

**FW313**

Ultrahigh-Speed Switching Applications

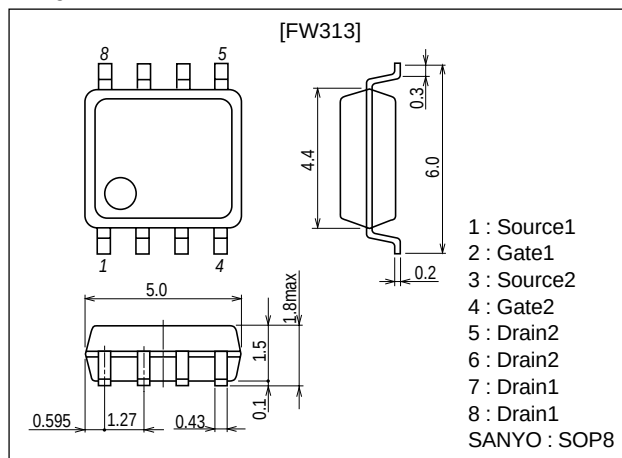
Features

- Low ON resistance.
- Ultrahigh-speed switching.
- Composite type with a N-channel MOSFET and a P-channel MOSFET driving from a 4V supply voltage contained in a single package.
- High-density mounting.

Package Dimensions

unit:mm

2129



Specifications

Absolute Maximum Ratings at Ta = 25°C

Parameter	Symbol	Conditions	Ratings		Unit
			N-channel	P-channel	
Drain-to-Source Voltage	V_{DSS}		30	-30	V
Gate-to-Source Voltage	V_{GSS}		±20	±20	V
Drain Current (DC)	I_D		7	-5	A
Drain Current (pulse)	I_{DP}	$PW \leq 10\mu s$, duty cycle $\leq 1\%$	28	-20	A
Allowable Power Dissipation	P_D	Mounted on a ceramic board (1000mm ² ×0.8mm) 1unit	1.7		W
Total Dissipation	P_T	Mounted on a ceramic board (1000mm ² ×0.8mm)	2.0		W
Channel Temperature	T_{ch}		150		°C
Storage Temperature	T_{stg}		-55 to +150		°C

Electrical Characteristics at Ta = 25°C

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
[N-channel]						
Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	$I_D=1mA, V_{GS}=0$	30			V
Zero-Gate Voltage Drain Current	I_{DSS}	$V_{DS}=30V, V_{GS}=0$			10	μA
Gate-to-Source Leakage Current	I_{GSS}	$V_{GS}=\pm 16V, V_{DS}=0$			± 10	μA
Cutoff Voltage	$V_{GS(off)}$	$V_{DS}=10V, I_D=1mA$	1.0		2.4	V
Forward Transfer Admittance	$ y_{fs} $	$V_{DS}=10V, I_D=7A$	9	13		S
Static Drain-to-Source On-State Resistance	$R_{DS(on)1}$	$I_D=7A, V_{GS}=10V$		25	32	m Ω
	$R_{DS(on)2}$	$I_D=4A, V_{GS}=4V$		37	50	m Ω

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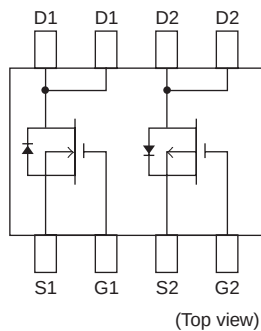
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Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Input Capacitance	C_{iss}	$V_{DS}=10V, f=1MHz$		700		pF
Output Capacitance	C_{oss}	$V_{DS}=10V, f=1MHz$		380		pF
Reverse Transfer Capacitance	C_{rss}	$V_{DS}=10V, f=1MHz$		180		pF
Turn-ON Delay Time	$t_{d(on)}$	See specified Test Circuit		15		ns
Rise Time	t_r	See specified Test Circuit		180		ns
Turn-OFF Delay Time	$t_{d(off)}$	See specified Test Circuit		90		ns
Fall Time	t_f	See specified Test Circuit		80		ns
Total Gate Charge	Q_g	$V_{DS}=10V, V_{GS}=10V, I_D=7A$		22		nC
Gate-to-Source Charge	Q_{gs}	$V_{DS}=10V, V_{GS}=10V, I_D=7A$		5		nC
Gate-to-Drain "Miller" Charge	Q_{gd}	$V_{DS}=10V, V_{GS}=10V, I_D=7A$		6		nC
Diode Forward Voltage	V_{SD}	$I_S=7A, V_{GS}=0$		0.85	1.2	V
[P-channel]						
Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	$I_D=-1mA, V_{GS}=0$	-30			V
Zero-Gate Voltage Drain Current	I_{DSS}	$V_{DS}=-30V, V_{GS}=0$			-10	μA
Gate-to-Source Leakage Current	I_{GSS}	$V_{GS}=\pm 16V, V_{DS}=0$			± 10	μA
Cutoff Voltage	$V_{GS(off)}$	$V_{DS}=-10V, I_D=-1mA$	-1.0		-2.5	V
Forward Transfer Admittance	$ y_{fs} $	$V_{DS}=-10V, I_D=-5A$	5	8		S
Static Drain-to-Source On-State Resistance	$R_{DS(on)1}$	$I_D=-5A, V_{GS}=-10V$		42	53	$m\Omega$
	$R_{DS(on)2}$	$I_D=-2A, V_{GS}=-4V$		85	120	$m\Omega$
Input Capacitance	C_{iss}	$V_{DS}=-10V, f=1MHz$		820		pF
Output Capacitance	C_{oss}	$V_{DS}=-10V, f=1MHz$		470		pF
Reverse Transfer Capacitance	C_{rss}	$V_{DS}=-10V, f=1MHz$		230		pF
Turn-ON Delay Time	$t_{d(on)}$	See specified Test Circuit		15		ns
Rise Time	t_r	See specified Test Circuit		150		ns
Turn-OFF Delay Time	$t_{d(off)}$	See specified Test Circuit		85		ns
Fall Time	t_f	See specified Test Circuit		90		ns
Total Gate Charge	Q_g	$V_{DS}=-10V, V_{GS}=-10V, I_D=-5A$		25		nC
Gate-to-Source Charge	Q_{gs}	$V_{DS}=-10V, V_{GS}=-10V, I_D=-5A$		5		nC
Gate-to-Drain "Miller" Charge	Q_{gd}	$V_{DS}=-10V, V_{GS}=-10V, I_D=-5A$		7		nC
Diode Forward Voltage	V_{SD}	$I_S=-5A, V_{GS}=0$		-1.0	-1.5	V

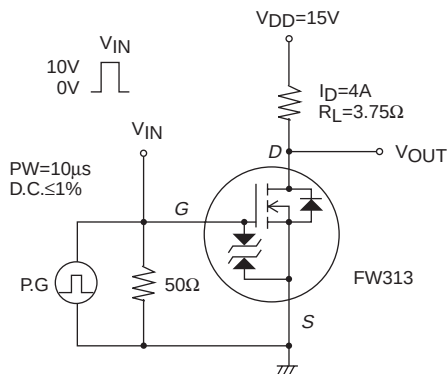
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Electrical Connection



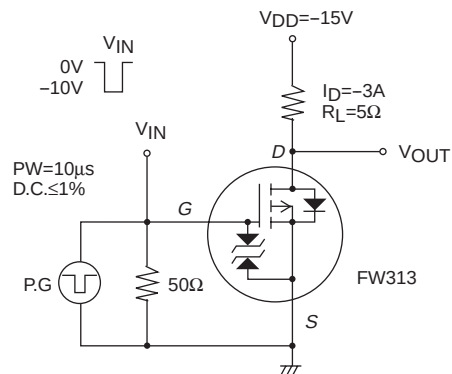
Switching Time Test Circuit

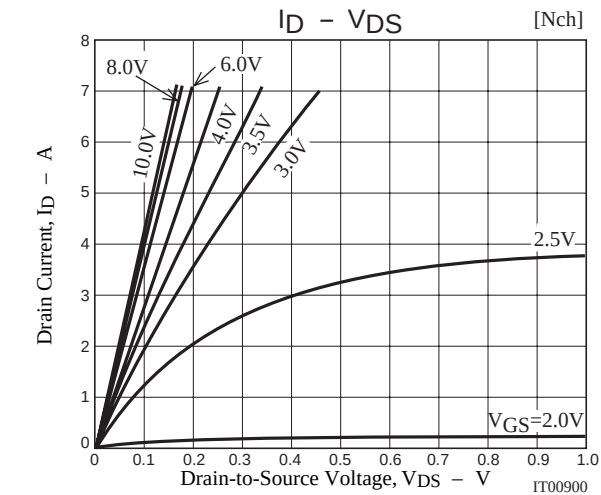
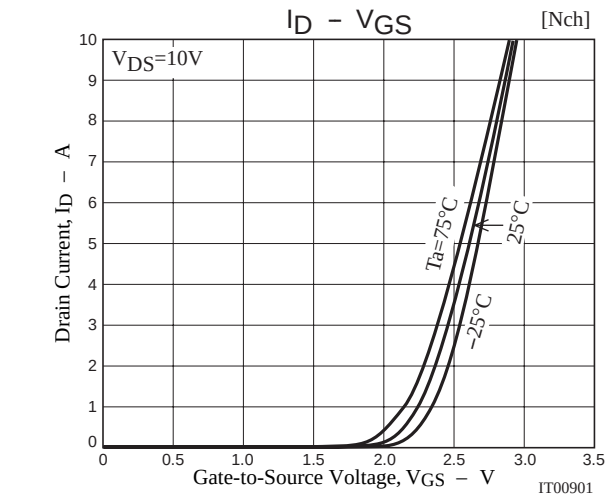
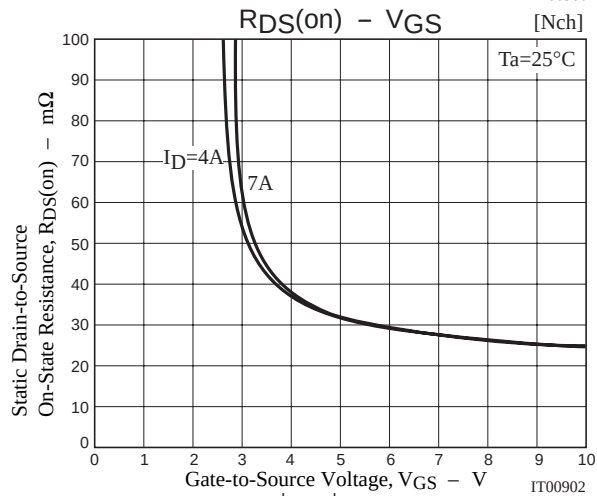
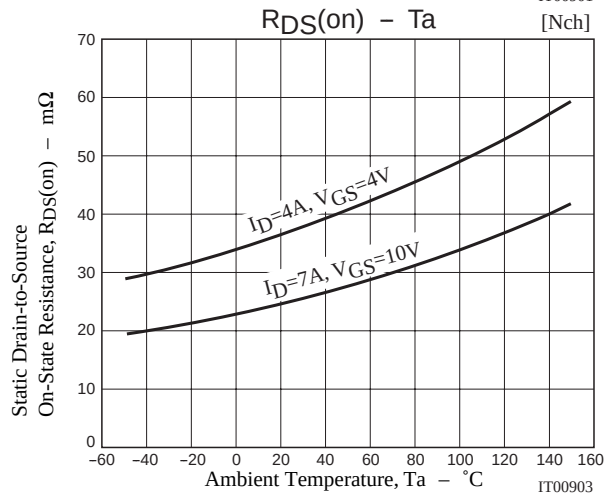
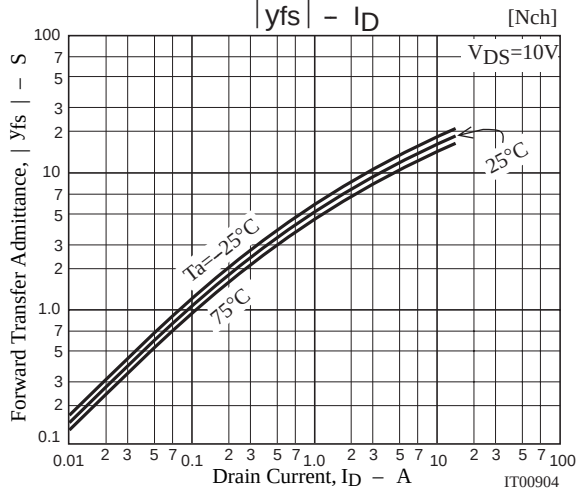
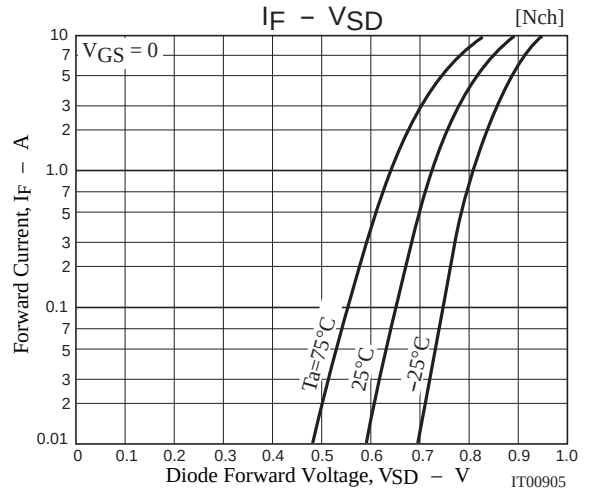
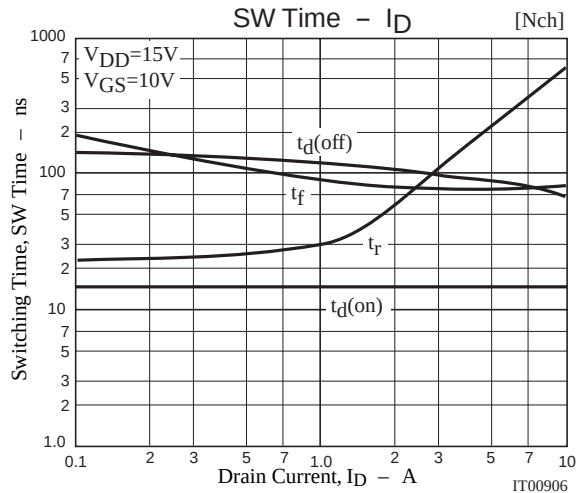
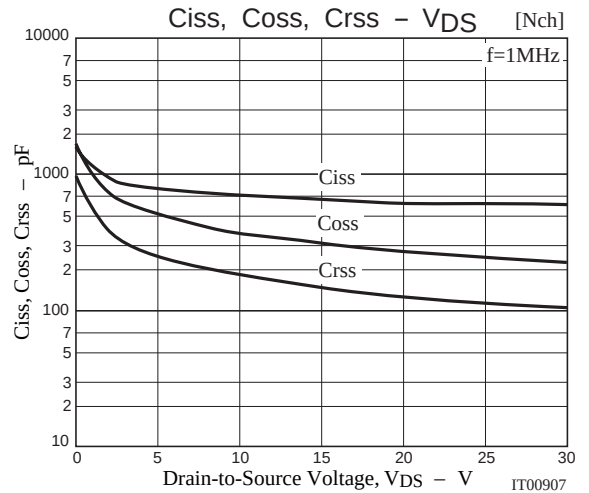
[N-channel]

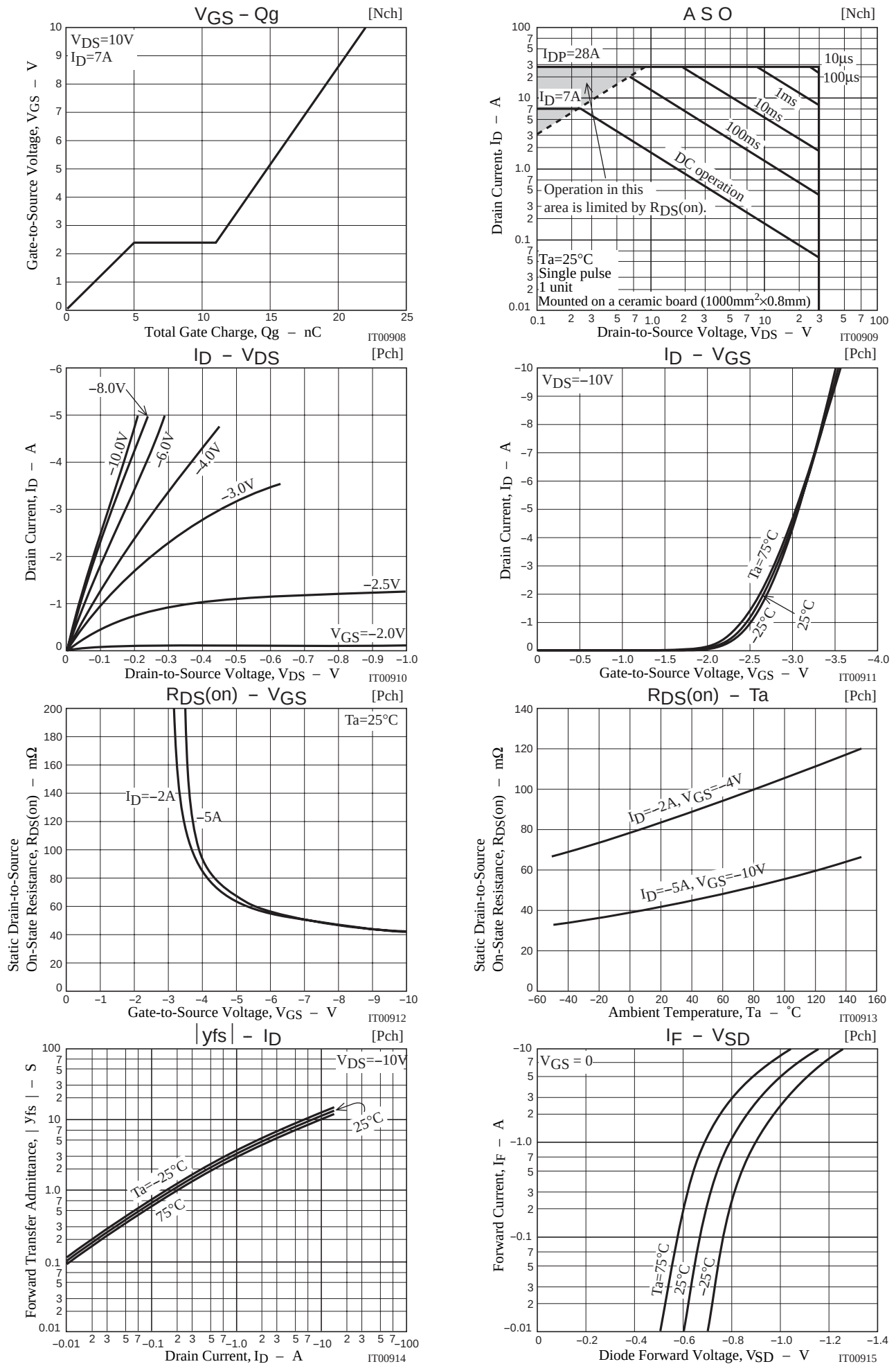


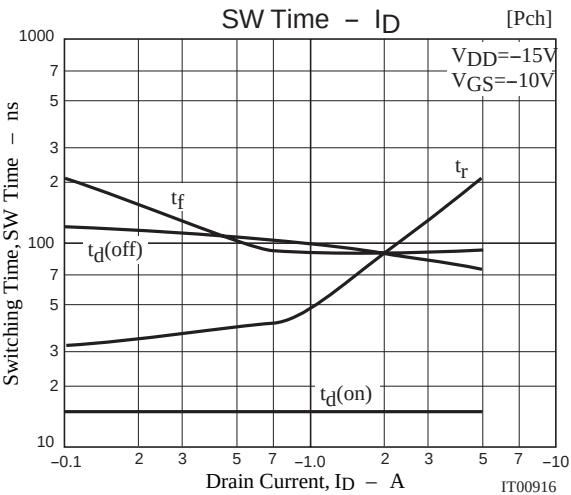
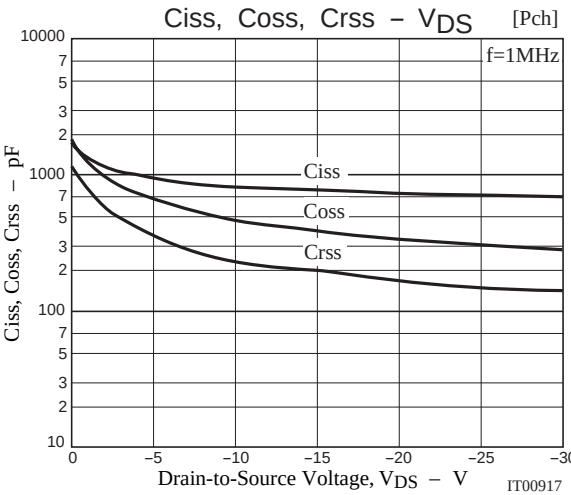
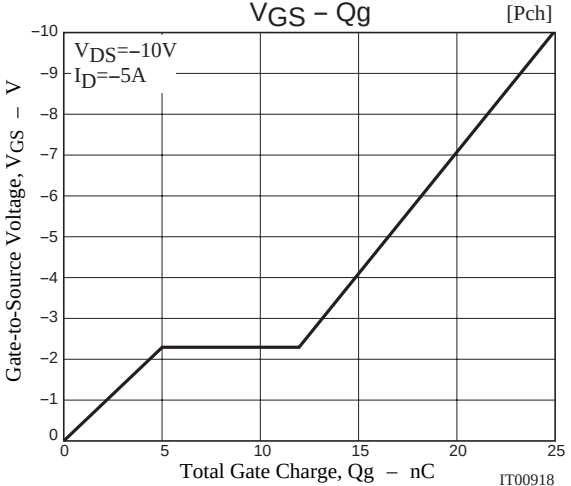
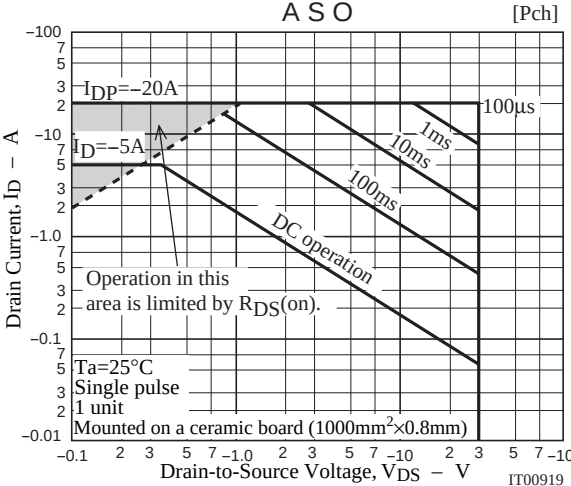
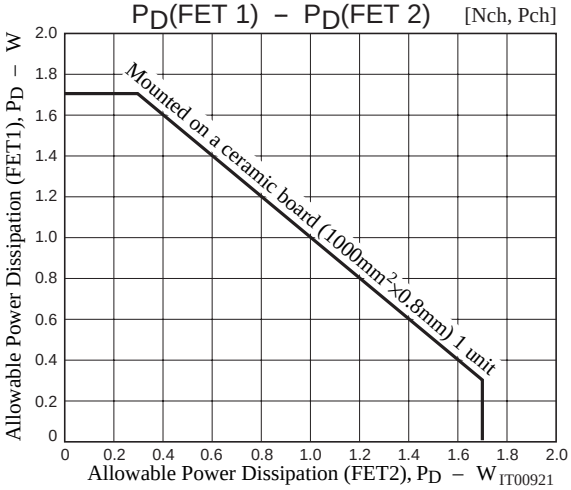
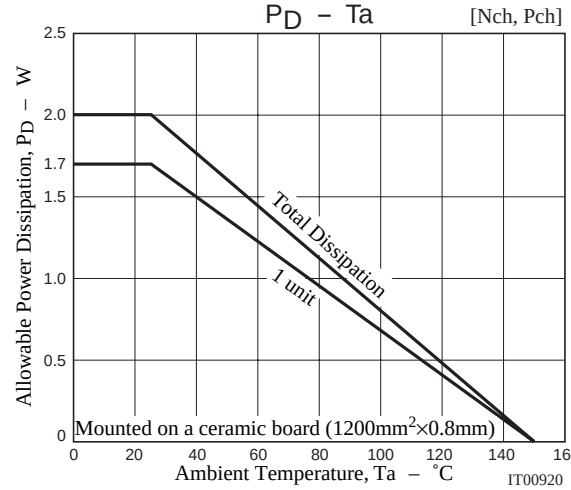
Switching Time Test Circuit

[P-channel]









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