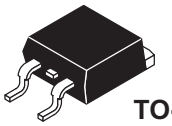
Ordering number : ENA1357C

BBS3002

P-Channel Power MOSFET
−60V, −100A, 5.8mΩ, TO-263-2L/TO-263

ON Semiconductor®

http://onsemi.com



TO-263

Features

- ON-resistance $R_{DS}(on)1$=4.4mΩ (typ.)
- Input capacitance Ciss=13200pF (typ.)
- 4V drive

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		−100	A
Drain Current (Pulse)	I_{DP}	PW≤10μs, duty cycle≤1%	−400	A
Allowable Power Dissipation	P_D	Tc=25°C	90	W
Channel Temperature	Tch		150	°C
Storage Temperature	Tstg		−55 to +150	°C
Avalanche Energy (Single Pulse) *1	E_{AS}		340	mJ
Avalanche Current *2	I_{AV}		−60	A

Note :*1 V_{DD}=−30V, L=100μH, I_{AV}=−60A (Fig.1)

*2 L≤100μH, Single pulse

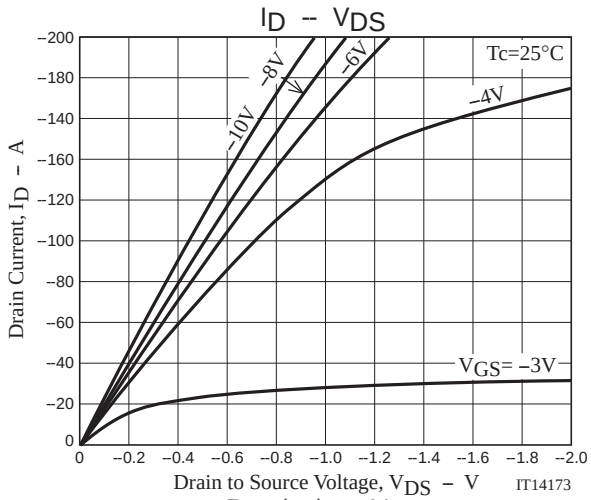
Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

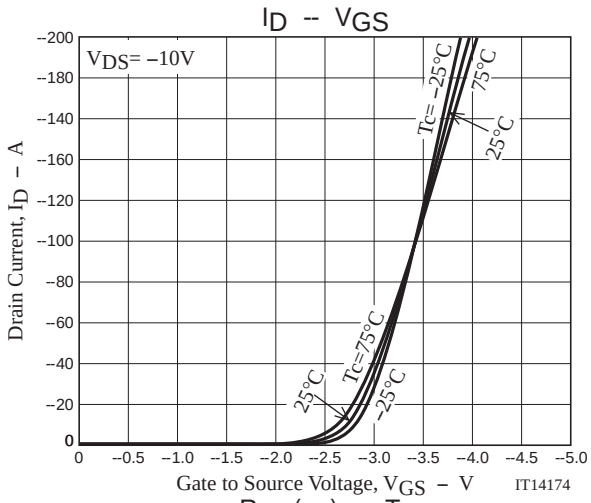
Electrical Characteristics at Ta=25°C

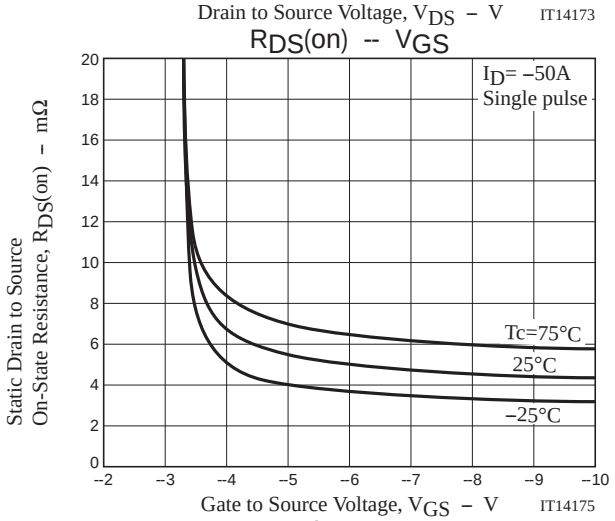
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Drain to Source Breakdown Voltage	$V_{(BR)DSS}$	I_D=−1mA, V_{GS}=0V	−60			V
Zero-Gate Voltage Drain Current	I_{DSS}	V_{DS}=−60V, V_{GS}=0V			−1	μA
Gate to Source Leakage Current	I_{GSS}	V_{GS}=±16V, V_{DS}=0V			±10	μA
Cutoff Voltage	$V_{GS}(off)$	V_{DS}=−10V, I_D=−1mA	−1.2		−2.6	V
Forward Transfer Admittance	| yfs |	V_{DS}=−10V, I_D=−50A	54	90		S
Static Drain to Source On-State Resistance	$R_{DS}(on)1$	I_D=−50A, V_{GS}=−10V		4.4	5.8	mΩ
	$R_{DS}(on)2$	I_D=−50A, V_{GS}=−4V		6.4	9.0	mΩ
Input Capacitance	Ciss	V_{DS}=−20V, f=1MHz		13200		pF
Output Capacitance	Coss			1300		pF
Reverse Transfer Capacitance	Crss			950		pF
Turn-ON Delay Time	$t_d(on)$	See Fig.2		95		ns
Rise Time	t_r			1000		ns
Turn-OFF Delay Time	$t_d(off)$			800		ns
Fall Time	t_f			820		ns
Total Gate Charge	Qg	V_{DS}=−30V, V_{GS}=−10V, I_D=−100A		280		nC
Gate to Source Charge	Qgs			50		nC
Gate to Drain “Miller” Charge	Qgd			55		nC
Diode Forward Voltage	V_{SD}	I_S=−100A, V_{GS}=0V		−1.0	−1.5	V

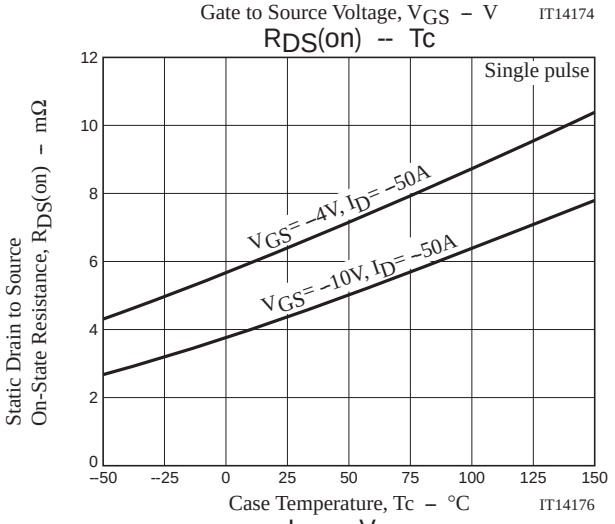
ORDERING INFORMATION

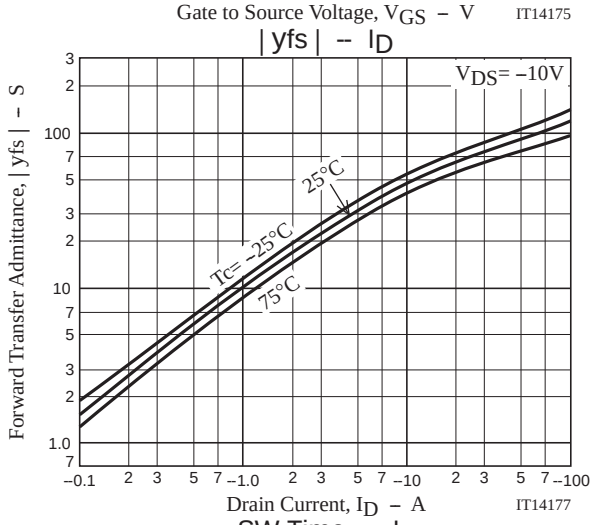
See detailed ordering and shipping information on page 6 of this data sheet.

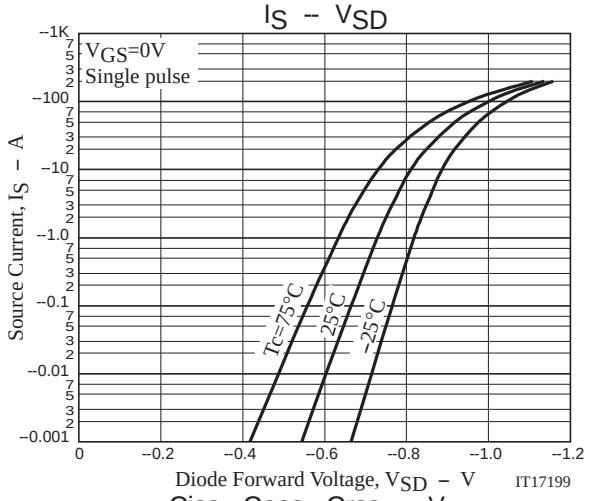

ID -- VDS
Tc=25°C
–10V
–8V
–6V
–4V
VGS= –3V
Drain Current, ID – A
Drain to Source Voltage, VDS – V
IT14173

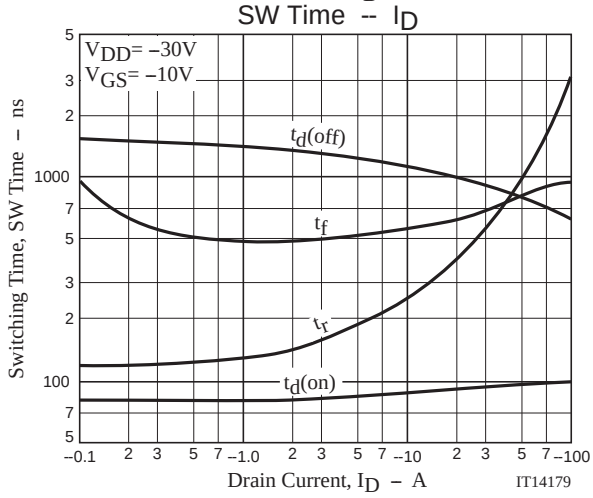

ID -- VGS
VDS= –10V
Tc= –25°C
75°C
25°C
Tc=75°C
25°C
–25°C
Drain Current, ID – A
Gate to Source Voltage, VGS – V
IT14174

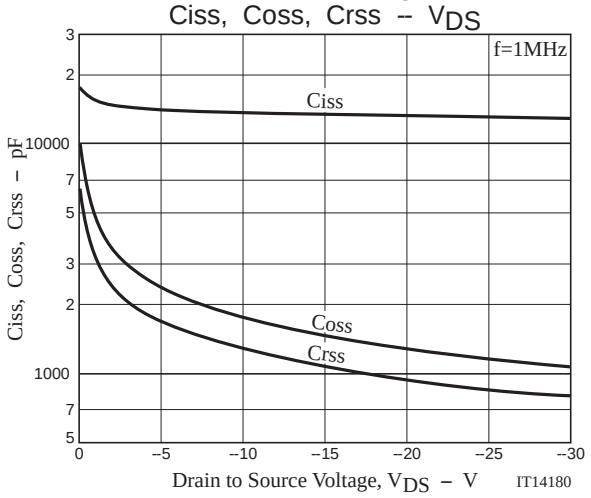

RDS(on) -- VGS
ID= –50A
Single pulse
Tc=75°C
25°C
–25°C
Static Drain to Source On-State Resistance, RDS(on) – mΩ
Gate to Source Voltage, VGS – V
IT14175

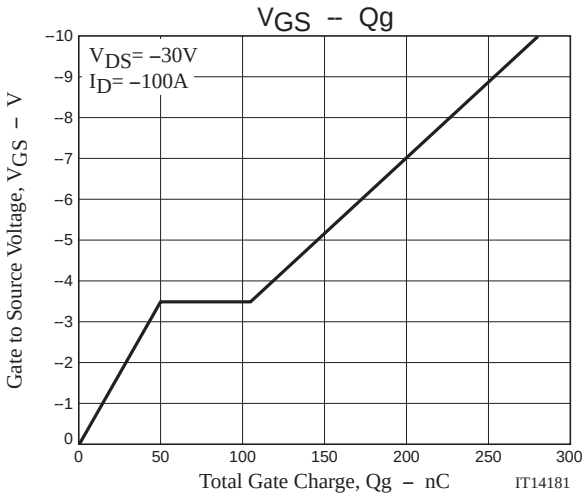

RDS(on) -- Tc
Single pulse
VGS= –4V, ID= –50A
VGS= –10V, ID= –50A
Static Drain to Source On-State Resistance, RDS(on) – mΩ
Case Temperature, Tc – °C
IT14176

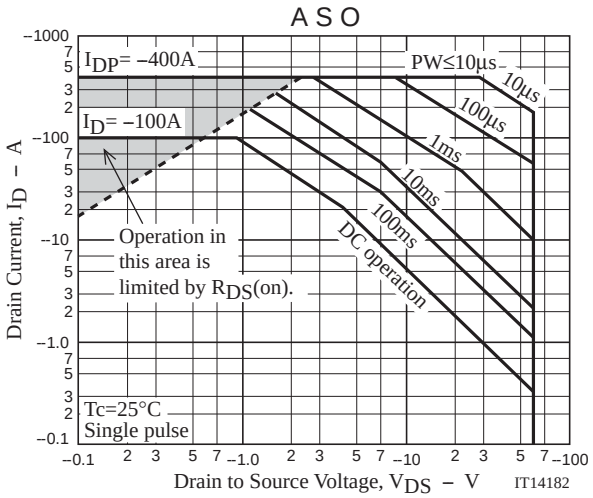

| yfs | -- ID
VDS= –10V
25°C
Tc= –25°C
75°C
Forward Transfer Admittance, | yfs | – S
Drain Current, ID – A
IT14177

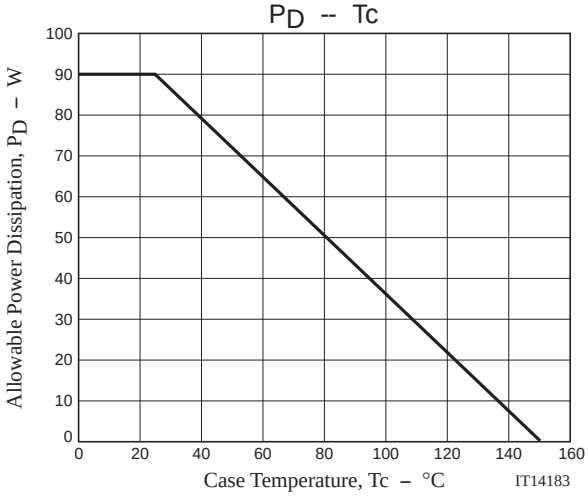

IS -- VSD
VGS=0V
Single pulse
Tc=75°C
25°C
–25°C
Source Current, IS – A
Diode Forward Voltage, VSD – V
IT17199

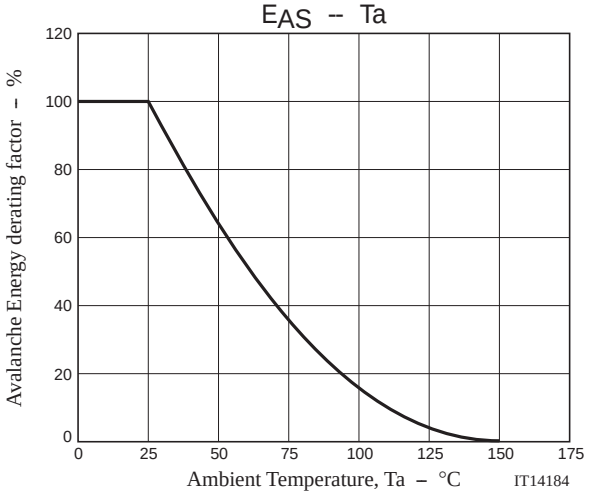

SW Time -- ID
VDD= –30V
VGS= –10V
td(off)
tf
tr
td(on)
Switching Time, SW Time – ns
Drain Current, ID – A
IT14179


Ciss, Coss, Crss -- VDS
f=1MHz
Ciss
Coss
Crss
Ciss, Coss, Crss – pF
Drain to Source Voltage, VDS – V
IT14180


VGS – Qg
VDS= –30V
ID= –100A
Gate to Source Voltage, VGS – V
Total Gate Charge, Qg – nC
IT14181


A S O
IDP= –400A
ID= –100A
PW≤10µs
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
IT14182


PD -- Tc
Allowable Power Dissipation, PD – W
Case Temperature, Tc – °C
IT14183

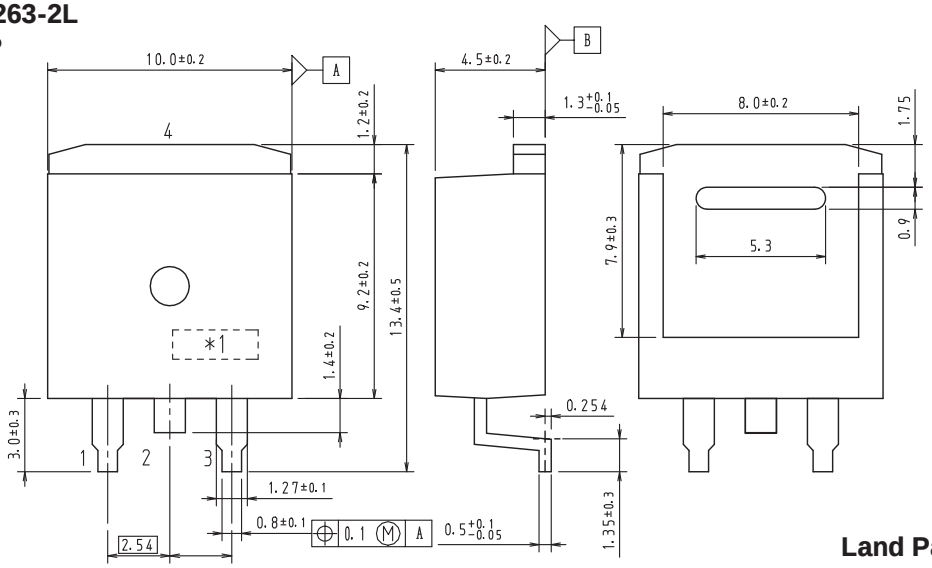

EAS -- Ta
Avalanche Energy derating factor – %
Ambient Temperature, Ta – °C
IT14184

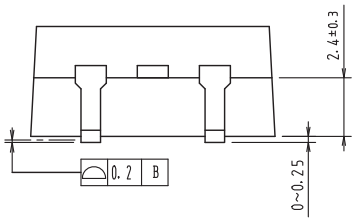
Package Dimensions

BBS3002-DL-1E

D2PAK/TO-263-2L
CASE 418AP
ISSUE O
Unit : mm

1: Gate
2: Drain
3: Source
4: Drain

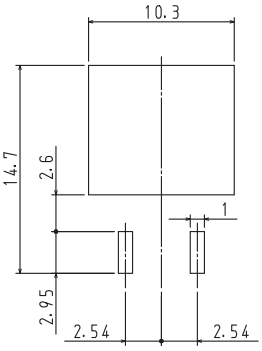




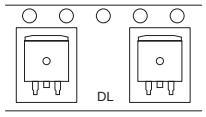
1. These dimension do not include mold protrusion
2. Pin2 is idle pin with electrical designation only carried

*1:Lot indication

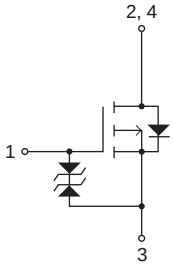
Land Pattern Example



Packing Type: DL



Electrical Connection

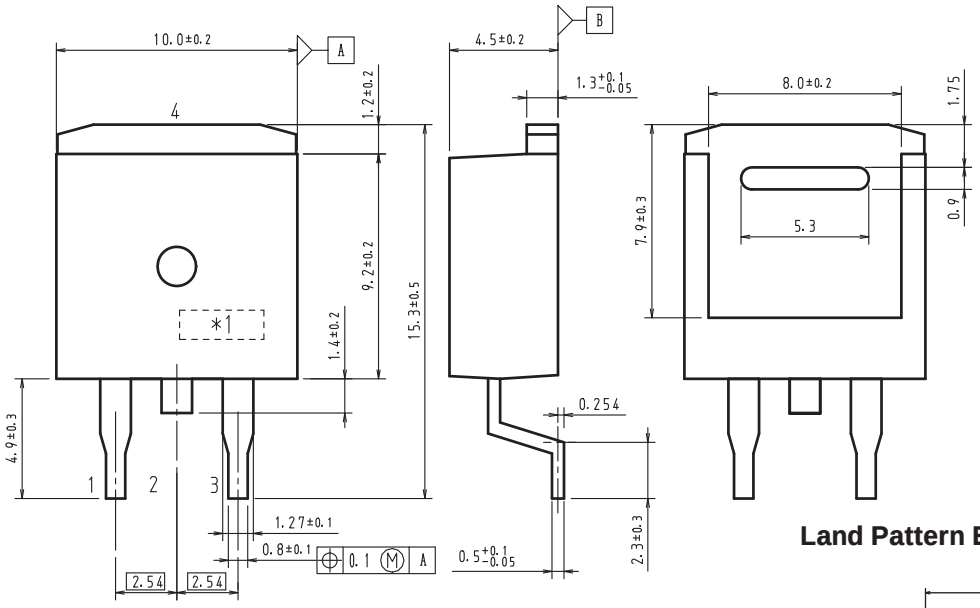


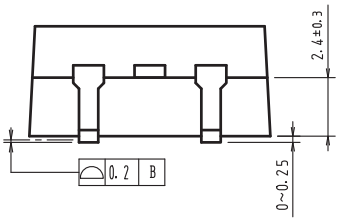
Package Dimensions

BBS3002-TL-1E

Unit : mm

1: Gate
2: Drain
3: Source
4: Drain

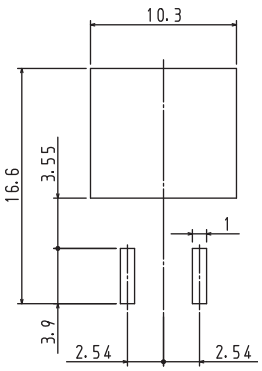




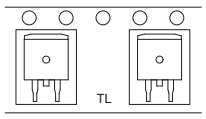
1. These dimension do not include mold protrusion
2. Pin2 is idle pin with electrical designation only carried

*1:Lot indication

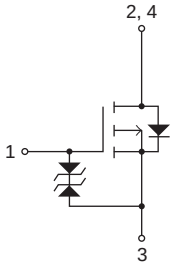
Land Pattern Example



Packing Type: TL



Electrical Connection



Ordering & Package Information

Device	Package	Shipping	memo
BBS3002-DL-1E	TO-263-2L SC-83, TO-263	800 pcs./reel	Pb-Free
BBS3002-TL-1E	TO-263		

Marking

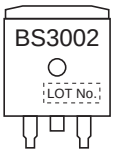


Fig.1 Unclamped Inductive Switching Test Circuit

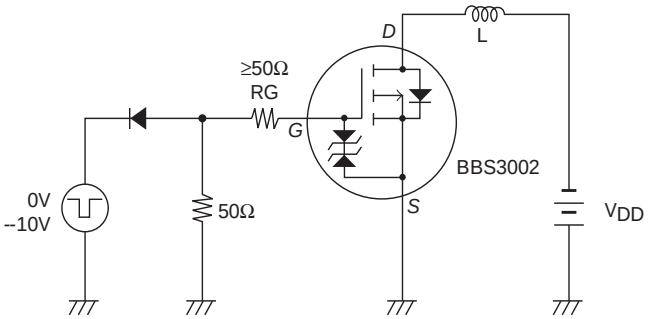
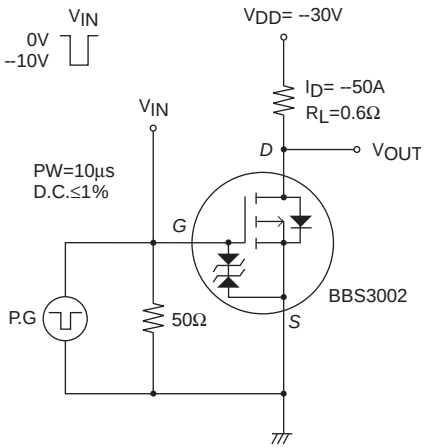


Fig.2 Switching Time Test Circuit



Note on usage : Since the BBS3002 is a MOSFET product, please avoid using this device in the vicinity of highly charged objects.