



WPB4002

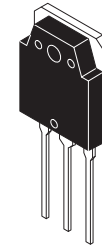
N-Channel Power MOSFET 600V, 23A, 0.36Ω, TO-3P-3L

ON Semiconductor®

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Features

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



TO-3P-3L

Specifications

Absolute Maximum Ratings at $T_a=25^\circ\text{C}$

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}	$PW \leq 10\mu\text{s}$, duty cycle $\leq 1\%$	80	A
Source to Drain Diode Forward Current (DC)	I_{SD}		23	A
Source to Drain Diode Forward Current (Pulse)	I_{SDP}	$PW \leq 10\mu\text{s}$, duty cycle $\leq 1\%$	80	A
Allowable Power Dissipation	P_D		2.5	W
		$T_c=25^\circ\text{C}$	220	W
Channel Temperature	T_{ch}		150	$^\circ\text{C}$
Storage Temperature	T_{stg}		-55 to +150	$^\circ\text{C}$
Avalanche Energy (Single Pulse) *1	E_{AS}		157	mJ
Avalanche Current *2	I_{AV}		17	A

Note : *1 $V_{DD}=50\text{V}$, $L=1\text{mH}$, $I_{AV}=17\text{A}$ (Fig.1)*2 $L \leq 1\text{mH}$, single pulse

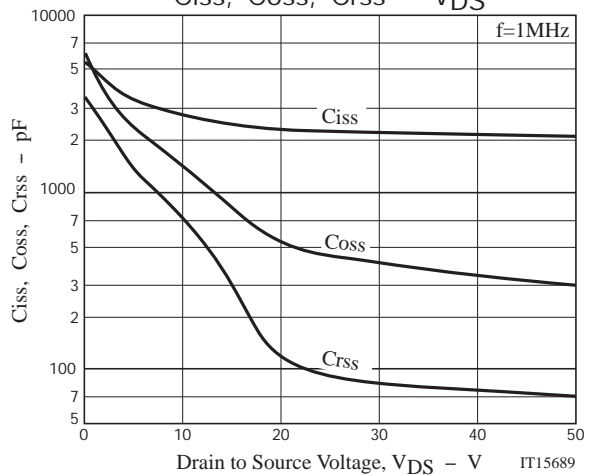
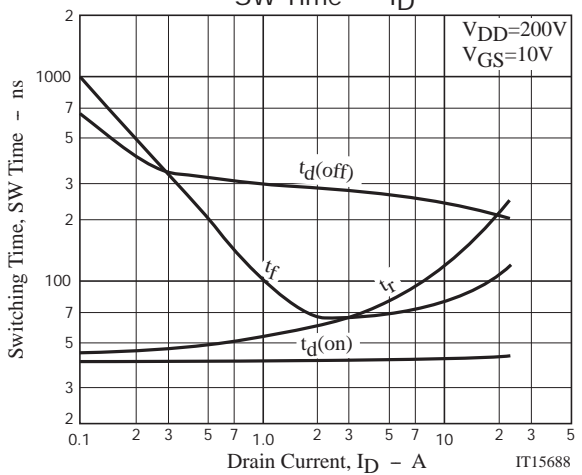
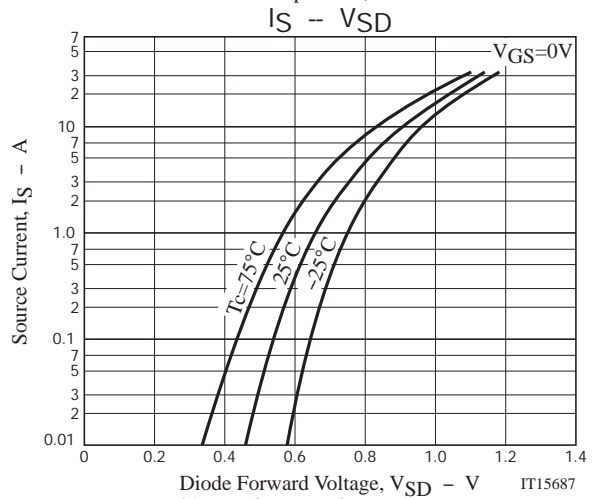
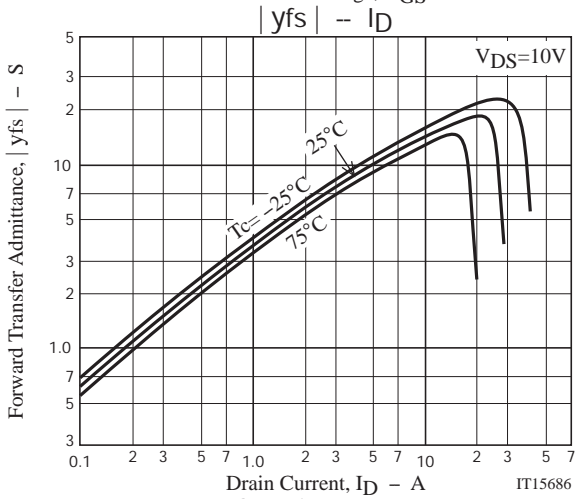
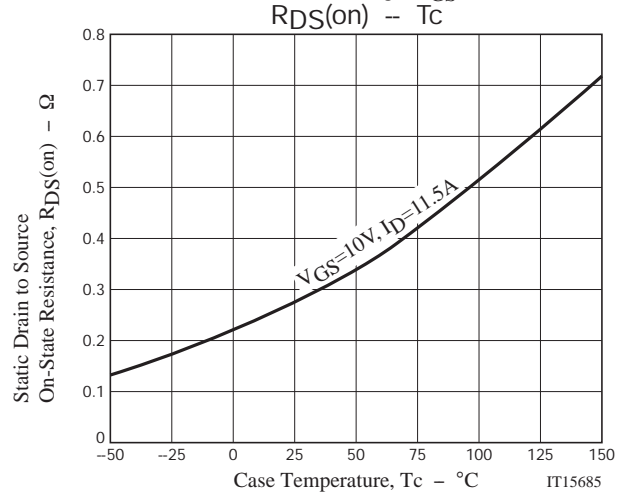
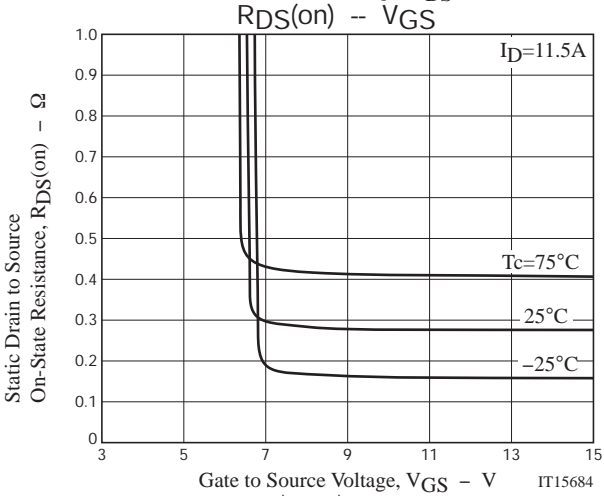
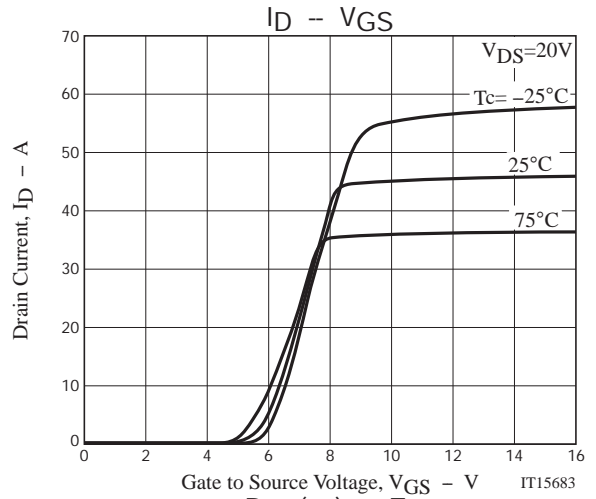
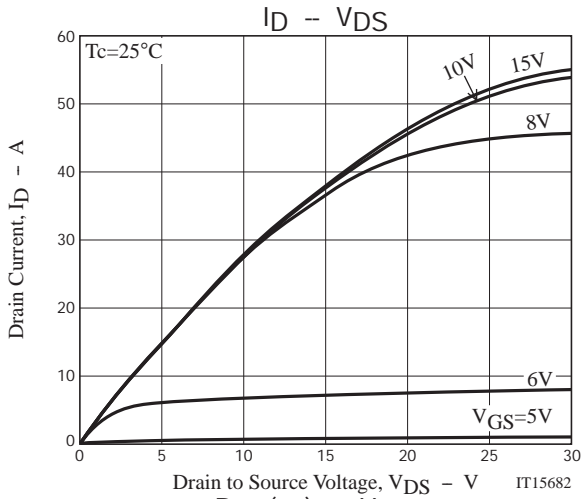
Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

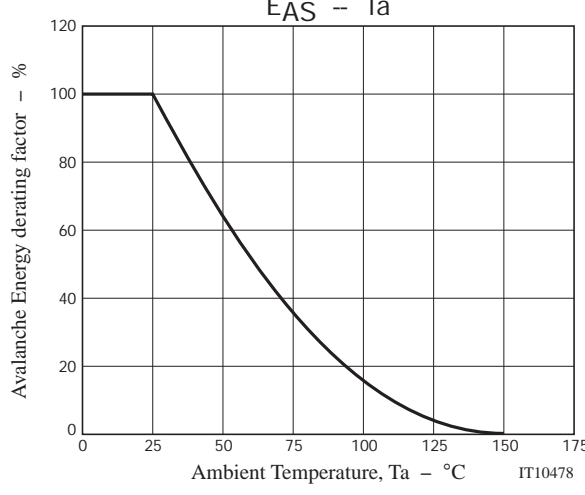
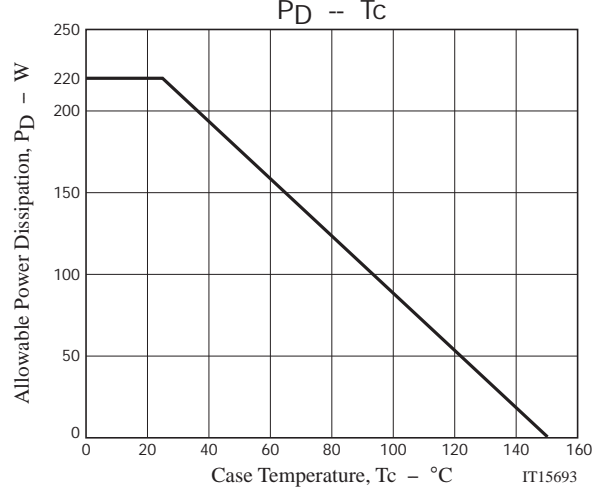
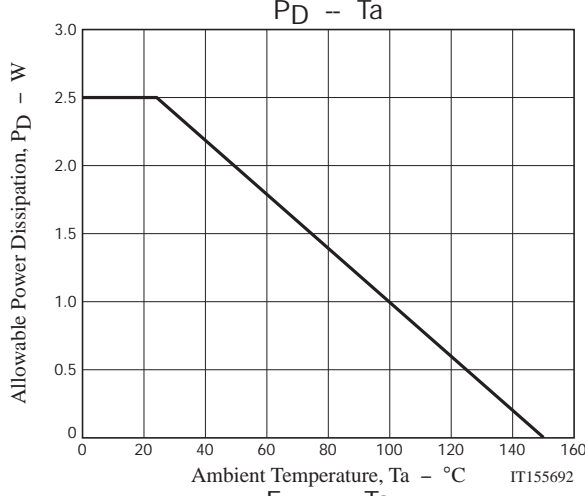
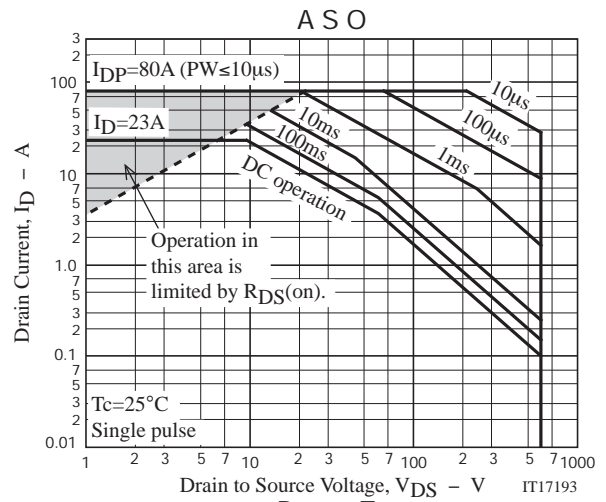
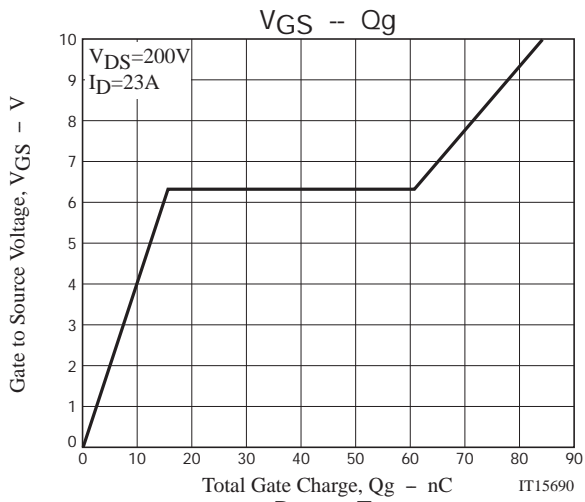
Electrical Characteristics at $T_a=25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings			Unit	
			min	typ	max		
Drain to Source Breakdown Voltage	$V_{(BR)DSS}$	$I_D=10\text{mA}$, $V_{GS}=0\text{V}$	600			V	
Zero-Gate Voltage Drain Current	I_{DSS}	$V_{DS}=480\text{V}$, $V_{GS}=0\text{V}$			100	μA	
Gate to Source Leakage Current	I_{GSS}	$V_{GS}=\pm 30\text{V}$, $V_{DS}=0\text{V}$			± 100	nA	
Cutoff Voltage	$V_{GS(off)}$	$V_{DS}=10\text{V}$, $I_D=1\text{mA}$	3		5	V	
Forward Transfer Admittance	$ y_{fs} $	$V_{DS}=10\text{V}$, $I_D=11.5\text{A}$	7.5	15		S	
Static Drain to Source On-State Resistance	$R_{DS(on)}$	$I_D=11.5\text{A}$, $V_{GS}=10\text{V}$		0.28	0.36	Ω	
Input Capacitance	C_{iss}	$V_{DS}=30\text{V}$, $f=1\text{MHz}$		2200		pF	
Output Capacitance	C_{oss}				400		pF
Reverse Transfer Capacitance	C_{rss}				83		pF
Turn-ON Delay Time	$t_d(on)$				42		ns
Rise Time	t_r	See Fig.2		130		ns	
Turn-OFF Delay Time	$t_d(off)$				234		ns
Fall Time	t_f				84		ns
Total Gate Charge	Q_g	$V_{DS}=200\text{V}$, $V_{GS}=10\text{V}$, $I_D=23\text{A}$		84		nC	
Gate to Source Charge	Q_{gs}				15.2		nC
Gate to Drain "Miller" Charge	Q_{gd}				45.4		nC
Diode Forward Voltage	V_{SD}	$I_S=23\text{A}$, $V_{GS}=0\text{V}$		1.1	1.5	V	
Reverse Recovery Time	t_{rr}	See Fig.3		115		ns	
Reverse Recovery Charge	Q_{rr}	$I_{SD}=23\text{A}$, $V_{GS}=0\text{V}$, $di/dt=100\text{A}/\mu\text{s}$		340		nC	

ORDERING INFORMATION

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





WPB4002

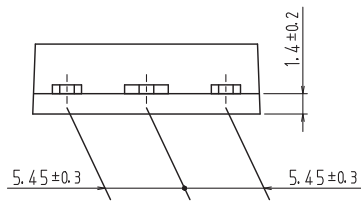
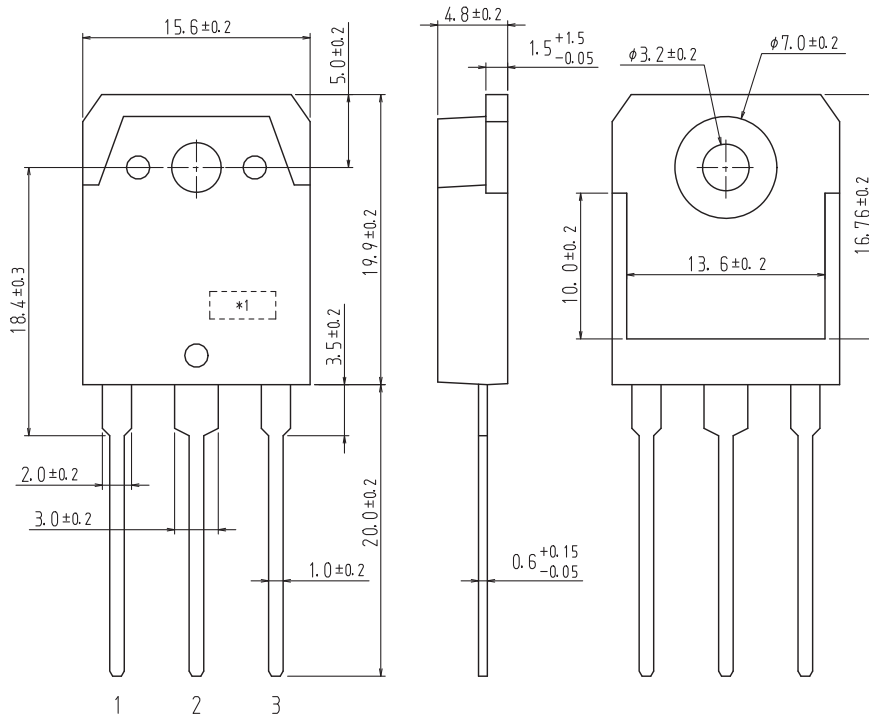
Package Dimensions

WPB4002-1E

TO-3P-3L
CASE 340AF
ISSUE O

Unit : mm

- 1: Gate
- 2: Drain
- 3: Source



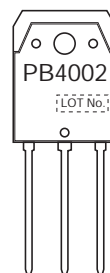
These dimension do not include mold protrusion

*1: Lot indication

Ordering & Package Information

Device	Package	Shipping	memo
WPB4002-1E	TO-3P-3L SC-65, SOT-199, TO-247	30 pcs./tube	Pb-Free

Marking



Electrical Connection

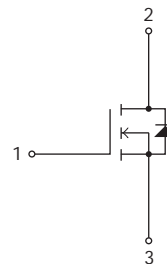


Fig.1 Unclamped Inductive Switching Test Circuit

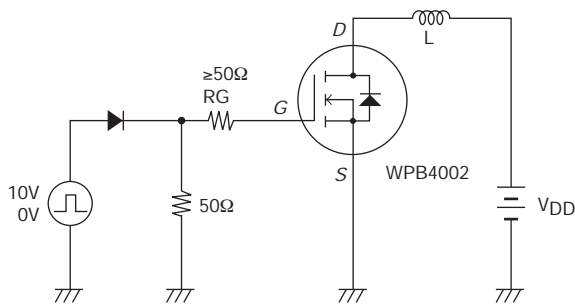


Fig.2 Switching Time Test Circuit

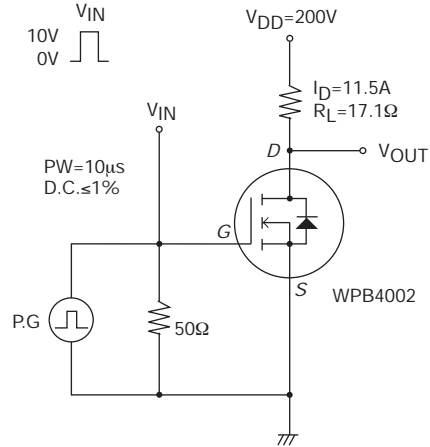
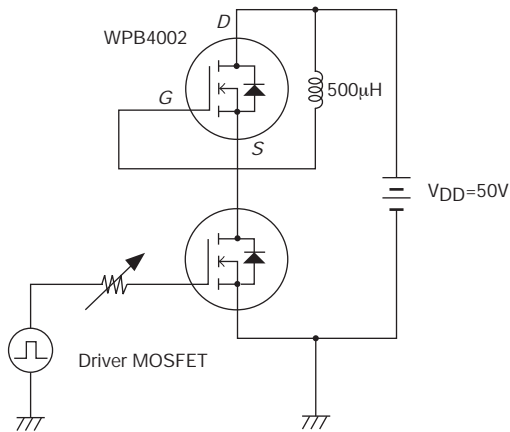


Fig.3 Reverse Recovery Resistance Test Circuit



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

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