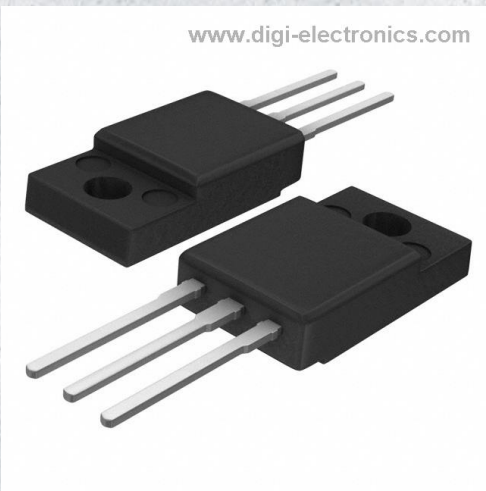
BBL4001-1E Datasheet



https://www.DiGi-Electronics.com

DiGi Electronics Part Number	BBL4001-1E-DG
Manufacturer	onsemi
Manufacturer Product Number	BBL4001-1E
Description	MOSFET N-CH 60V 74A TO220-3 FP
Detailed Description	N-Channel 60 V 74A (Ta) 2W (Ta), 35W (Tc) Through Hole TO-220-3 Fullpack/TO-220F-3SG

Tel: +00 852-30501935

RFQ Email: Info@DiGi-Electronics.com

Purchase and inquiry

Manufacturer Product Number:	Manufacturer:
BBL4001-1E	onsemi
Series:	Product Status:
-	Obsolete
FET Type:	Technology:
N-Channel	MOSFET (Metal Oxide)
Drain to Source Voltage (Vdss):	Current - Continuous Drain (Id) @ 25°C:
60 V	74A (Ta)
Drive Voltage (Max Rds On, Min Rds On):	Rds On (Max) @ Id, Vgs:
4V, 10V	6.1mOhm @ 37A, 10V
Vgs(th) (Max) @ Id:	Gate Charge (Qg) (Max) @ Vgs:
2.6V @ 1mA	135 nC @ 10 V
Vgs (Max):	Input Capacitance (Ciss) (Max) @ Vds:
±20V	6900 pF @ 20 V
FET Feature:	Power Dissipation (Max):
-	2W (Ta), 35W (Tc)
Operating Temperature:	Mounting Type:
150°C (TJ)	Through Hole
Supplier Device Package:	Package / Case:
TO-220-3 Fullpack/TO-220F-3SG	TO-220-3 Full Pack
Base Product Number:	
BBL4001	

Environmental & Export classification

RoHS Status:	Moisture Sensitivity Level (MSL):
ROHS3 Compliant	1 (Unlimited)
REACH Status:	ECCN:
REACH Unaffected	EAR99
HTSUS:	
8541.29.0095	

Ordering number : ENA1356A

BBL4001

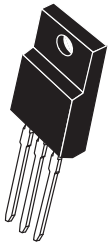
N-Channel Power MOSFET
60V, 74A, 6.1mΩ, TO-220F-3SG

ON Semiconductor®

http://onsemi.com

Features

- ON-resistance $R_{DS}(on)1$=4.7mΩ(typ.)
- Input capacitance Ciss=6,900pF(typ.)
- 4V drive



TO-220F-3SG

Specifications

Absolute Maximum Ratings at Ta=25°C

Parameter	Symbol	Conditions	Ratings	Unit
Drain to Source Voltage	V_{DSS}		60	V
Gate to Source Voltage	V_{GSS}		±20	V
Drain Current (DC)	I_D		74	A
Drain Current (Pulse)	I_{DP}	PW≤10μs, duty cycle≤1%	296	A
Allowable Power Dissipation	P_D		2.0	W
		Tc=25°C	35	W
Junction Temperature	Tj		150	°C
Storage Temperature	Tstg		−55 to +150	°C
Avalanche Energy (Single Pulse) *1	E_{AS}		370	mJ
Avalanche Current *2	I_{AV}		65	A

Note :*1 V_{DD}=30V, L=100μH, I_{AV}=65A(Fig.1)
*2 L≤100μH, Single pulse

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

Electrical Characteristics at Ta=25°C

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Drain to Source Breakdown Voltage	$V_{(BR)DSS}$	I_D=1mA, V_{GS}=0V	60			V
Zero-Gate Voltage Drain Current	I_{DSS}	V_{DS}=60V, V_{GS}=0V			1	μA
Gate to Source Leakage Current	I_{GSS}	V_{GS}=±16V, V_{DS}=0V			±10	μA
Gate Threshold Voltage	$V_{GS}(th)$	V_{DS}=10V, I_D=1mA	1.2		2.6	V
Forward Transconductance	g_{FS}	V_{DS}=10V, I_D=37A	32	53		S
Static Drain to Source On-State Resistance	$R_{DS}(on)1$	I_D=37A, V_{GS}=10V		4.7	6.1	mΩ
	$R_{DS}(on)2$	I_D=37A, V_{GS}=4V		7.0	9.8	mΩ
Input Capacitance	Ciss	V_{DS}=20V, f=1MHz		6900		pF
Output Capacitance	Coss			740		pF
Reverse Transfer Capacitance	Crss			540		pF
Turn-ON Delay Time	$t_d(on)$	See specified Test Circuit.		48		ns
Rise Time	t_r			300		ns
Turn-OFF Delay Time	$t_d(off)$			510		ns
Fall Time	t_f			340		ns
Total Gate Charge	Qg	V_{DS}=30V, V_{GS}=10V, I_D=74A		135		nC
Gate to Source Charge	Qgs			18		nC
Gate to Drain “Miller” Charge	Qgd			32		nC
Diode Forward Voltage	V_{SD}	I_S=74A, V_{GS}=0V		1.0	1.2	V

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

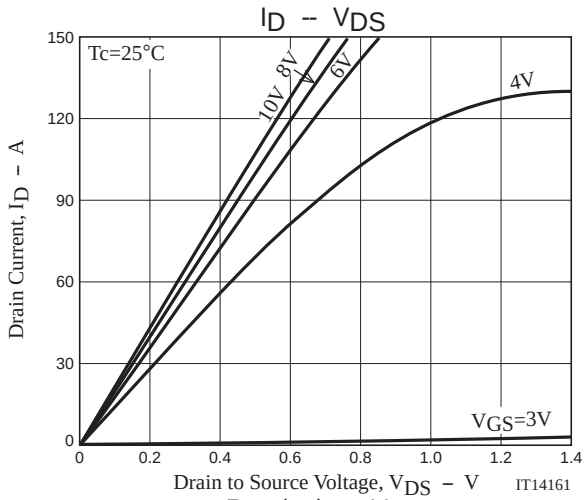
ORDERING INFORMATION

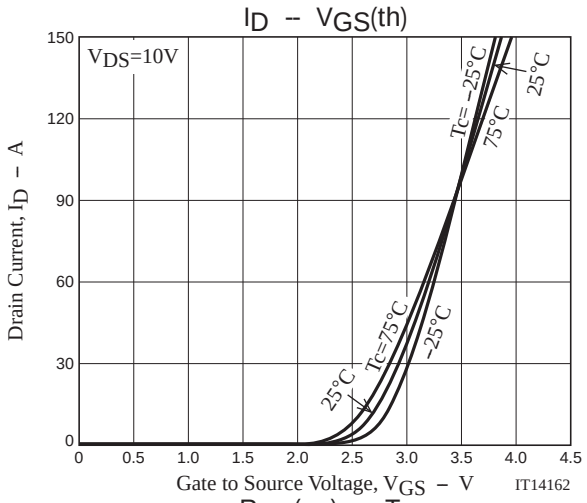
See detailed ordering and shipping information on page 4 of this data sheet.

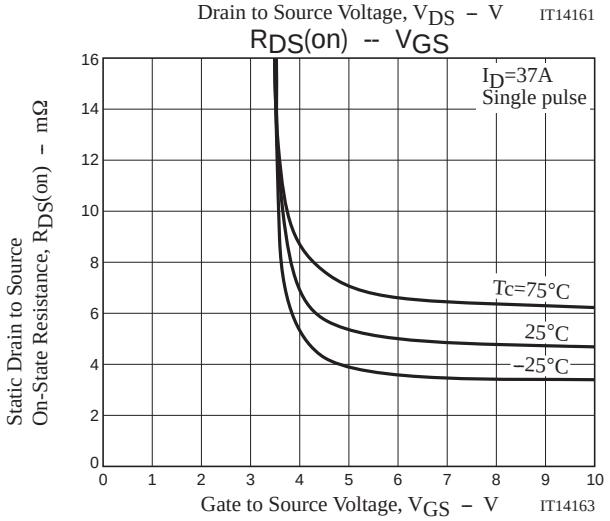
April, 2014

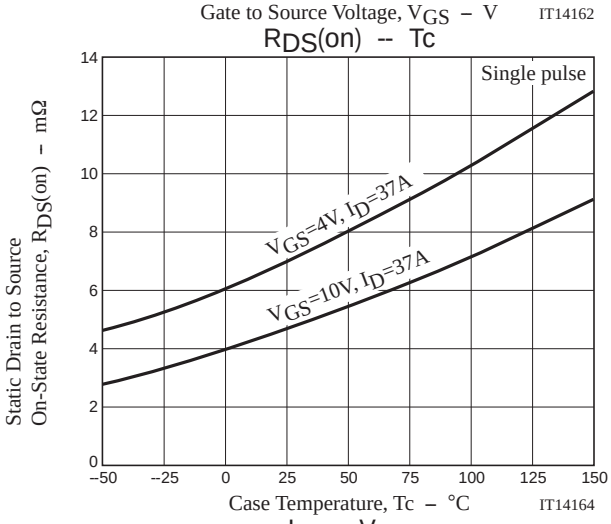
40214 TKIM TC-00003095 / N2608QA TI IM TC-00001754 No. A1356-1/5

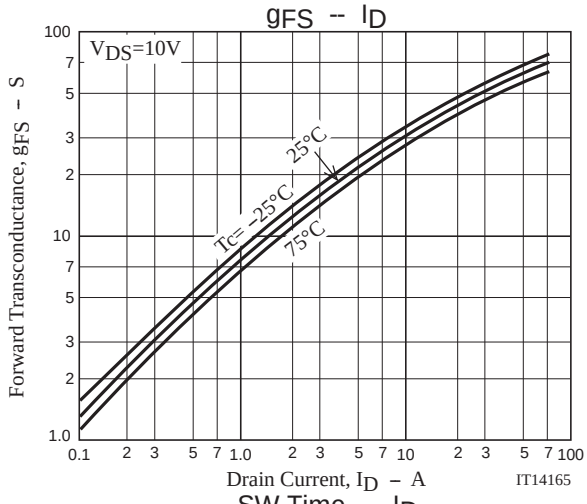
BBL4001

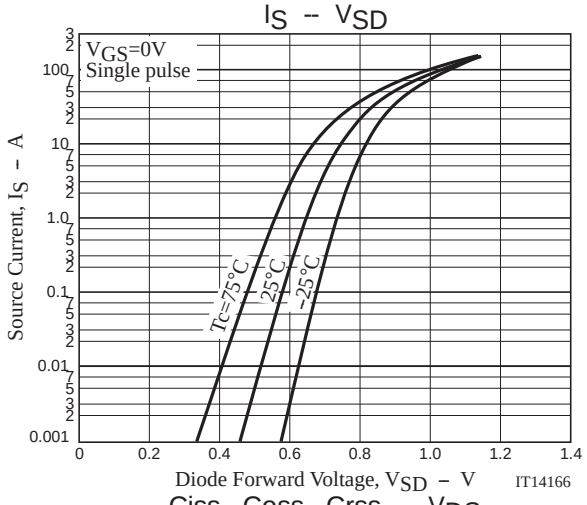

ID -- VDS
Tc=25°C
10V
8V
6V
4V
VGS=3V
Drain Current, ID – A
Drain to Source Voltage, VDS – V
IT14161

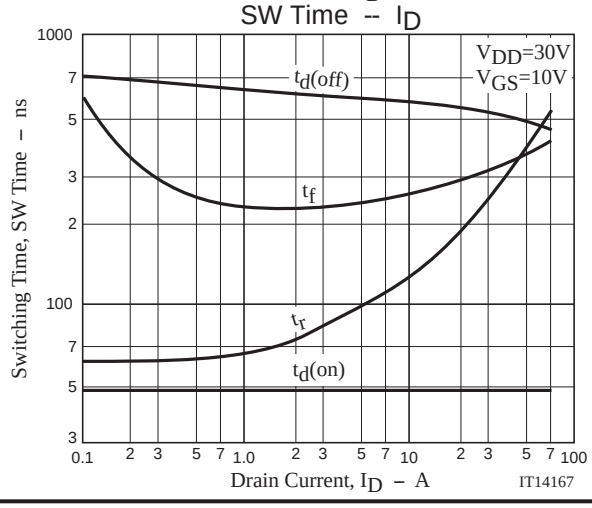

ID -- VGS(th)
VDS=10V
Tc=–25°C
25°C
75°C
Drain Current, ID – A
Gate to Source Voltage, VGS – V
IT14162

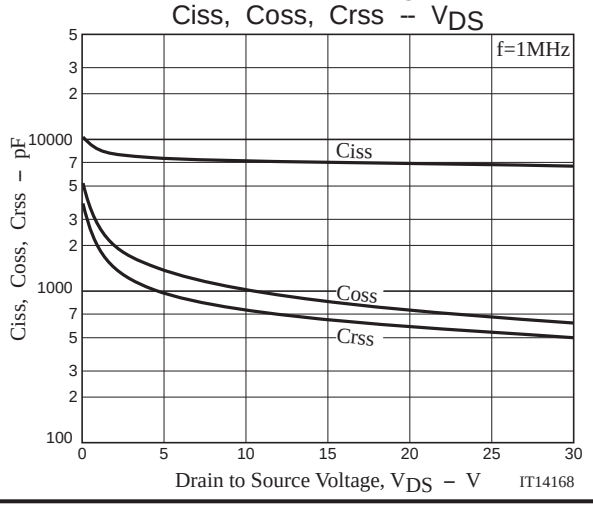

RDS(on) -- VGS
ID=37A
Single pulse
Tc=75°C
25°C
–25°C
Static Drain to Source On-State Resistance, RDS(on) – mΩ
Gate to Source Voltage, VGS – V
IT14163


RDS(on) -- Tc
Single pulse
VGS=4V, ID=37A
VGS=10V, ID=37A
Static Drain to Source On-State Resistance, RDS(on) – mΩ
Case Temperature, Tc – °C
IT14164

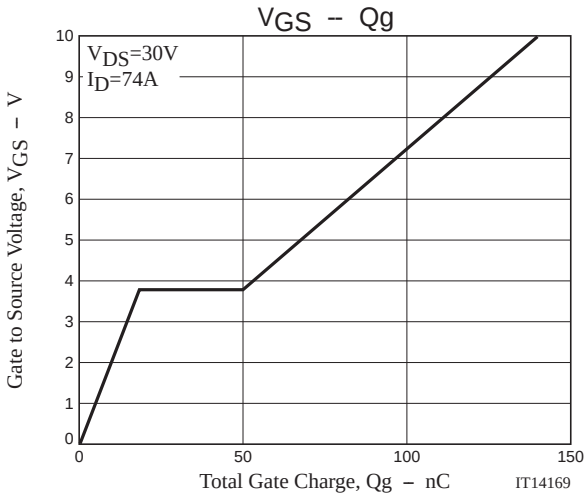

gFS -- ID
VDS=10V
25°C
Tc=–25°C
75°C
Forward Transconductance, gFS – S
Drain Current, ID – A
IT14165

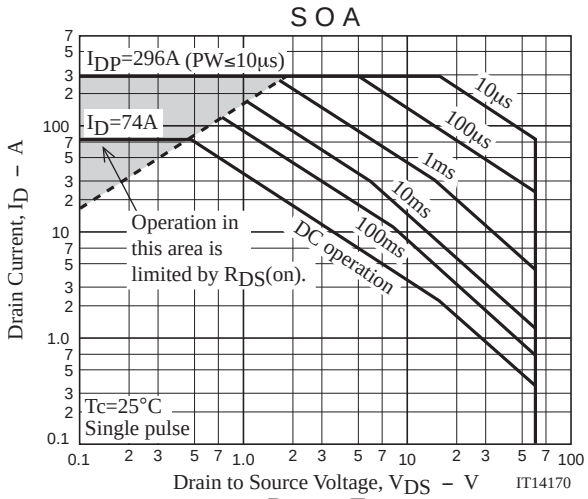

IS -- VSD
VGS=0V
Single pulse
Tc=75°C
25°C
–25°C
Source Current, IS – A
Diode Forward Voltage, VSD – V
IT14166

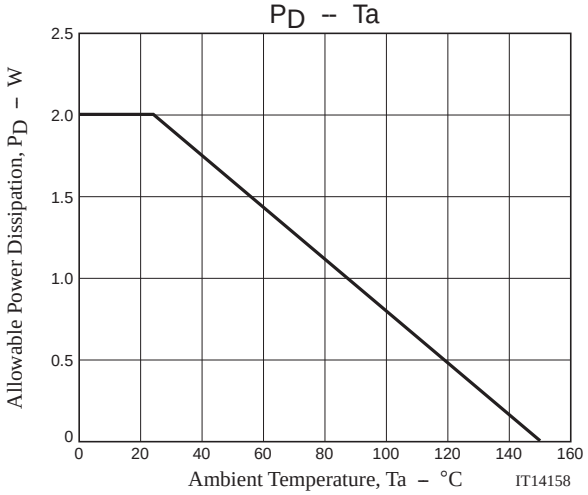

SW Time -- ID
VDD=30V
VGS=10V
td(off)
tf
tr
td(on)
Switching Time, SW Time – ns
Drain Current, ID – A
IT14167

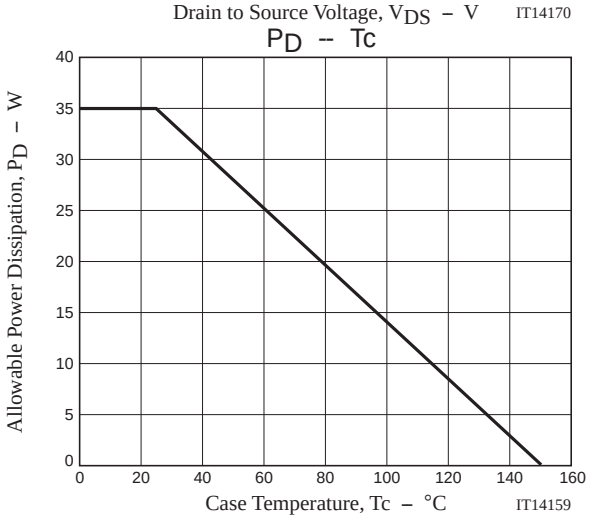

Ciss, Coss, Crss -- VDS
f=1MHz
Ciss
Coss
Crss
Ciss, Coss, Crss – pF
Drain to Source Voltage, VDS – V
IT14168

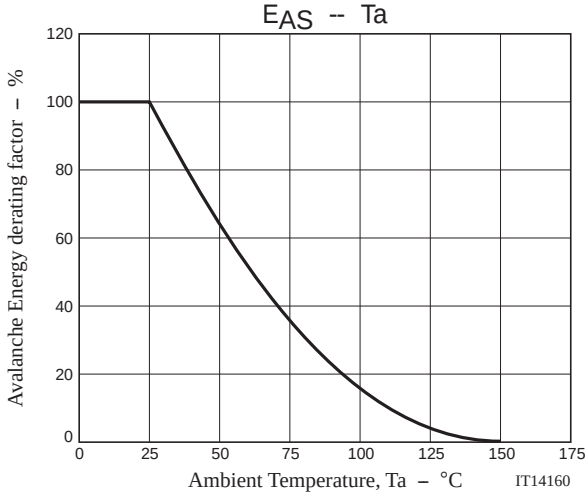
BBL4001

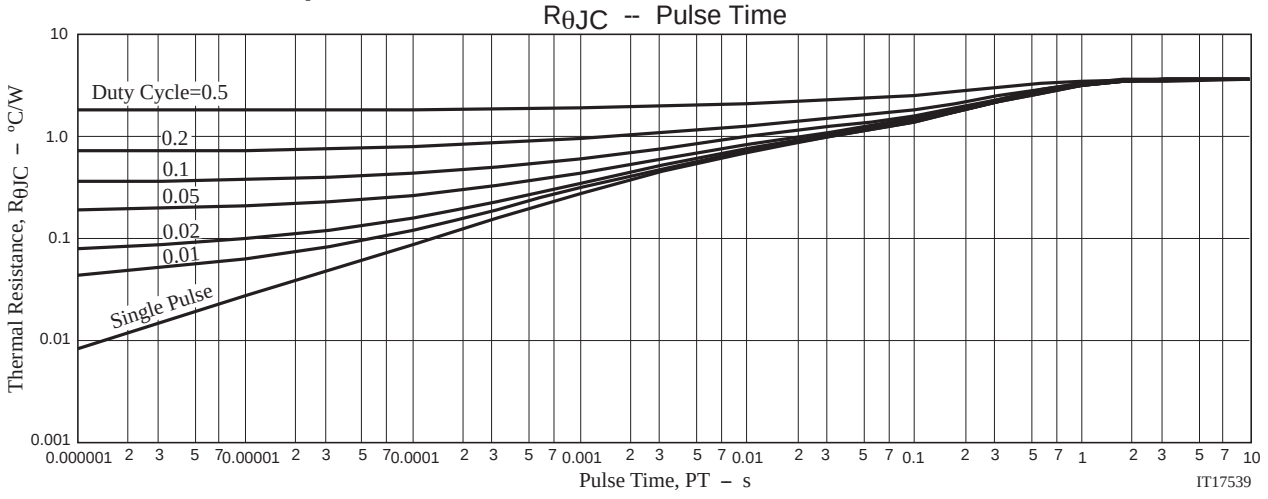

VGS – Qg
VDS=30V
ID=74A
Gate to Source Voltage, VGS – V
Total Gate Charge, Qg – nC
IT14169


S O A
IDP=296A (PW≤10μs)
ID=74A
10μs
100μs
1ms
10ms
100ms
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
IT14170


PD – Ta
Allowable Power Dissipation, PD – W
Ambient Temperature, Ta – °C
IT14158


PD – Tc
Allowable Power Dissipation, PD – W
Case Temperature, Tc – °C
IT14159


EAS – Ta
Avalanche Energy derating factor – %
Ambient Temperature, Ta – °C
IT14160


RθJC – Pulse Time
Duty Cycle=0.5
0.2
0.1
0.05
0.02
0.01
Single Pulse
Thermal Resistance, RθJC – °C/W
Pulse Time, PT – s
IT17539

BBL4001

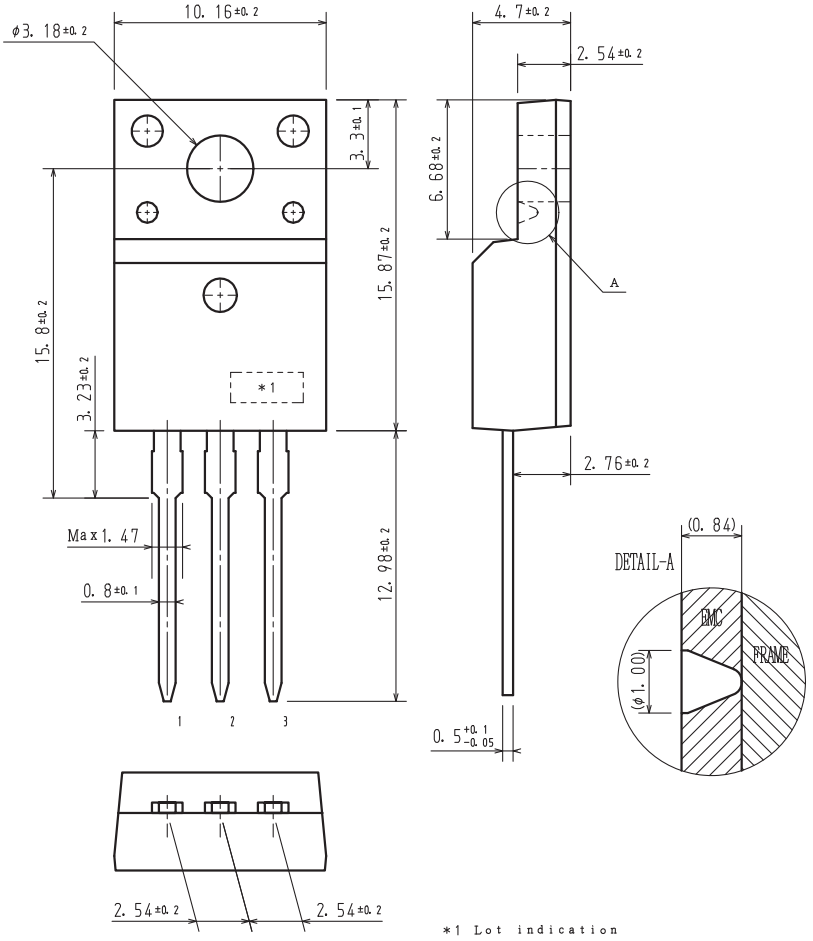
Package Dimensions

BBL4001-1E

TO-220 Fullpack, 3-Lead / TO-220F-3SG

CASE 221AT
ISSUE A
unit : mm

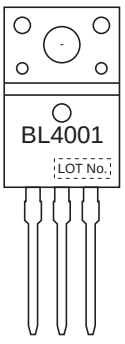
1: Gate
2: Drain
3: Source



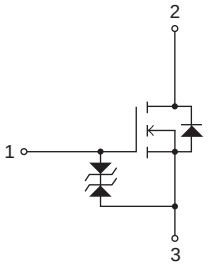
Ordering & Package Information

Device	Package	Shipping	memo
BBL4001-1E	TO-220F-3SG SC-67	50 pcs. / tube	Pb-Free

Marking



Electrical Connection



BBL4001

Fig.1 Unclamped Inductive Switching Test Circuit

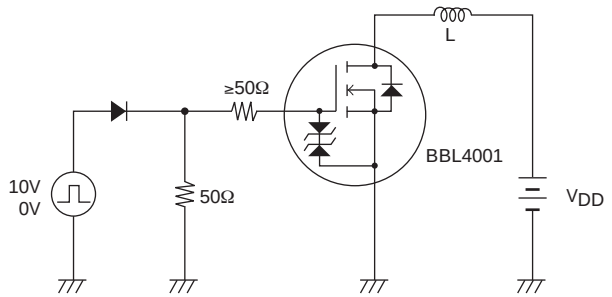
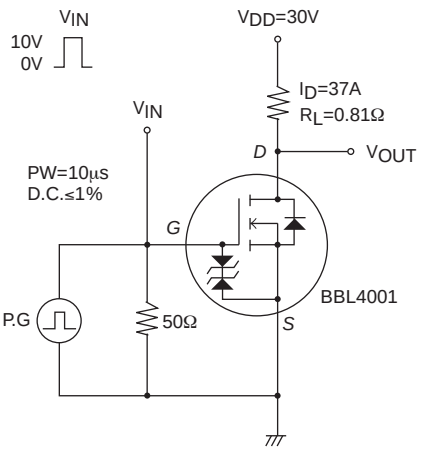


Fig.2 Switching Time Test Circuit



Note on usage : Since the BBL4001 is a MOSFET product, please avoid using this device in the vicinity of highly charged objects.

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