Ordering number : ENA1356

SANYO Semiconductors

DATA SHEET

N-Channel Silicon MOSFET

BBL4001 — General-Purpose Switching Device Applications

Features

- Low ON-resistance.
- Motor drive.
- Avalanche resistance guarantee.

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
Channel Temperature	Tch		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
*2 L≤100μH, Single pulse

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

Marking : BL4001

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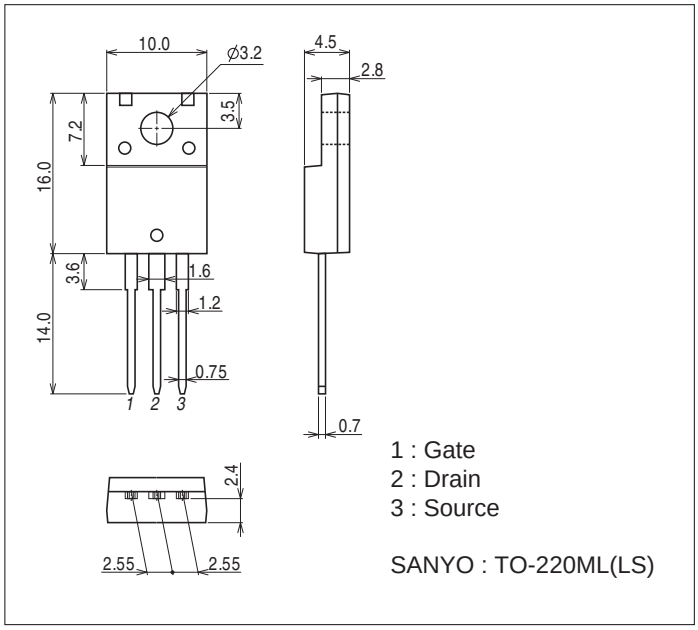
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Cutoff Voltage	V_{GS}(off)	V_{DS}=10V, I_D=1mA	1.2		2.6	V
Forward Transfer Admittance	| yfs |	V_{DS}=10V, I_D=37A	32	53		S
Static Drain-to-Source On-State Resistance	R_{DS}(on)1	I_D=37A, V_{GS}=10V		4.7	6.1	mΩ
	R_{DS}(on)2	I_D=37A, V_{GS}=4V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

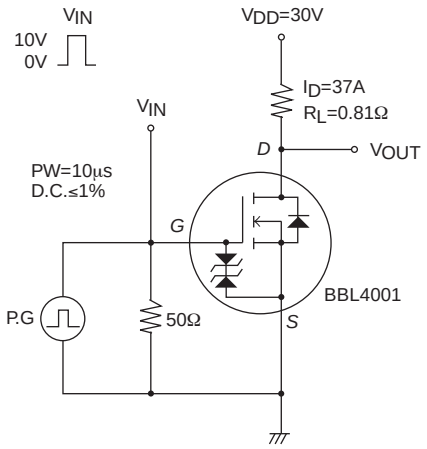
Package Dimensions

unit : mm (typ)

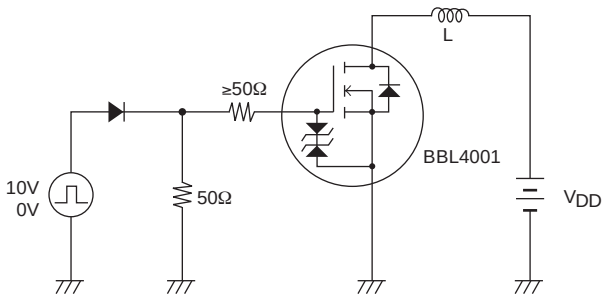
7525-002

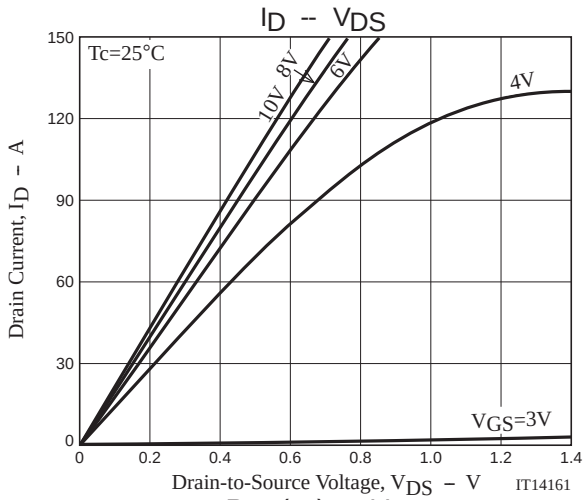


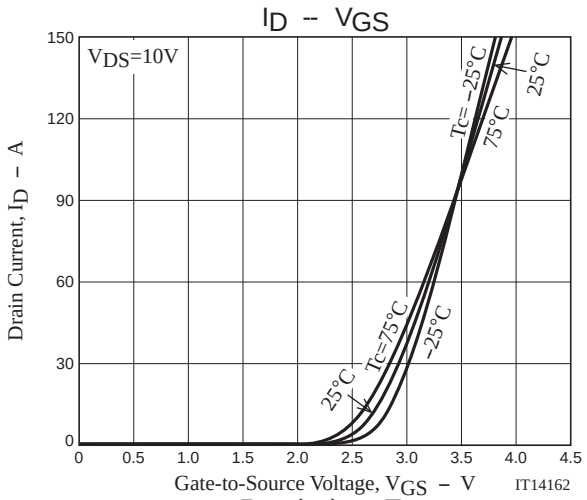
Switching Time Test Circuit

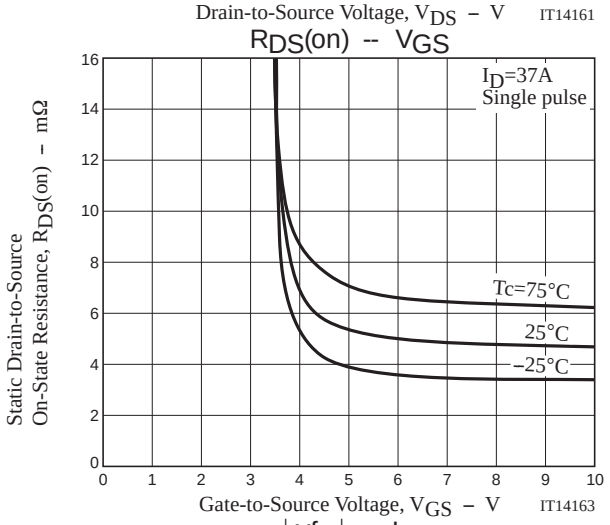


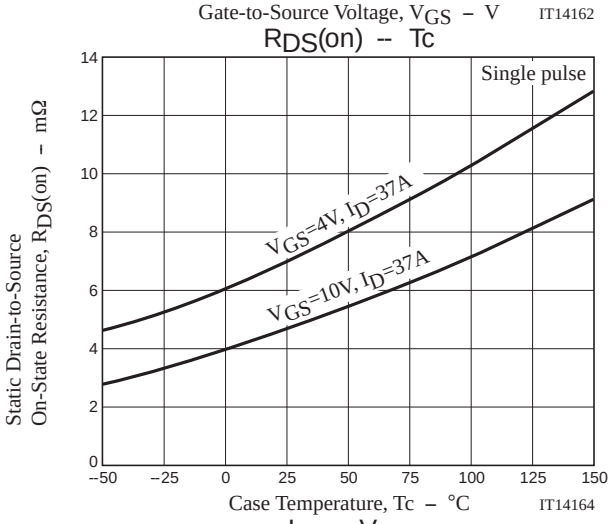
Avalanche Resistance Test Circuit

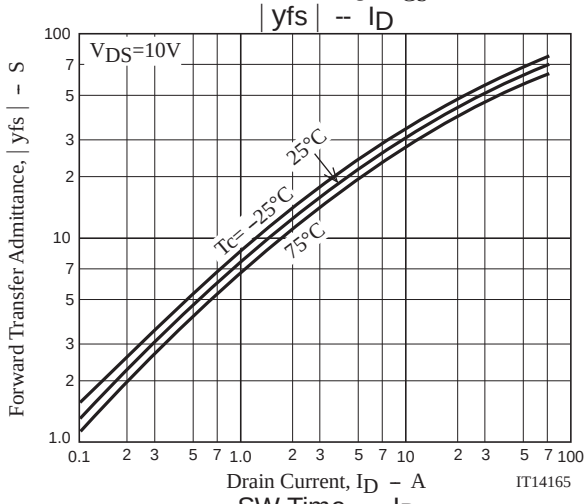


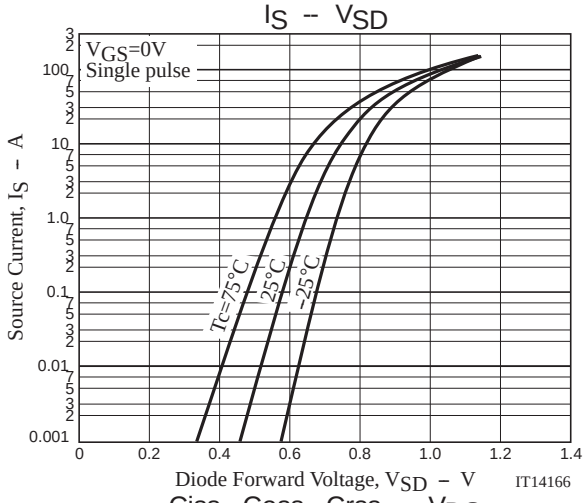

ID -- VDS
Tc=25°C
10V
8V
6V
4V
VGS=3V
Drain Current, ID – A
Drain-to-Source Voltage, VDS – V
IT14161

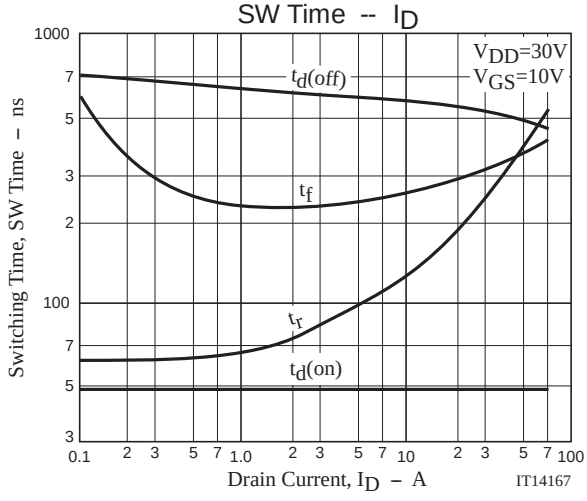

ID -- VGS
VDS=10V
Tc=–25°C
25°C
75°C
Drain Current, ID – A
Gate-to-Source Voltage, VGS – V
IT14162

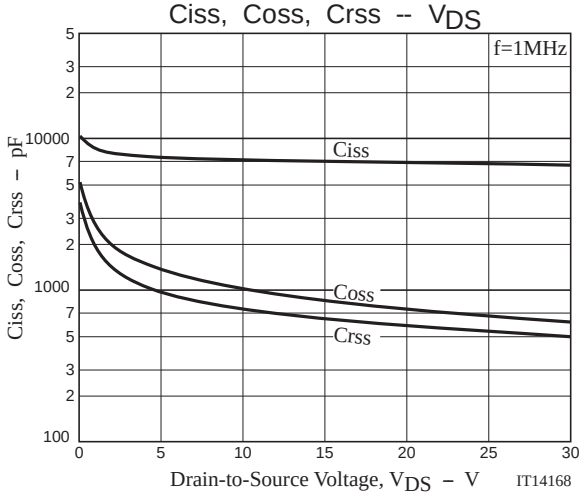

RDS(on) -- VGS
ID=37A
Single pulse
Tc=75°C
25°C
–25°C
Static Drain-to-Source On-State Resistance, RDS(on) – mΩ
Gate-to-Source Voltage, VGS – V
IT14163

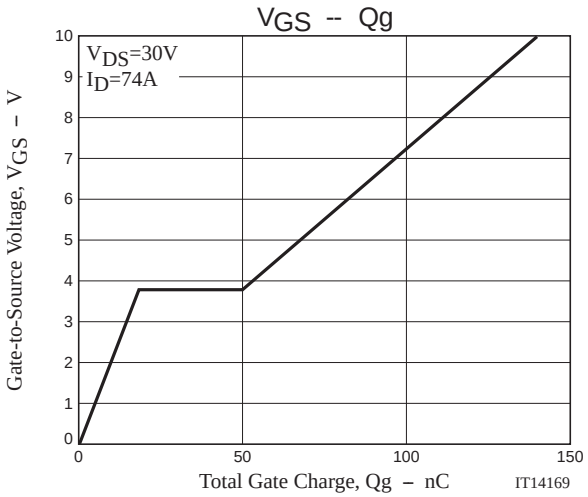

RDS(on) -- Tc
Single pulse
VGS=4V, ID=37A
VGS=10V, ID=37A
Static Drain-to-Source On-State Resistance, RDS(on) – mΩ
Case Temperature, Tc – °C
IT14164

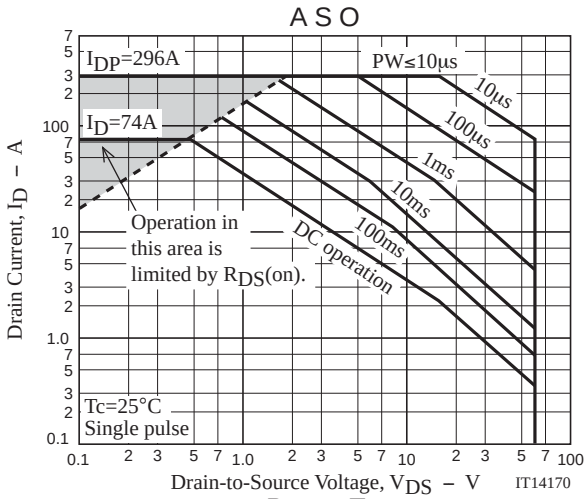

| yfs | -- ID
VDS=10V
25°C
Tc=–25°C
75°C
Forward Transfer Admittance, | yfs | – S
Drain Current, ID – A
IT14165

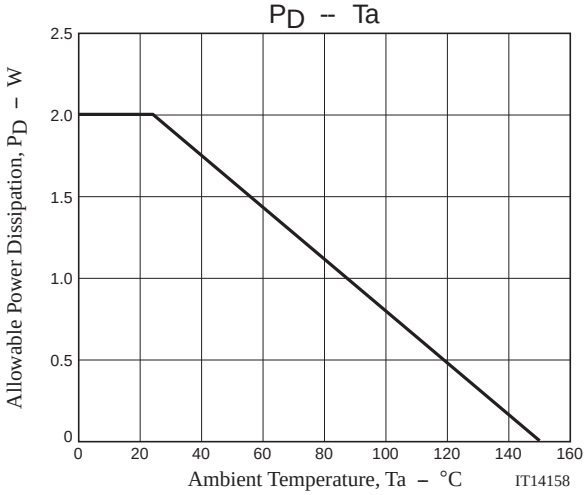

IS -- VSD
VGS=0V
Single pulse
Tc=75°C
25°C
–25°C
Source Current, IS – A
Diode Forward Voltage, VSD – V
IT14166

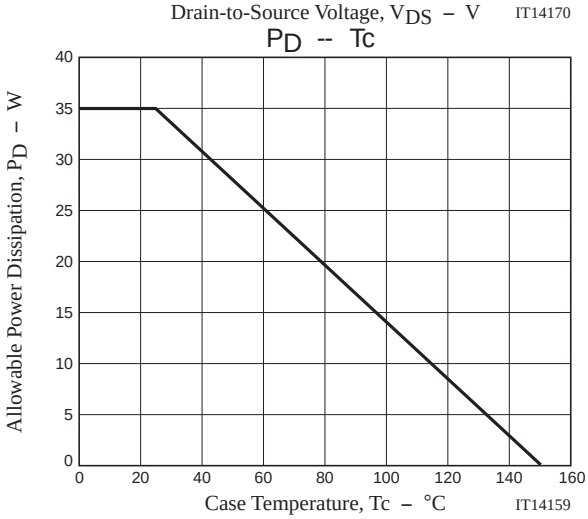

SW Time -- ID
VDD=30V
VGS=10V
td(off)
tf
tr
td(on)
Switching Time, SW Time – ns
Drain Current, ID – A
IT14167

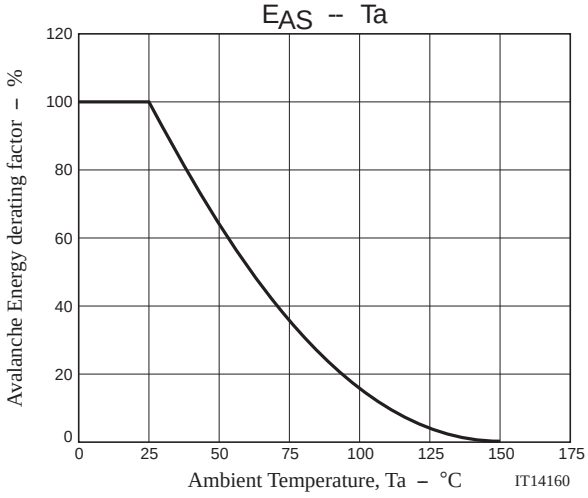

Ciss, Coss, Crss -- VDS
f=1MHz
Ciss
Coss
Crss
Ciss, Coss, Crss – pF
Drain-to-Source Voltage, VDS – V
IT14168


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


A S O
IDP=296A
PW≤10μs
10μs
100μs
1ms
10ms
100ms
DC operation
ID=74A
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

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

This catalog provides information as of November, 2008. Specifications and information herein are subject to change without notice.