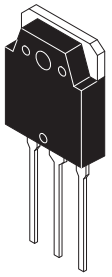
Ordering number : ENA2212

WPB4001

N-Channel Power MOSFET
500V, 26A, 0.26Ω, TO-3P-3L

ON Semiconductor®

http://onsemi.com



TO-3P-3L

Features

- ON-resistance $R_{DS}(on)$=0.2Ω (typ.)
- Input capacitance Ciss=2250pF (typ.)
- 10V Drive

Specifications

Absolute Maximum Ratings at Ta=25°C

Parameter	Symbol	Conditions	Ratings	Unit
Drain to Source Voltage	V_{DSS}		500	V
Gate to Source Voltage	V_{GSS}		±30	V
Drain Current (DC)	I_D		26	A
Drain Current (Pulse)	I_{DP}	PW≤10μs, duty cycle≤1%	90	A
Source to Drain Diode Forward Current (DC)	I_{SD}		26	A
Source to Drain Diode Forward Current (Pulse)	I_{SDP}	PW≤10μs, duty cycle≤1%	90	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}		543	mJ
Avalanche Current *2	I_{AV}		14	A

Note :*1 V_{DD}=50V, L=5mH, I_{AV}=14A (Fig.1)
*2 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.

Electrical Characteristics at Ta=25°C

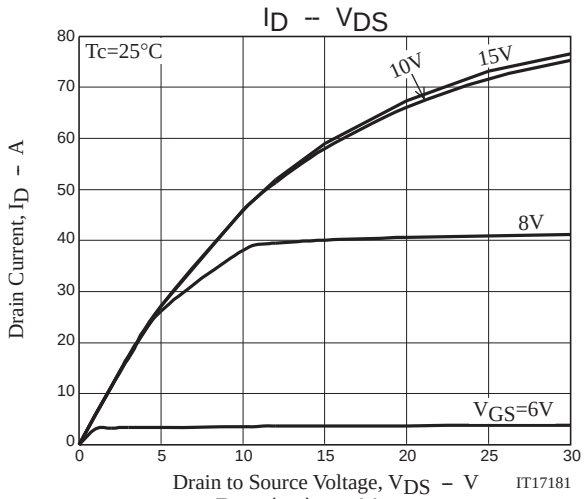
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Drain to Source Breakdown Voltage	$V_{(BR)DSS}$	I_D=10mA, V_{GS}=0V	500			V
Zero-Gate Voltage Drain Current	I_{DSS}	V_{DS}=400V, V_{GS}=0V			100	μA
Gate to Source Leakage Current	I_{GSS}	V_{GS}=±30V, V_{DS}=0V			±100	nA
Cutoff Voltage	$V_{GS}(off)$	V_{DS}=10V, I_D=1mA	3		5	V
Forward Transfer Admittance	| yfs |	V_{DS}=10V, I_D=13A	7.5	15.5		S
Static Drain to Source On-State Resistance	$R_{DS}(on)$	I_D=13A, V_{GS}=10V		0.20	0.26	Ω
Input Capacitance	Ciss	V_{DS}=30V, f=1MHz		2250		pF
Output Capacitance	Coss			450		pF
Reverse Transfer Capacitance	Crss			90		pF
Turn-ON Delay Time	$t_d(on)$	See Fig.2		44		ns
Rise Time	t_r			156		ns
Turn-OFF Delay Time	$t_d(off)$			224		ns
Fall Time	t_f			94		ns
Total Gate Charge	Qg	V_{DS}=200V, V_{GS}=10V, I_D=26A		87		nC
Gate to Source Charge	Qgs			15.2		nC
Gate to Drain “Miller” Charge	Qgd			50		nC
Diode Forward Voltage	V_{SD}	I_S=26A, 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}=26A, V_{GS}=0V, di/dt=100A/μs		340		nC

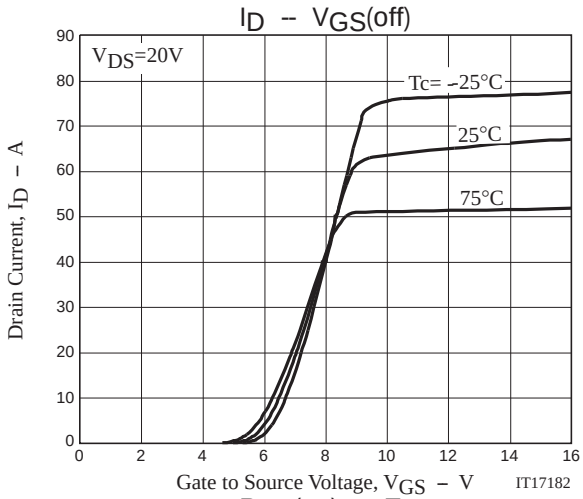
ORDERING INFORMATION

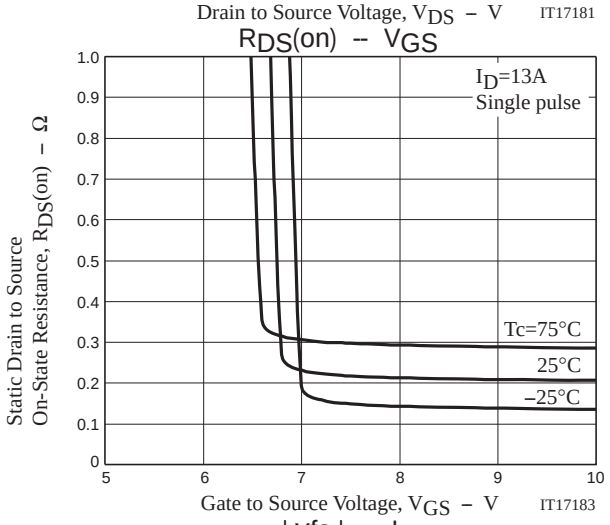
See detailed ordering and shipping information on page 4 of this data sheet.

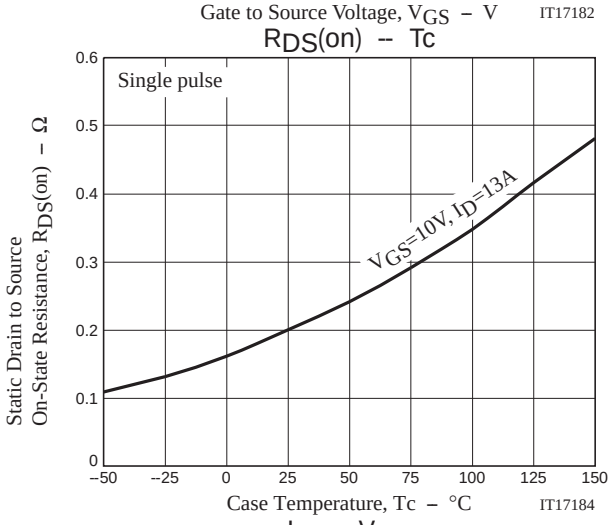
September, 2013

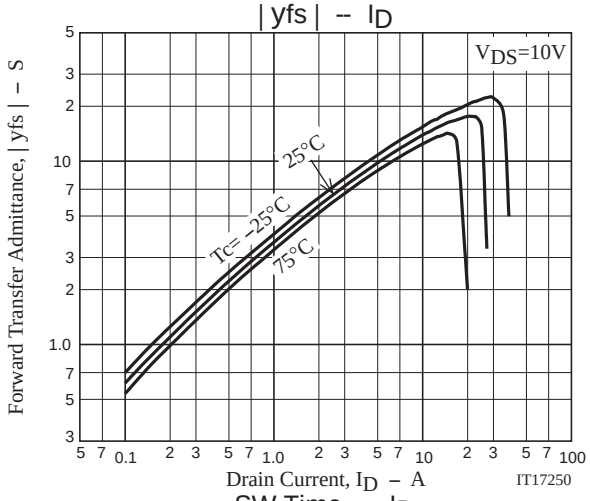
91813 TKIM TC-00002976 No. A2212-1/5

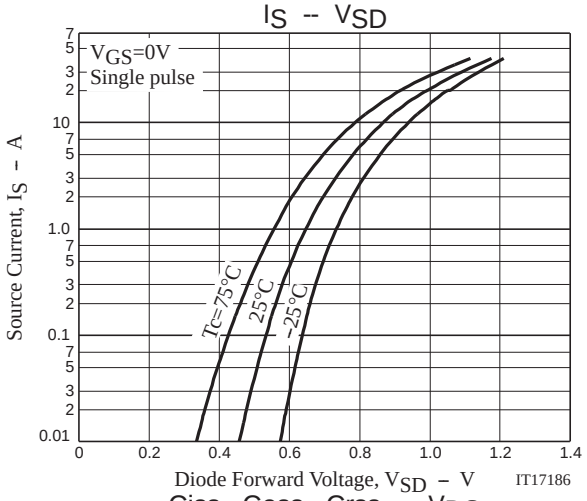

ID – VDS
Tc=25°C
10V
15V
8V
VGS=6V
Drain Current, ID – A
Drain to Source Voltage, VDS – V
IT17181

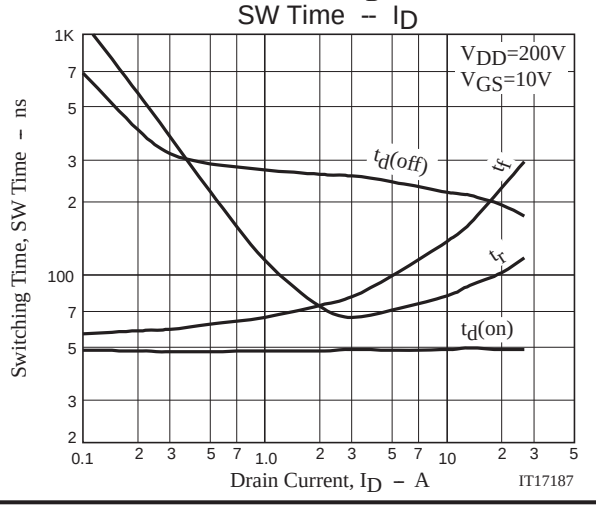

ID – VGS(off)
VDS=20V
Tc= –25°C
25°C
75°C
Drain Current, ID – A
Gate to Source Voltage, VGS – V
IT17182

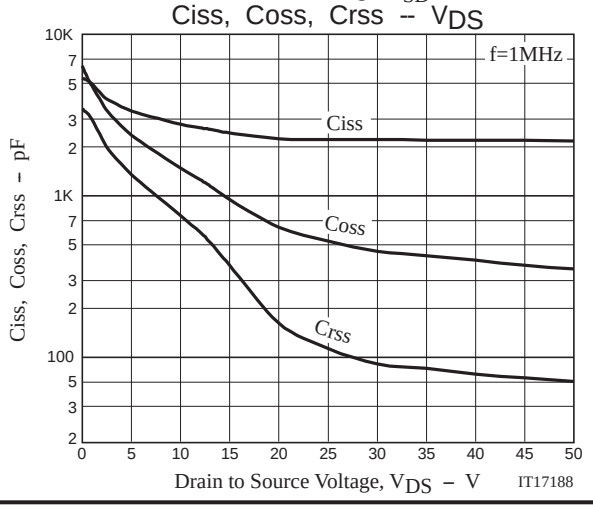

RDS(on) – VGS
ID=13A
Single pulse
Tc=75°C
25°C
–25°C
Static Drain to Source On-State Resistance, RDS(on) – Ω
Gate to Source Voltage, VGS – V
IT17183

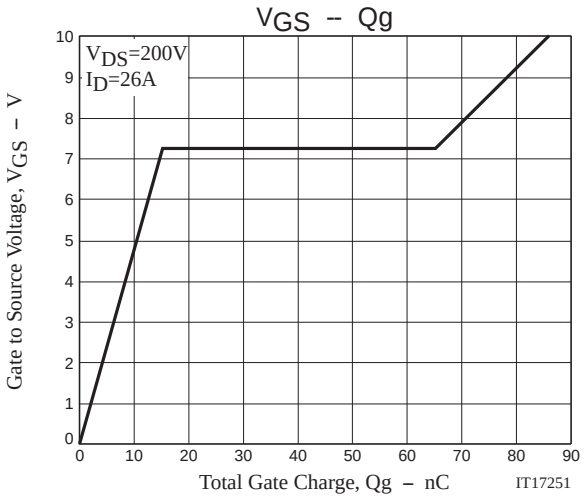

RDS(on) – Tc
Single pulse
VGS=10V, ID=13A
Static Drain to Source On-State Resistance, RDS(on) – Ω
Case Temperature, Tc – °C
IT17184

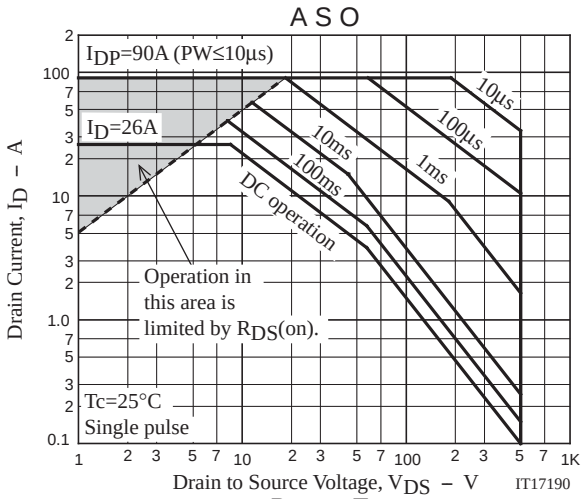

| yfs | – ID
VDS=10V
25°C
Tc= –25°C
75°C
Forward Transfer Admittance, | yfs | – S
Drain Current, ID – A
IT17250

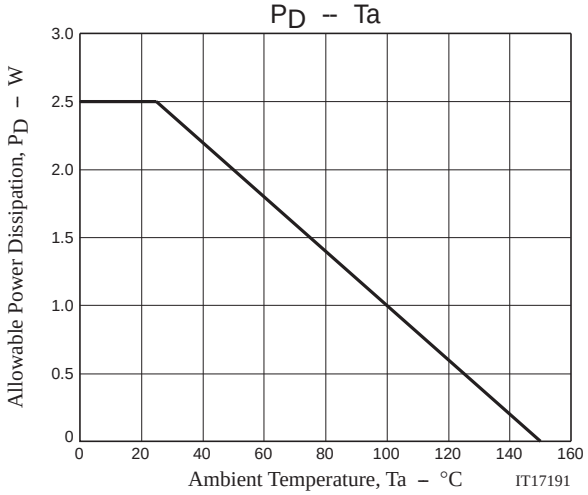

IS – VSD
VGS=0V
Single pulse
Tc=75°C
25°C
–25°C
Source Current, IS – A
Diode Forward Voltage, VSD – V
IT17186

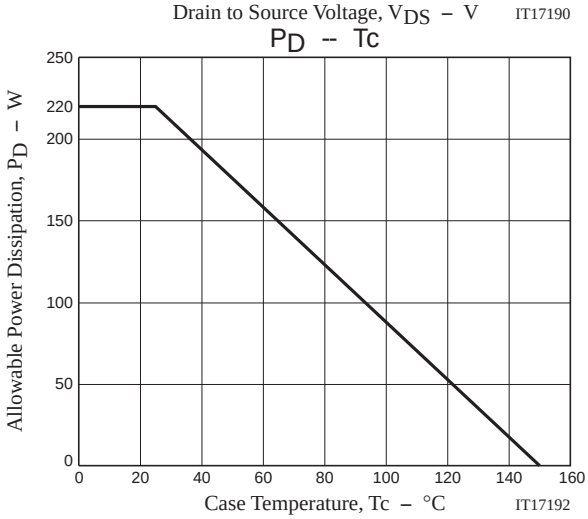

SW Time – ID
VDD=200V
VGS=10V
td(off)
tf
tr
td(on)
Switching Time, SW Time – ns
Drain Current, ID – A
IT17187

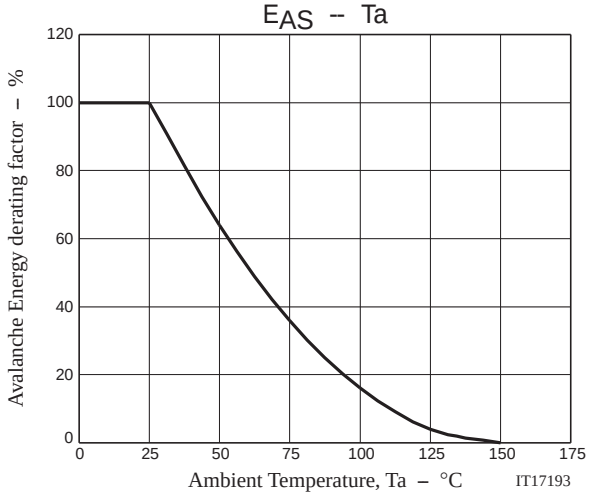

Ciss, Coss, Crss – VDS
f=1MHz
Ciss
Coss
Crss
Ciss, Coss, Crss – pF
Drain to Source Voltage, VDS – V
IT17188


VGS – Qg
VDS=200V
ID=26A
Gate to Source Voltage, VGS – V
Total Gate Charge, Qg – nC
IT17251


A S O
IDP=90A (PW≤10μs)
ID=26A
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
IT17190


PD – Ta
Allowable Power Dissipation, PD – W
Ambient Temperature, Ta – °C
IT17191


PD – Tc
Allowable Power Dissipation, PD – W
Case Temperature, Tc – °C
IT17192

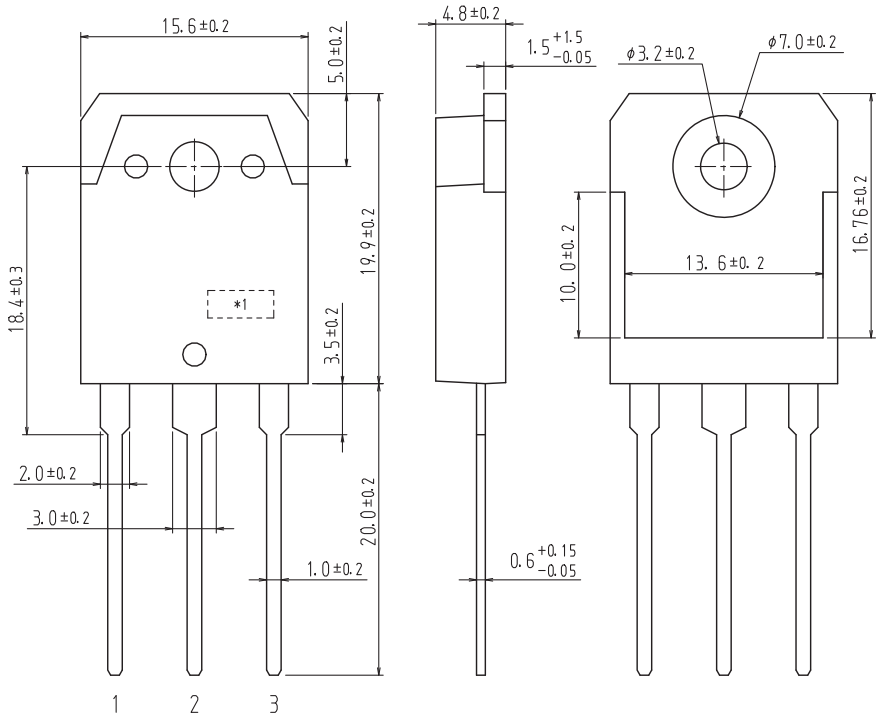

EAS – Ta
Avalanche Energy derating factor – %
Ambient Temperature, Ta – °C
IT17193

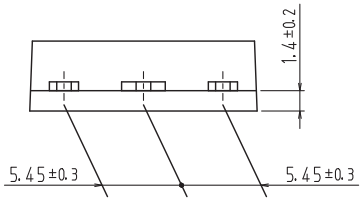
Package Dimensions

WPB4001-1E

TO-3P-3L
CASE 340AF
ISSUE O
Unit : mm

1: Gate
2: Drain
3: Source





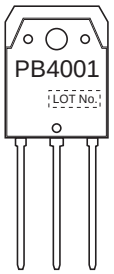
These dimension do not include mold protrusion

*1:Lot indication

Ordering & Package Information

Device	Package	Shipping	memo
WPB4001-1E	TO-3P-3L SC-65, SOT-199, TO-247	30 pcs./tube	Pb-Free

Marking



Electrical Connection

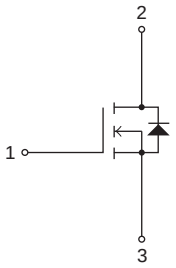


Fig.1 Unclamped Inductive Switching Test Circuit

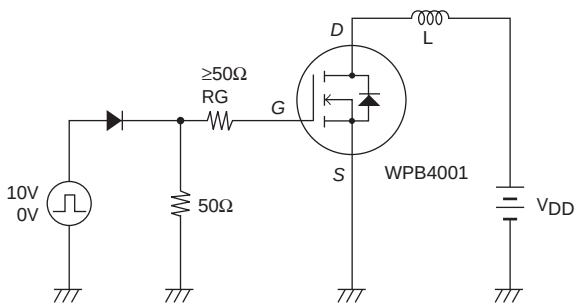


Fig.2 Switching Time Test Circuit

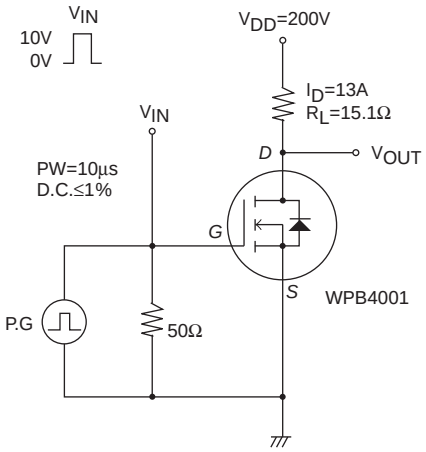
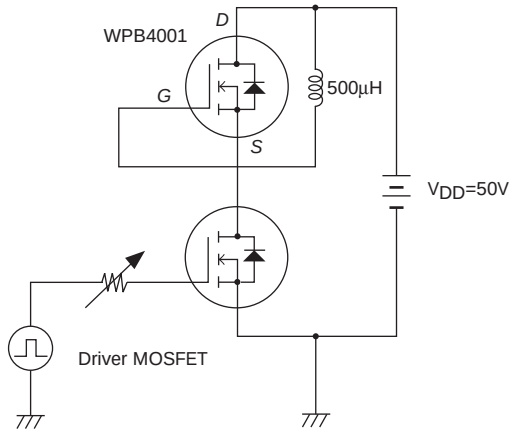


Fig.3 Reverse Recovery Resistance Test Circuit



Note on usage : Since the WPB4001 is a MOSFET product, please avoid using this device in the vicinity of highly charged objects.