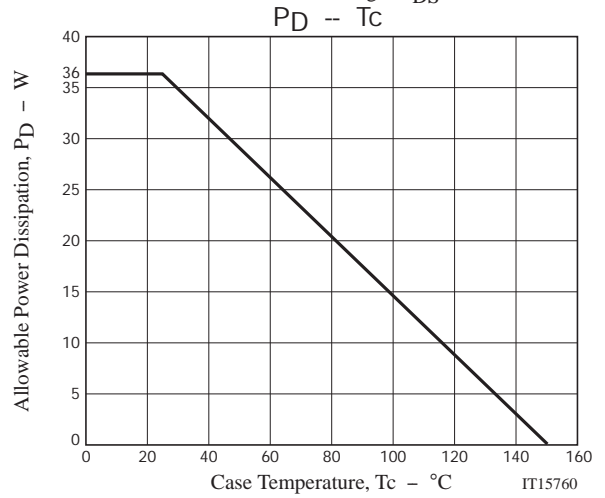
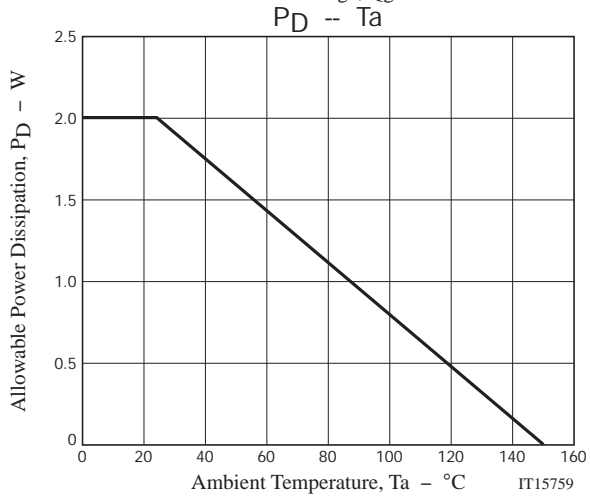
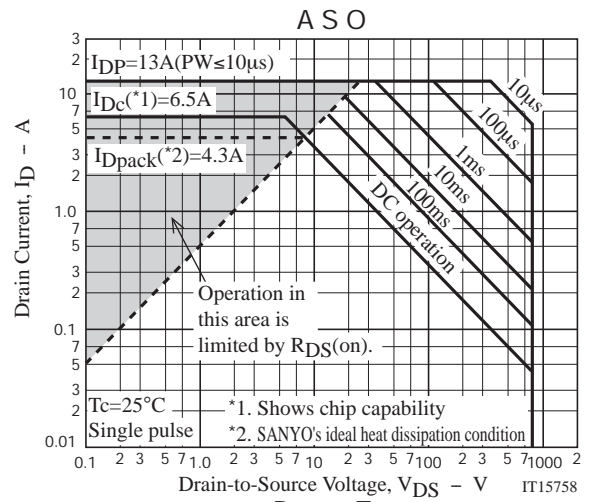
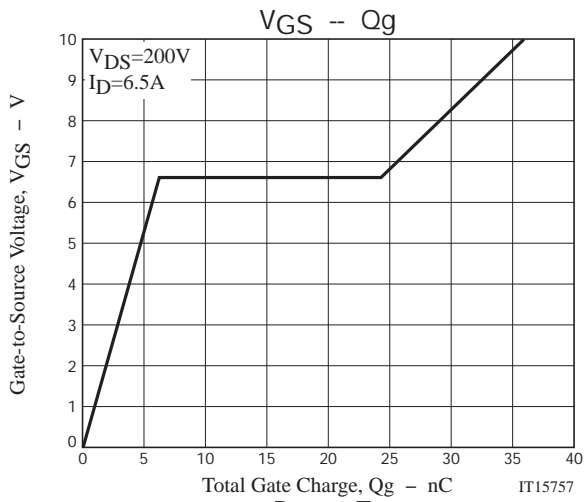


Fig.3  $t_{rr}$  Reverse Recovery Time Test Circuit







Note on usage : Since the BFL4004 is a MOSFET product, please avoid using this device in the vicinity of highly charged objects.

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