Ordering number : ENA1769

SANYO Semiconductors

DATA SHEET

N-Channel Silicon MOSFET

WPB4002 — General-Purpose Switching Device Applications

Features

- Reverse recovery time t_{rr}=115ns (typ)
- Input capacitance Ciss=2200pF (typ)
- ON-resistance $R_{DS}(on)$=0.28Ω (typ)
- 10V drive

Specifications

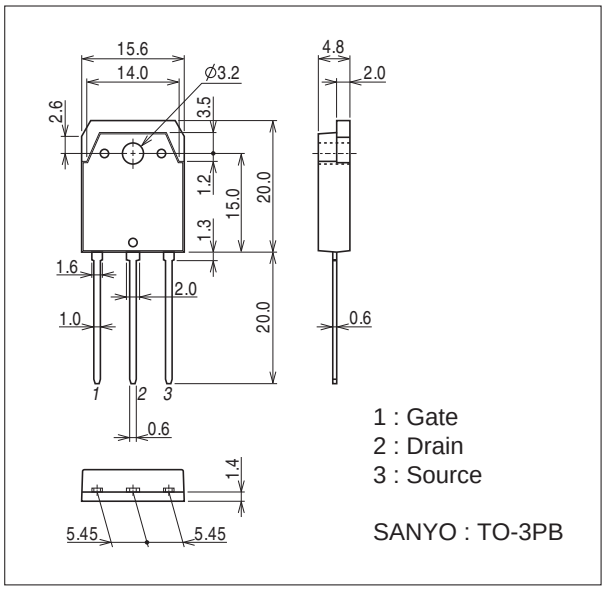
Absolute Maximum Ratings at Ta=25°C

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_D		23	A
Drain Current (Pulse)	I_{DP}	PW≤10μs, duty cycle≤1%	80	A
Source-to-Drain Diode Forward Current (DC)	I_{SD}		23	A
Source-to-Drain Diode Forward Current (Pulse)	I_{SDP}	PW≤10μs, duty cycle≤1%	80	A
Allowable Power Dissipation	P_D		2.5	W
		Tc=25°C	220	W
Channel Temperature	Tch		150	°C
Storage Temperature	Tstg		−55 to +150	°C
Avalanche Energy (Single Pulse) *1	E_{AS}		172	mJ
Avalanche Current *2	I_{AV}		17	A

Note :*1 V_{DD}=99V, L=1mH, I_{AV}=17A (Fig.1)
*2 L≤1mH, single pulse

Package Dimensions

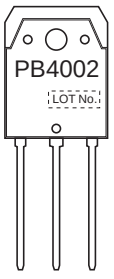
unit : mm (typ)
7503-004



Product & Package Information

- Package : TO-3PB
- JEITA, JEDEC : SC-65, TO-247, SOT199
- Minimum Packing Quantity : 100 pcs. / tray

Marking



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=11.5A	7.5	15		S
Static Drain-to-Source On-State Resistance	R_{DS}(on)	I_D=11.5A, V_{GS}=10V		0.28	0.36	Ω
Input Capacitance	Ciss	V_{DS}=30V, f=1MHz		2200		pF
Output Capacitance	Coss	V_{DS}=30V, f=1MHz		400		pF
Reverse Transfer Capacitance	Crss	V_{DS}=30V, f=1MHz		83		pF
Turn-ON Delay Time	t_d(on)	See Fig.2		42		ns
Rise Time	t_r	See Fig.2		130		ns
Turn-OFF Delay Time	t_d(off)	See Fig.2		234		ns
Fall Time	t_f	See Fig.2		84		ns
Total Gate Charge	Qg	V_{DS}=200V, V_{GS}=10V, I_D=23A		84		nC
Gate-to-Source Charge	Qgs	V_{DS}=200V, V_{GS}=10V, I_D=23A		15.2		nC
Gate-to-Drain “Miller” Charge	Qgd	V_{DS}=200V, V_{GS}=10V, I_D=23A		45.4		nC
Diode Forward Voltage	V_{SD}	I_S=23A, V_{GS}=0V		1.1	1.5	V
Reverse Recovery Time	t_{rr}	See Fig.3		115		ns
Reverse Recovery Charge	Q_{rr}	I_{SD}=23A, V_{GS}=0V, di/dt=100A/μs		340		nC

Fig.1 Avalanche Resistance Test Circuit

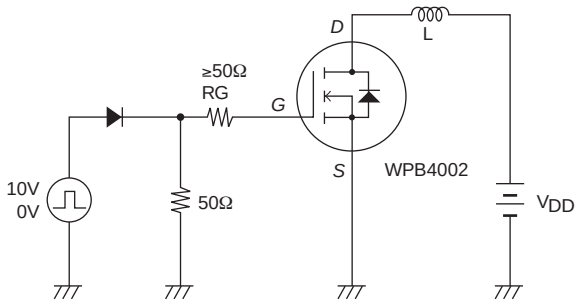


Fig.2 Switching Time Test Circuit

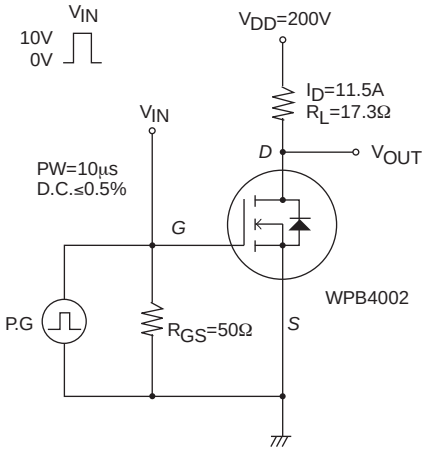
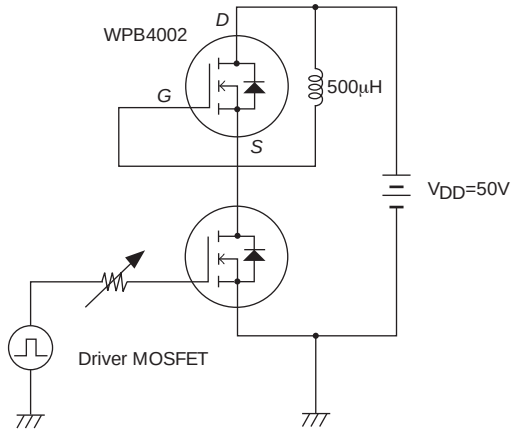
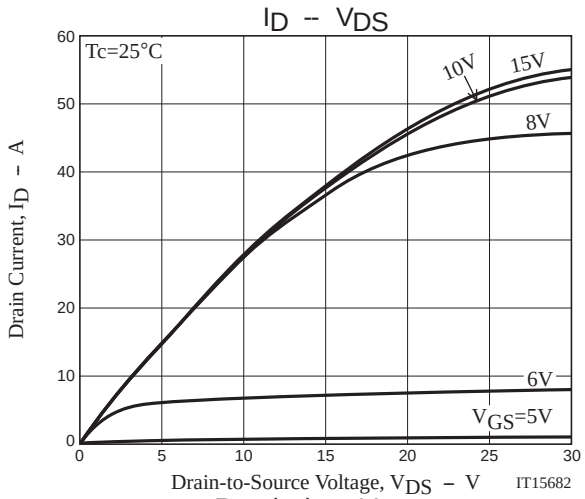
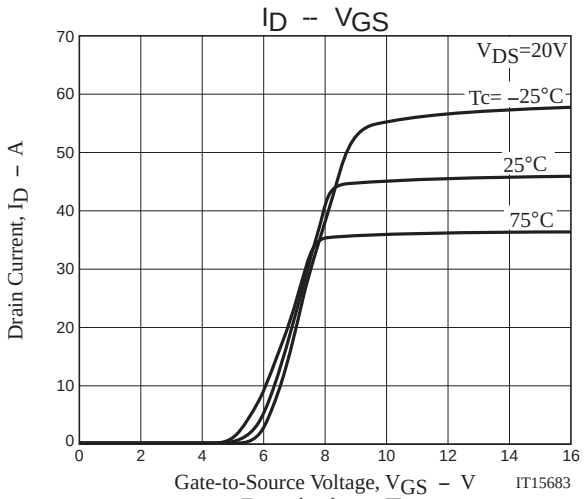
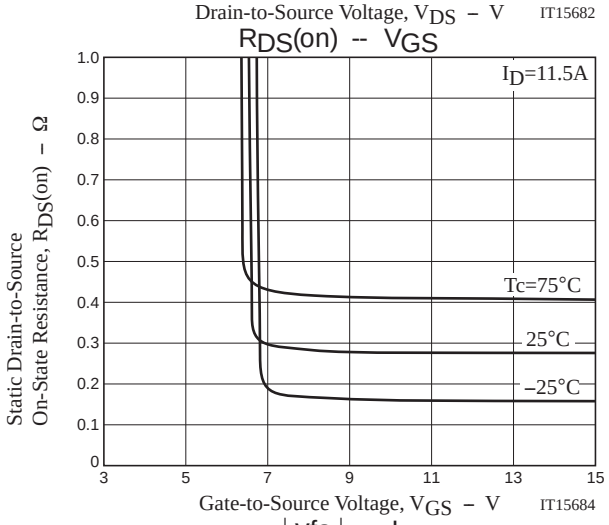


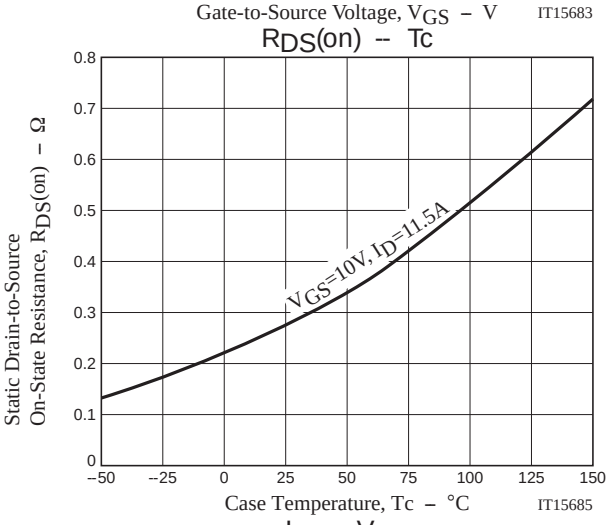
Fig.3 t_{rr} Reverse Recovery Resistance Test Circuit

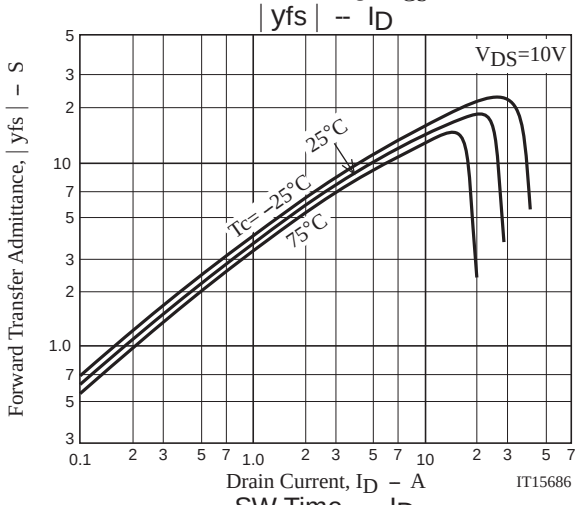


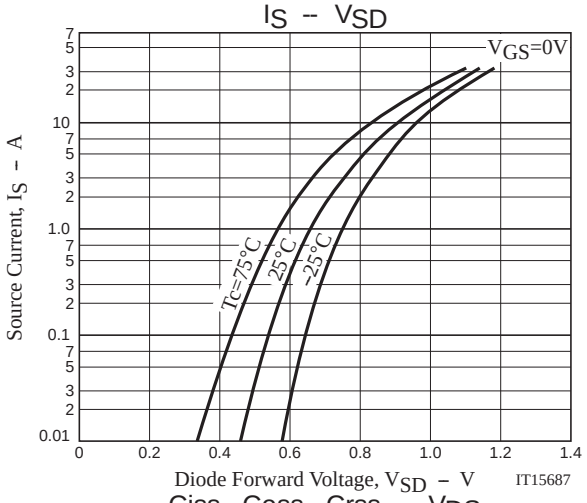

ID -- VDS
Tc=25°C
10V
15V
8V
6V
VGS=5V
Drain Current, ID – A
Drain-to-Source Voltage, VDS – V
IT15682

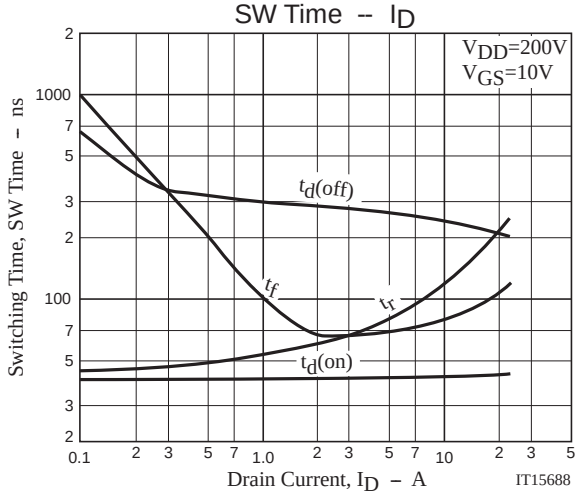

ID -- VGS
VDS=20V
Tc= –25°C
25°C
75°C
Drain Current, ID – A
Gate-to-Source Voltage, VGS – V
IT15683

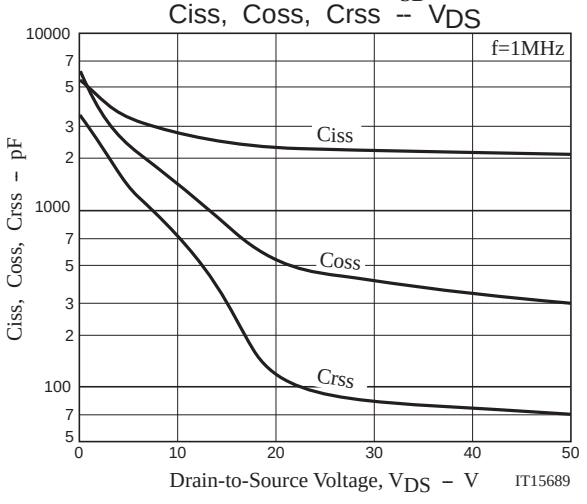

RDS(on) -- VGS
ID=11.5A
Tc=75°C
25°C
–25°C
Static Drain-to-Source On-State Resistance, RDS(on) – Ω
Gate-to-Source Voltage, VGS – V
IT15684

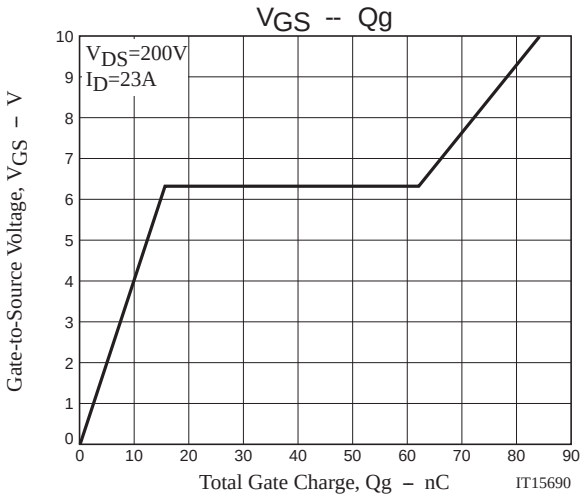

RDS(on) -- Tc
VGS=10V, ID=11.5A
Static Drain-to-Source On-State Resistance, RDS(on) – Ω
Case Temperature, Tc – °C
IT15685

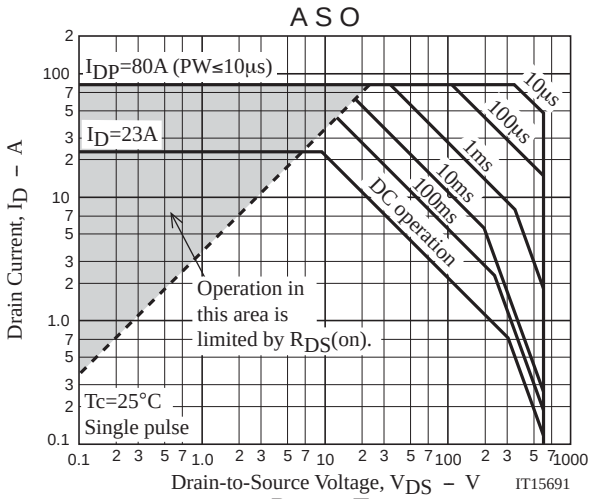

| yfs | -- ID
VDS=10V
25°C
Tc= –25°C
75°C
Forward Transfer Admittance, | yfs | – S
Drain Current, ID – A
IT15686

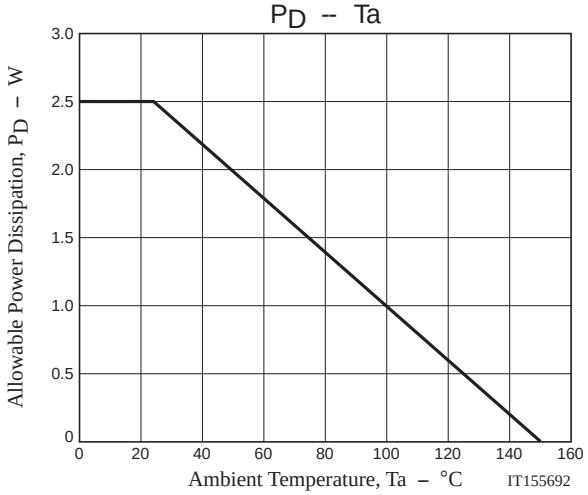

IS -- VSD
VGS=0V
Tc=75°C
25°C
–25°C
Source Current, IS – A
Diode Forward Voltage, VSD – V
IT15687

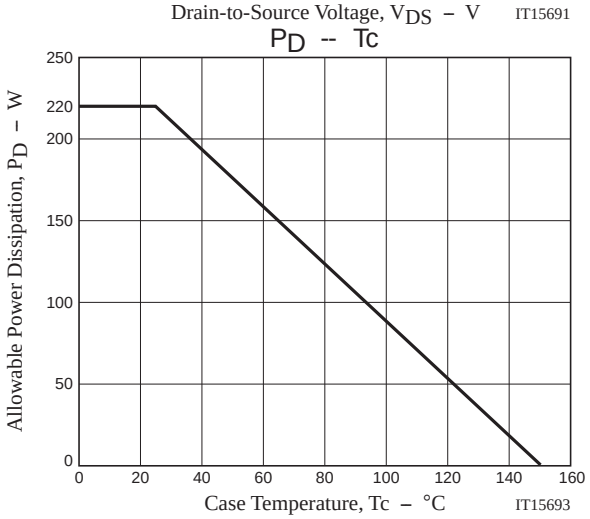

SW Time -- ID
VDD=200V
VGS=10V
td(off)
tf
tr
td(on)
Switching Time, SW Time – ns
Drain Current, ID – A
IT15688

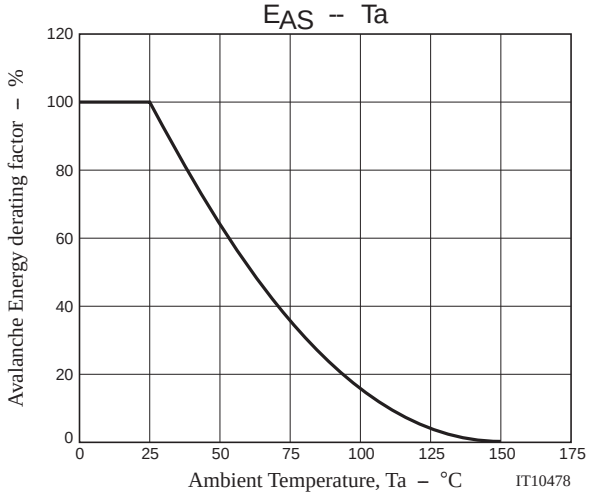

Ciss, Coss, Crss -- VDS
f=1MHz
Ciss
Coss
Crss
Ciss, Coss, Crss – pF
Drain-to-Source Voltage, VDS – V
IT15689


VGS -- Qg
VDS=200V
ID=23A
Gate-to-Source Voltage, VGS – V
Total Gate Charge, Qg – nC
IT15690


A S O
IDP=80A (PW≤10μs)
ID=23A
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
IT15691


PD -- Ta
Allowable Power Dissipation, PD – W
Ambient Temperature, Ta – °C
IT155692


PD -- Tc
Allowable Power Dissipation, PD – W
Case Temperature, Tc – °C
IT15693


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

Note on usage : Since the WPB4002 is a MOSFET product, please avoid using this device in the vicinity of highly charged objects.

This catalog provides information as of June, 2010. Specifications and information herein are subject to change without notice.