Ordering number : ENA1689A

BFL4007

N-Channel Power MOSFET
600V, 14A, 0.68Ω, TO-220F-3FS

ON Semiconductor®

http://onsemi.com

Features

- Reverse recovery time t_{rr}=95ns (typ.)
- Input capacitance Ciss=1200pF (typ.)
- ON-resistance $R_{DS}(on)$=0.52Ω (typ.)
- 10V drive

Specifications

Absolute Maximum Ratings at Ta=25°C

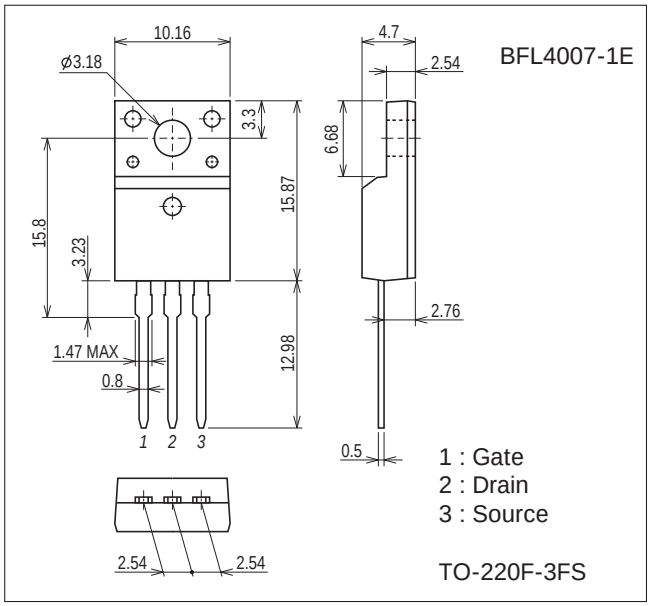
Parameter	Symbol	Conditions	Ratings	Unit
Drain to Source Voltage	V_{DSS}		600	V
Gate to Source Voltage	V_{GSS}		±30	V
Drain Current (DC)	I_{Dc}*1	Limited only by maximum temperature Tch=150°C	14	A
	I_{Dpack}*2	Tc=25°C (Our ideal heat dissipation condition)*3	8.7	A
Drain Current (Pulse)	I_{DP}	PW≤10μs, duty cycle≤1%	49	A
Source to Drain Diode Forward Current (DC)	I_S		14	A
Source to Drain Diode Forward Current (Pulse)	I_{SP}	PW≤10μs, duty cycle≤1%	49	A
Allowable Power Dissipation	P_D		2.0	W
		Tc=25°C (Our ideal heat dissipation condition)*3	40	W
Channel Temperature	Tch		150	°C
Storage Temperature	Tstg		−55 to +150	°C
Avalanche Energy (Single Pulse) *4	E_{AS}		196	mJ
Avalanche Current *5	I_{AV}		8.5	A

Note :*1 Shows chip capability
*2 Package limited
*3 Our 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}=50V, L=5mH, I_{AV}=8.5A (Fig.1)
*5 L≤5mH, single pulse

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

Package Dimensions

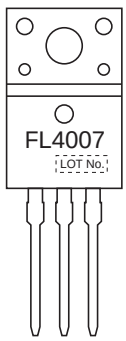
unit : mm (typ)
7528-001



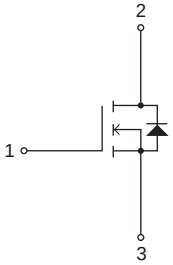
Ordering & Package Information

Device	Package	Shipping	memo
BFL4007-1E	TO-220F-3FS SC-67	50 pcs./tube	Pb-Free

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	600			V
Zero-Gate Voltage Drain Current	I_{DSS}	V_{DS}=480V, V_{GS}=0V			100	μA
Gate to Source Leakage Current	I_{GSS}	V_{GS}=±30V, V_{DS}=0V			±100	nA
Cutoff Voltage	V_{GS}(off)	V_{DS}=10V, I_D=1mA	3		5	V
Forward Transfer Admittance	| yfs |	V_{DS}=10V, I_D=7A	4.3	8.5		S
Static Drain to Source On-State Resistance	R_{DS}(on)	I_D=7A, V_{GS}=10V		0.52	0.68	Ω
Input Capacitance	Ciss	V_{DS}=30V, f=1MHz		1200		pF
Output Capacitance	Coss			220		pF
Reverse Transfer Capacitance	Crss			43		pF
Turn-ON Delay Time	t_d(on)	See Fig.2		27		ns
Rise Time	t_r			72		ns
Turn-OFF Delay Time	t_d(off)			122		ns
Fall Time	t_f			48		ns
Total Gate Charge	Qg	V_{DS}=200V, V_{GS}=10V, I_D=14A		46		nC
Gate to Source Charge	Qgs			8.6		nC
Gate to Drain “Miller” Charge	Qgd			26.4		nC
Diode Forward Voltage	V_{SD}	I_S=14A, V_{GS}=0V		1.1	1.5	V
Reverse Recovery Time	t_{rr}	See Fig.3		95		ns
Reverse Recovery Charge	Q_{rr}	I_S=14A, V_{GS}=0V, di/dt=100A/μs		250		nC

Fig.1 Unclamped Inductive Switching Test Circuit

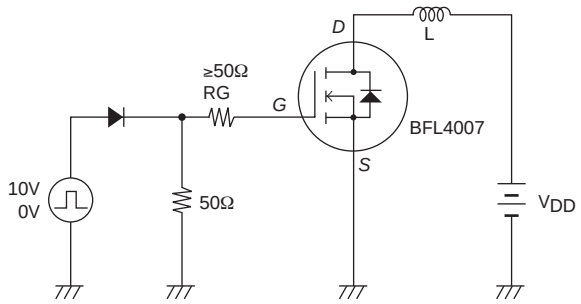


Fig.2 Switching Time Test Circuit

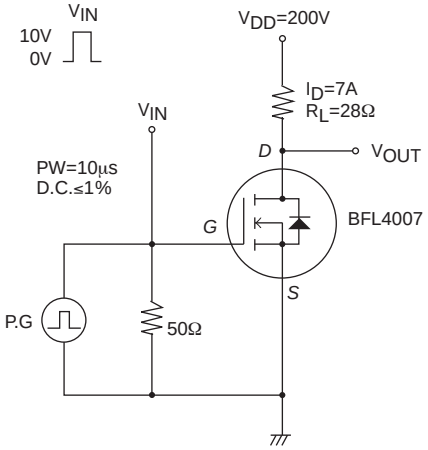
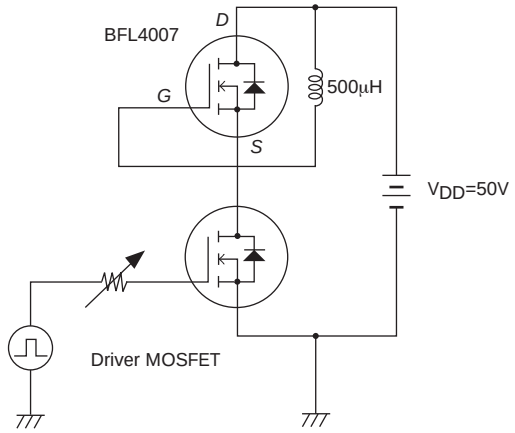
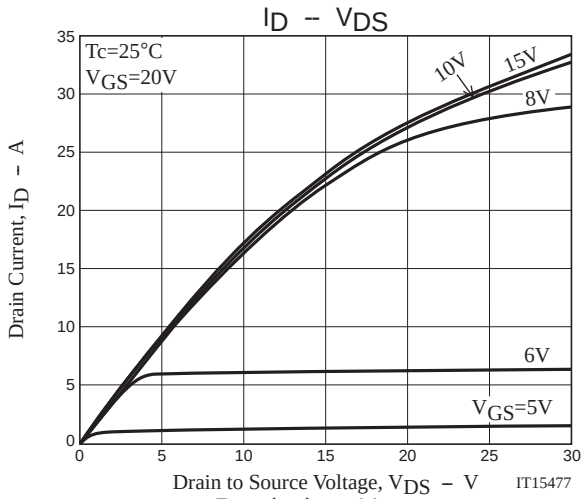
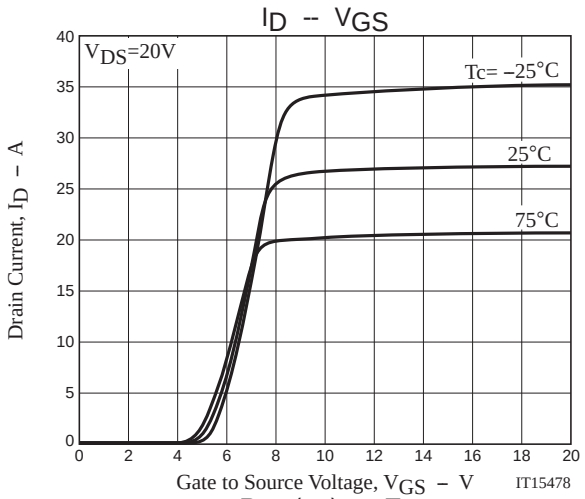
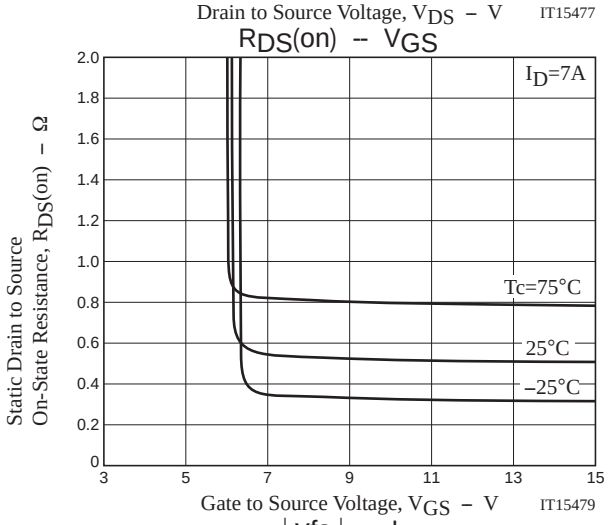


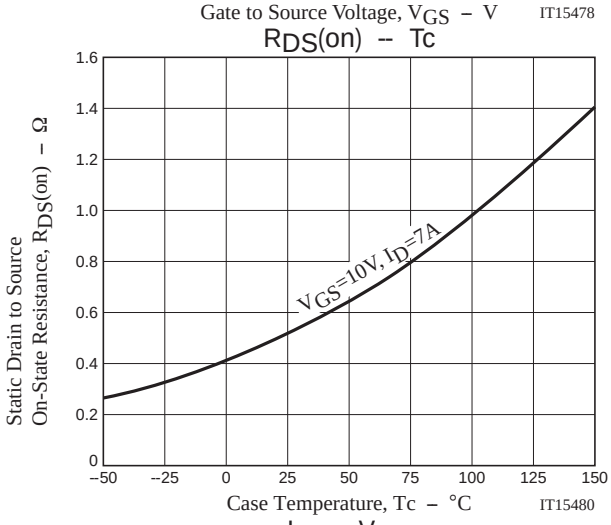
Fig.3 Reverse Recovery Time Test Circuit

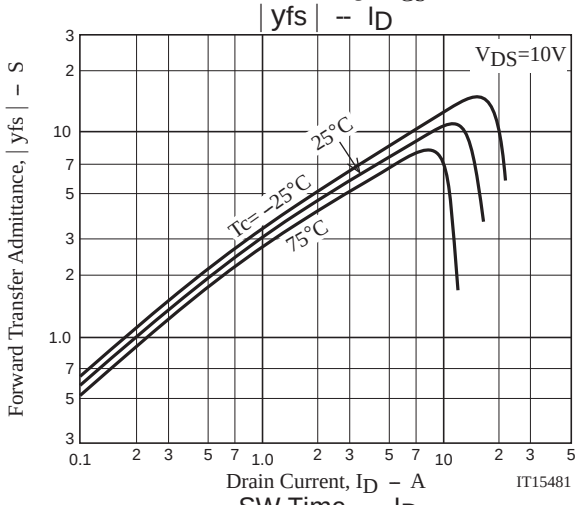


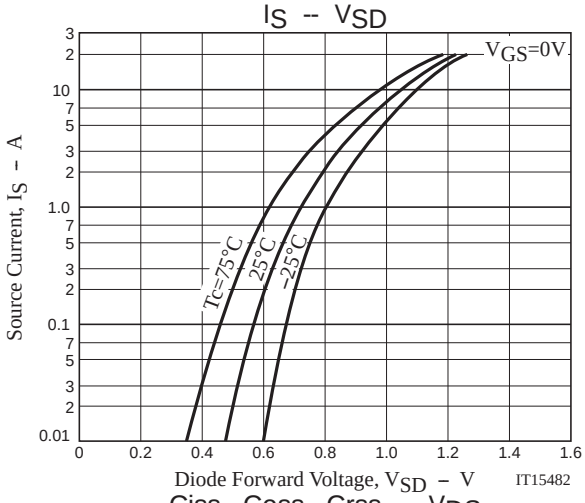

ID -- VDS
Tc=25°C
VGS=20V
10V
15V
8V
6V
VGS=5V
Drain Current, ID – A
Drain to Source Voltage, VDS – V
IT15477

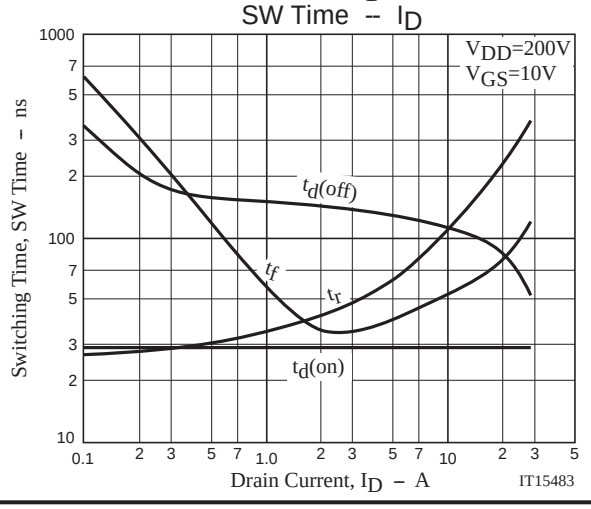

ID -- VGS
VDS=20V
Tc= –25°C
25°C
75°C
Drain Current, ID – A
Gate to Source Voltage, VGS – V
IT15478

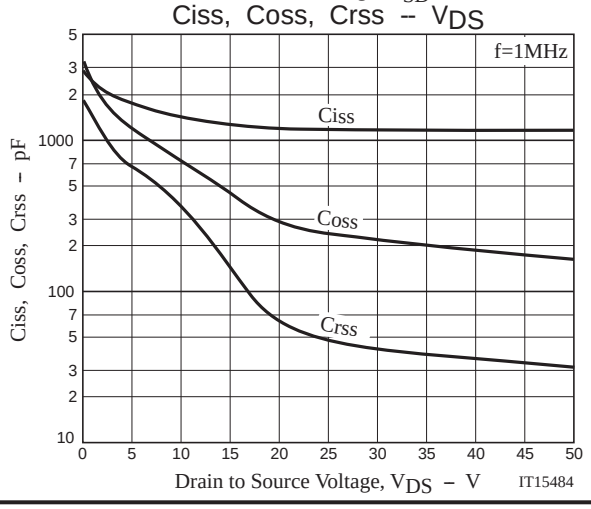

RDS(on) -- VGS
ID=7A
Tc=75°C
25°C
–25°C
Static Drain to Source
On-State Resistance, RDS(on) – Ω
Gate to Source Voltage, VGS – V
IT15479

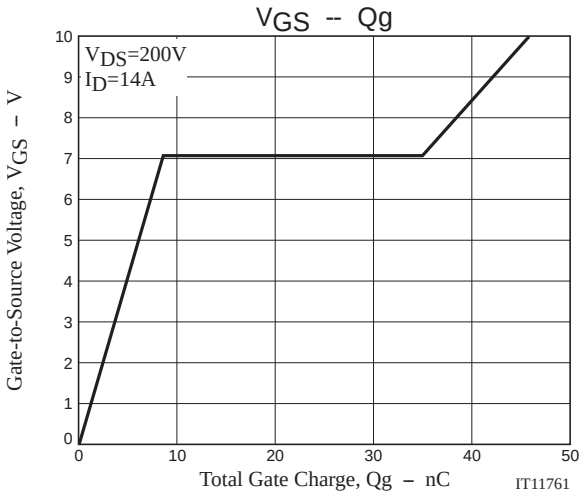

RDS(on) -- Tc
VGS=10V, ID=7A
Static Drain to Source
On-State Resistance, RDS(on) – Ω
Case Temperature, Tc – °C
IT15480

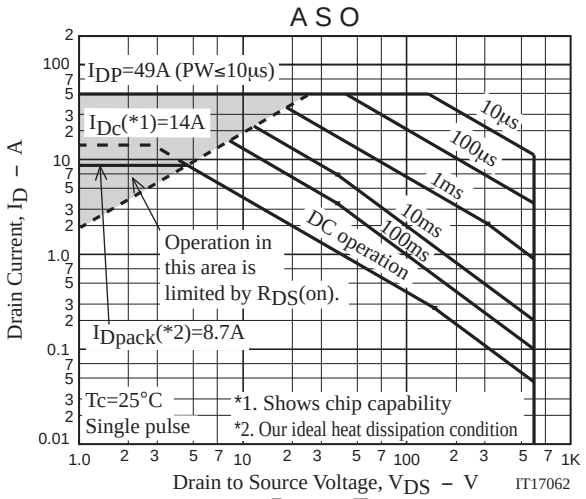

| yfs | -- ID
VDS=10V
25°C
Tc= –25°C
75°C
Forward Transfer Admittance, | yfs | – S
Drain Current, ID – A
IT15481

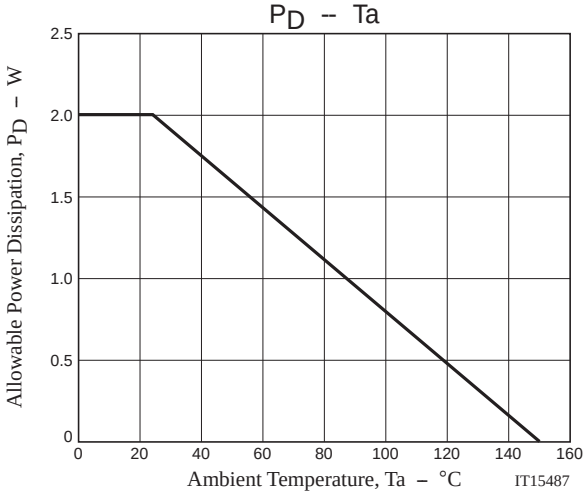

IS -- VSD
VGS=0V
Tc=75°C
25°C
–25°C
Source Current, IS – A
Diode Forward Voltage, VSD – V
IT15482

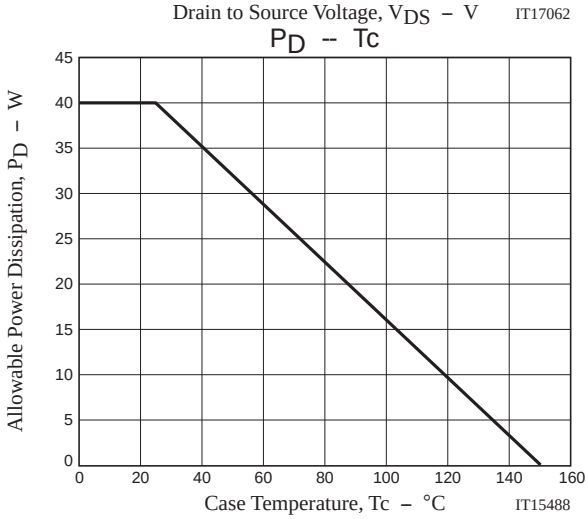

SW Time -- ID
VDD=200V
VGS=10V
td(off)
tf
tr
td(on)
Switching Time, SW Time – ns
Drain Current, ID – A
IT15483

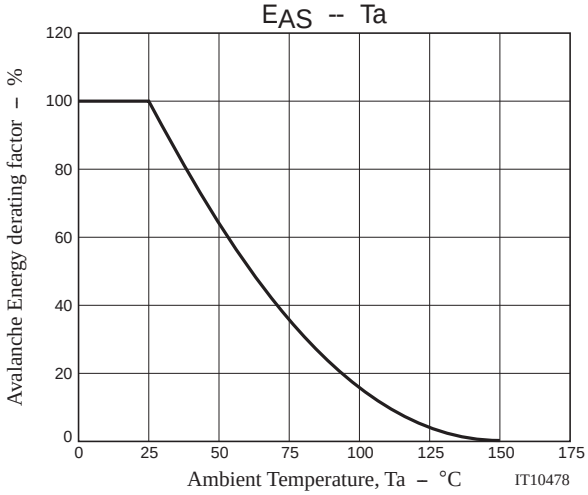

Ciss, Coss, Crss -- VDS
f=1MHz
Ciss
Coss
Crss
Ciss, Coss, Crss – pF
Drain to Source Voltage, VDS – V
IT15484


VGS -- Qg
VDS=200V
ID=14A
Gate-to-Source Voltage, VGS – V
Total Gate Charge, Qg – nC
IT11761


A S O
IDP=49A (PW≤10μs)
IDC(*1)=14A
10μs
100μs
1ms
10ms
100ms
DC operation
Operation in this area is limited by RDS(on).
IDpack(*2)=8.7A
Tc=25°C
Single pulse
*1. Shows chip capability
*2. Our ideal heat dissipation condition
Drain Current, ID – A
Drain to Source Voltage, VDS – V
IT17062

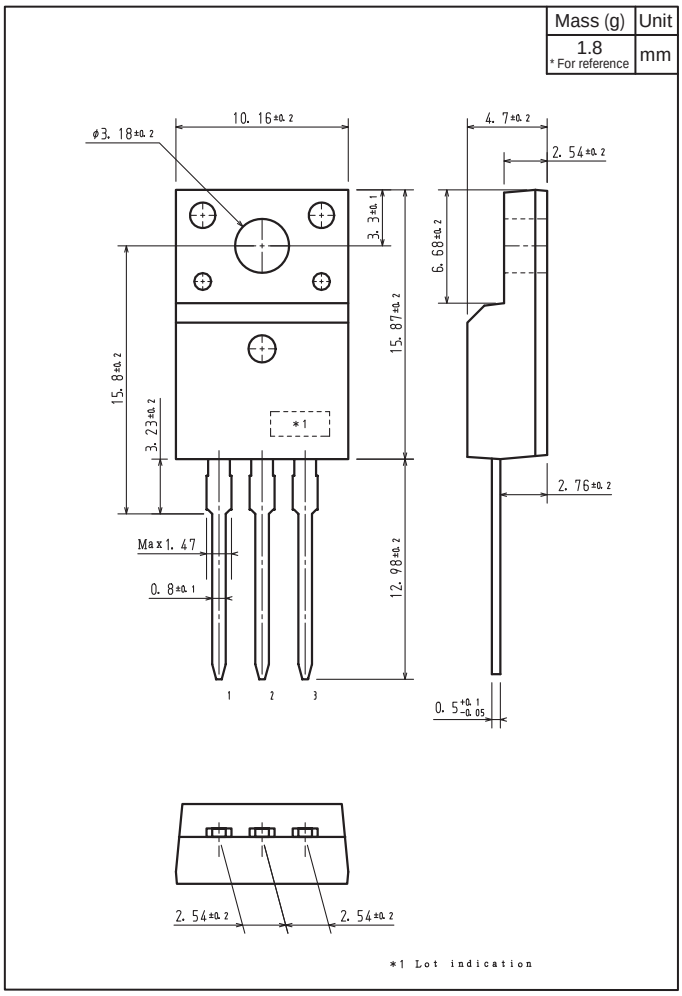

PD -- Ta
Allowable Power Dissipation, PD – W
Ambient Temperature, Ta – °C
IT15487


PD -- Tc
Allowable Power Dissipation, PD – W
Case Temperature, Tc – °C
IT15488


EAS -- Ta
Avalanche Energy derating factor – %
Ambient Temperature, Ta – °C
IT10478

Outline Drawing

BFL4007-1E



Note on usage : Since the BFL4007 is a MOSFET product, please avoid using this device in the vicinity of highly charged objects.