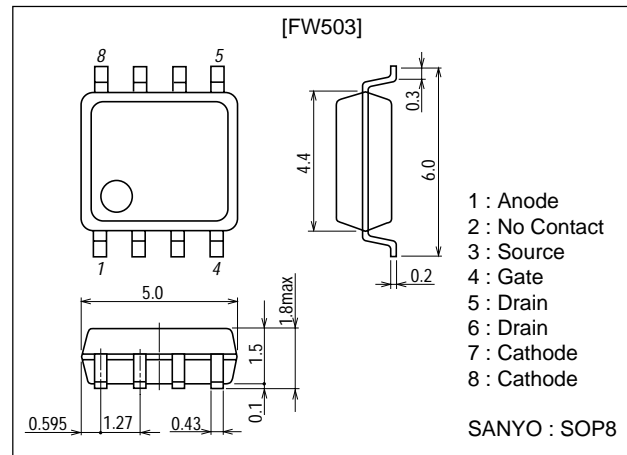


**FW503****DC / DC Converter Applications****Features**

- Composite type with a low ON-resistance, ultrahigh-speed switching, low voltage drive, P-channel MOSFET and a short reverse recovery time, low forward voltage schottky barrier diode facilitating high-density mounting.
- The FW503 incorporates two chips being equivalent to the MCH3306 and the SBS004 in one package.

**Package Dimensions**unit : mm  
2210**Specifications****Absolute Maximum Ratings** at  $T_a=25^\circ\text{C}$ 

Parameter	Symbol	Conditions	Ratings	Unit
[MOSFET]				
Drain-to-Source Voltage	$V_{DSS}$		-20	V
Gate-to-Source Voltage	$V_{GSS}$		$\pm 10$	V
Drain Current (DC)	$I_D$		-3	A
Drain Current (Pulse)	$I_{DP}$	$PW \leq 10\mu\text{s}$ , duty cycle $\leq 1\%$	-12	A
Allowable Power Dissipation	$P_D$	Mounted on a ceramic board (2000mm <sup>2</sup> X0.8mm) $\leq 10\text{S}$	2	W
Channel Temperature	$T_{ch}$		150	$^\circ\text{C}$
Storage Temperature	$T_{stg}$		-55 to +125	$^\circ\text{C}$
[SBD]				
Repetitive Peak Reverse Voltage	$V_{RRM}$		15	V
Nonrepetitive Peak Reverse Surge Voltage	$V_{RSM}$		15	V
Average Output Current	$I_O$		1	A
Surge Forward Current	$I_{FSM}$	50Hz sine wave, 1 cycle	10	A
Junction Temperature	$T_J$		-55 to +125	$^\circ\text{C}$
Storage Temperature	$T_{stg}$		-55 to +125	$^\circ\text{C}$

Marking : W503

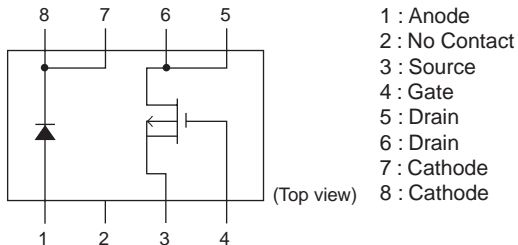
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# FW503

## Electrical Characteristics at Ta=25°C

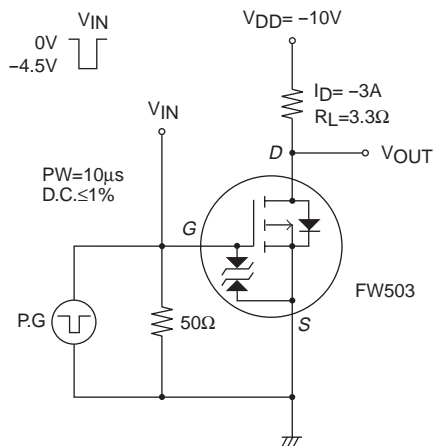
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
[MOSFET]						
Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	$I_D = -1mA, V_{GS} = 0$	-20			V
Zero-Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = -20V, V_{GS} = 0$			-10	$\mu A$
Gate-to-Source Leakage Current	$I_{GSS}$	$V_{GS} = \pm 8V, V_{DS} = 0$			$\pm 10$	$\mu A$
Cutoff Voltage	$V_{GS(off)}$	$V_{DS} = -10V, I_D = -1mA$	-0.3		-1.0	V
Forward Transfer Admittance	$ y_{fs} $	$V_{DS} = -10V, I_D = -3A$	3.5	5		S
Static Drain-to-Source On-State Resistance	$R_{DS(on)1}$	$I_D = -3A, V_{GS} = -4.5V$		130	170	$m\Omega$
	$R_{DS(on)2}$	$I_D = -2.5A, V_{GS} = -2.5V$		170	240	$m\Omega$
	$R_{DS(on)3}$	$I_D = -0.1A, V_{GS} = -1.8V$		230	340	$m\Omega$
Input Capacitance	$C_{iss}$	$V_{DS} = -10V, f = 1MHz$		410		pF
Output Capacitance	$C_{oss}$	$V_{DS} = -10V, f = 1MHz$		60		pF
Reverse Transfer Capacitance	$C_{rss}$	$V_{DS} = -10V, f = 1MHz$		40		pF
Turn-ON Delay Time	$t_{d(on)}$	See specified Test Circuit.		9		ns
Rise Time	$t_r$	See specified Test Circuit.		27		ns
Turn-OFF Delay Time	$t_{d(off)}$	See specified Test Circuit.		42		ns
Fall Time	$t_f$	See specified Test Circuit.		38		ns
Total Gate Charge	$Q_g$	$V_{DS} = -10V, V_{GS} = -4.5V, I_D = -3A$		5.0		nC
Gate-to-Source Charge	$Q_{gs}$	$V_{DS} = -10V, V_{GS} = -4.5V, I_D = -3A$		0.6		nC
Gate-to-Drain "Miller" Charge	$Q_{gd}$	$V_{DS} = -10V, V_{GS} = -4.5V, I_D = -3A$		1.2		nC
Diode Forward Voltage	$V_{SD}$	$I_S = -3A, V_{GS} = 0$		-1.0	-1.2	V
[SBD]						
Reverse Voltage	$V_R$	$I_R = 1mA$	15			V
Forward Voltage	$V_{F1}$	$I_F = 0.5A$		0.3	0.35	V
	$V_{F2}$	$I_F = 1A$		0.35	0.4	V
Reverse Current	$I_R$	$V_R = 15V$			500	$\mu A$
Interterminal Capacitance	$C$	$V_R = 10V, f = 1MHz$ cycle		42		pF
Reverse Recovery Time	$t_{rr}$	$I_F = I_R = 100mA$ , See specified Test Circuit.			15	ns

## Electrical Connection



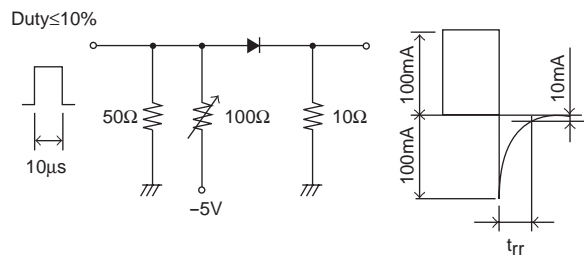
## Switching Time Test Circuit

[MOSFET]

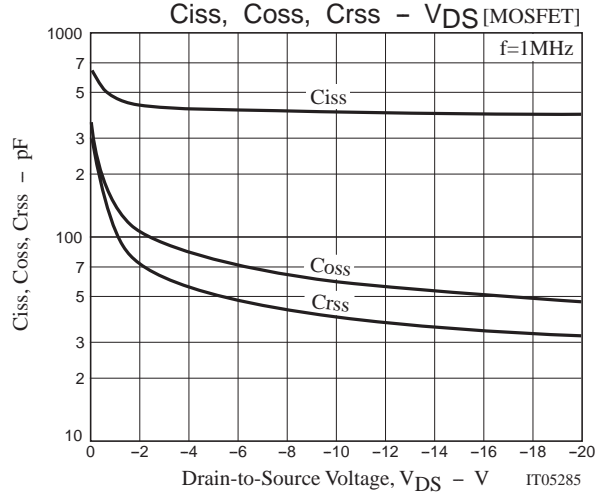
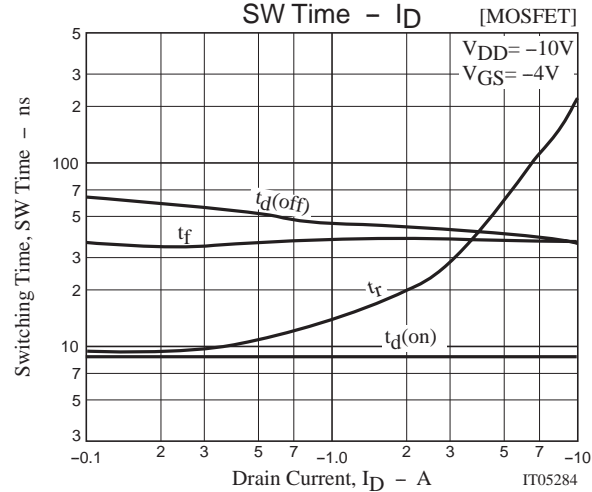
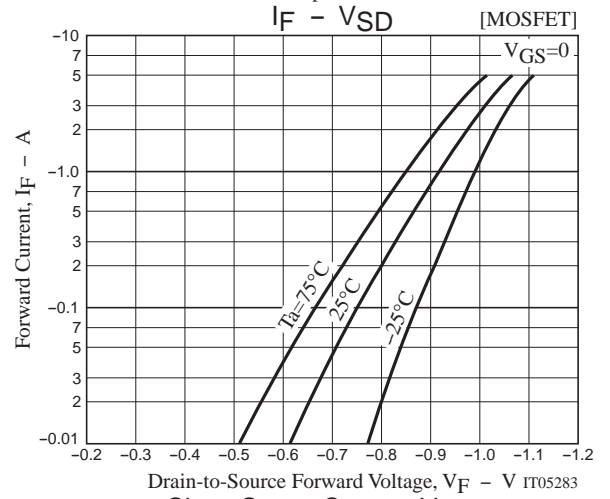
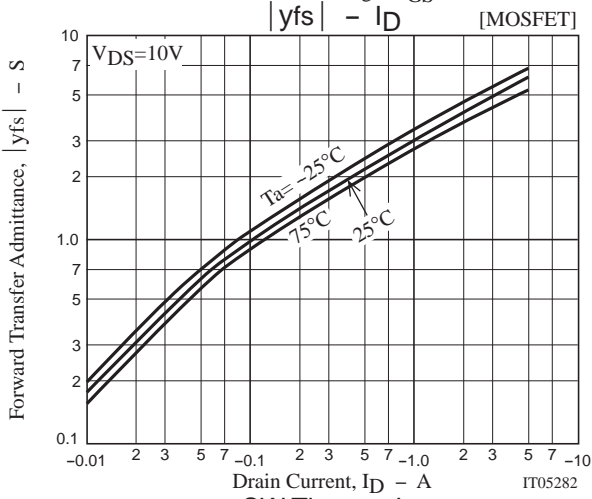
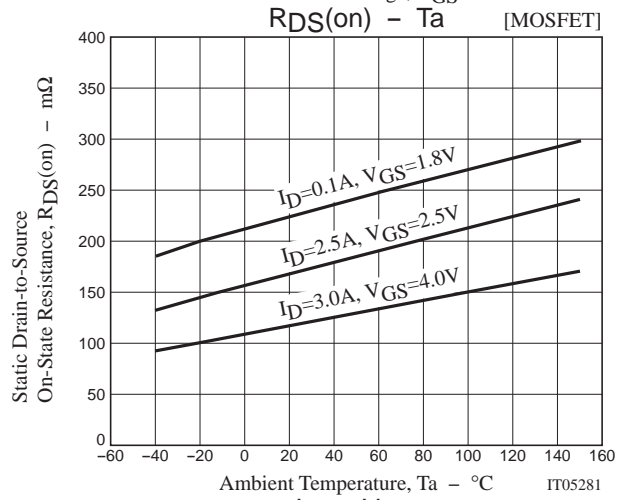
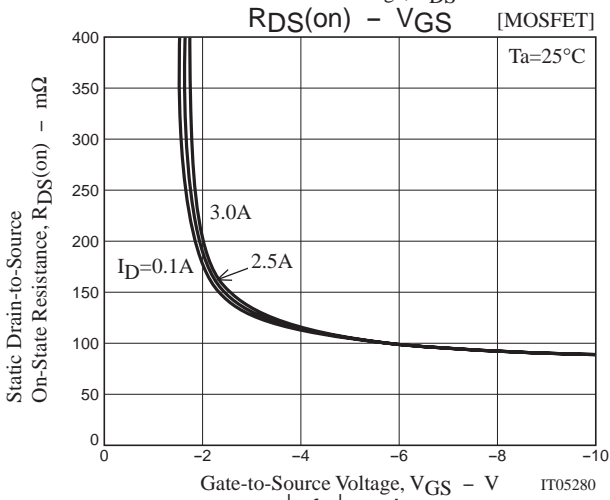
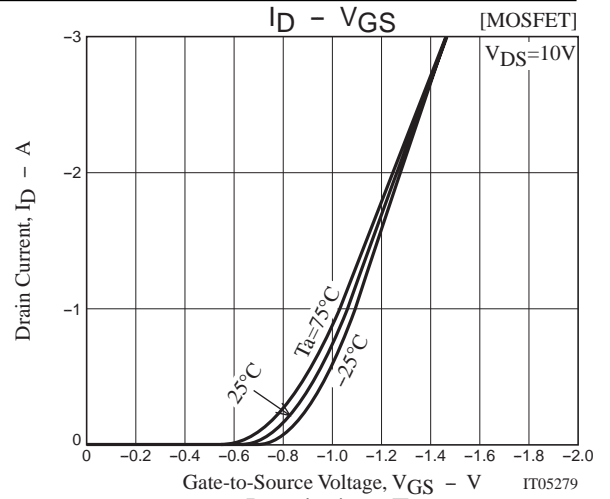
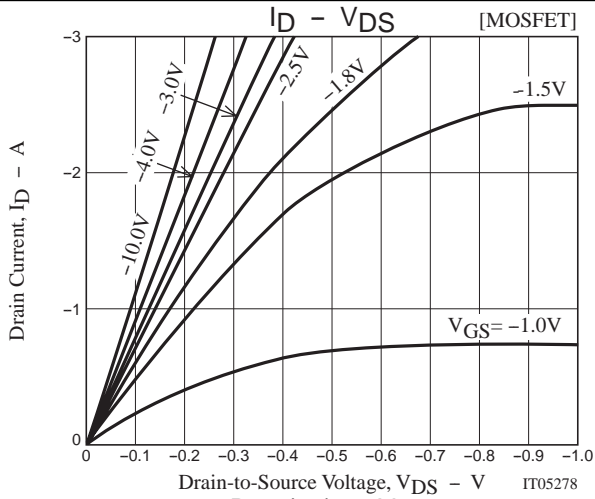


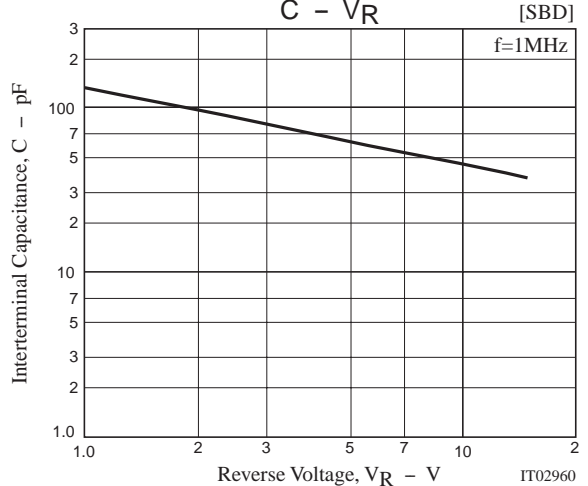
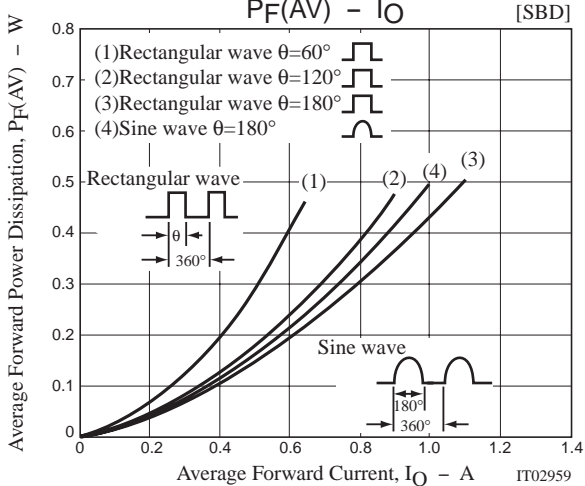
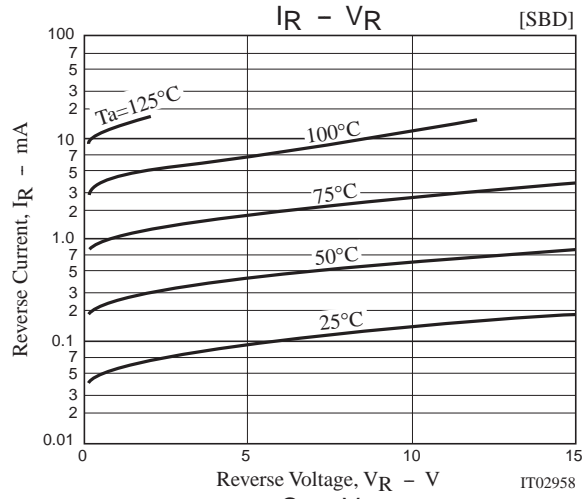
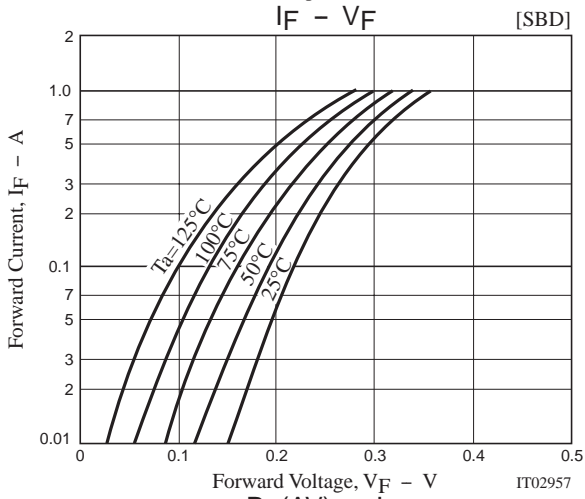
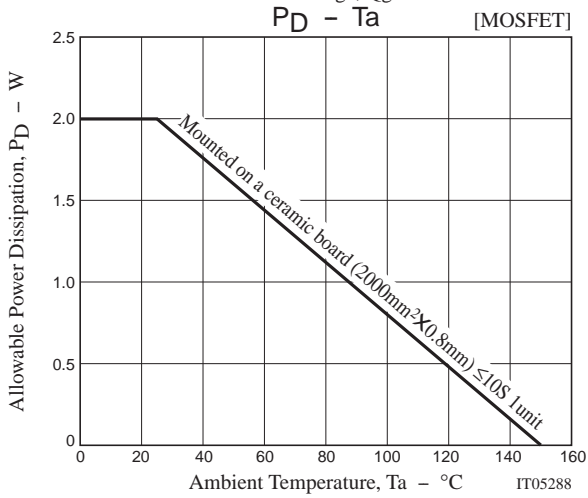
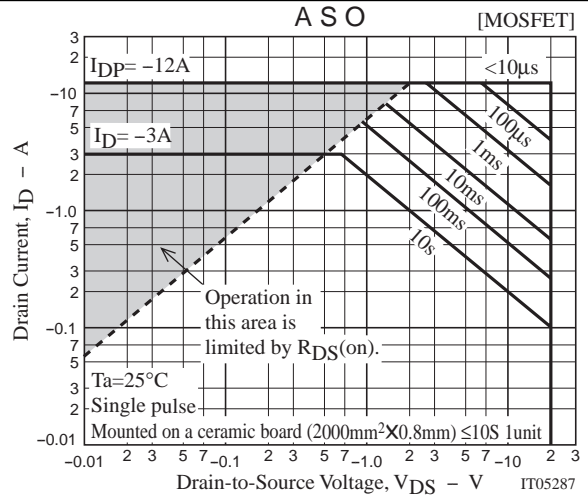
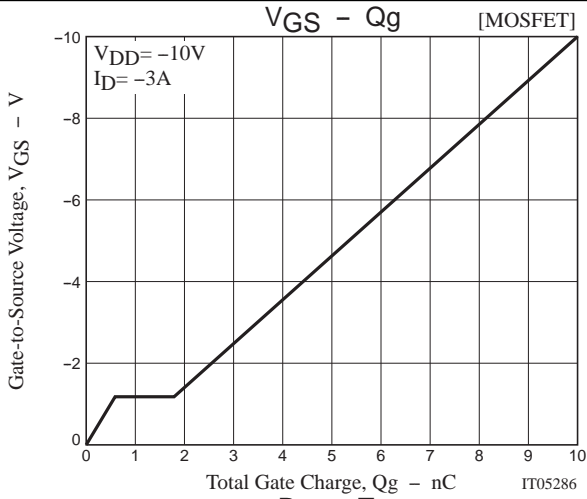
## $t_{rr}$ Test Circuit

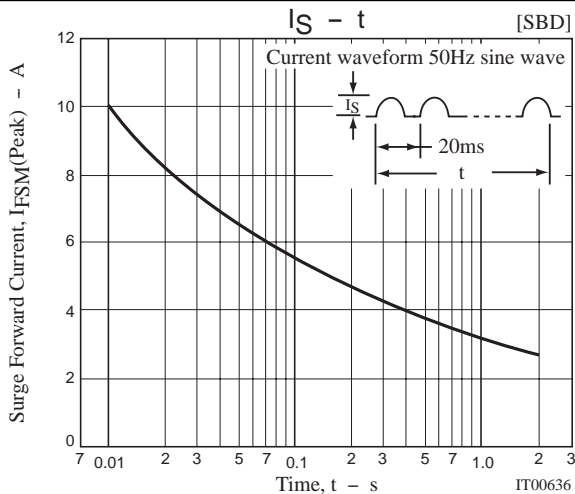
[SBD]



# FW503







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