

**FW313**

Ultrahigh-Speed Switching Applications

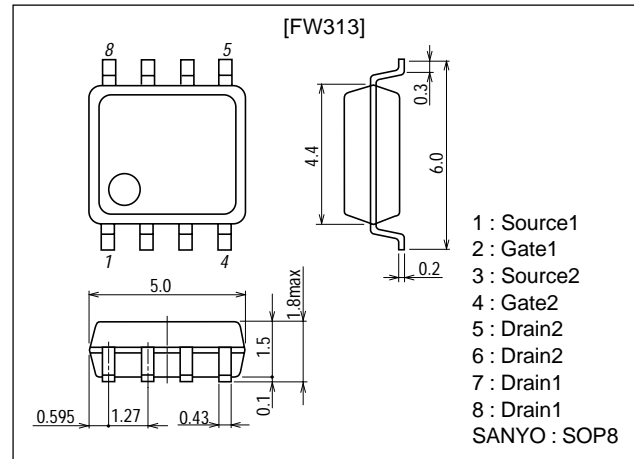
Features

- 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	mΩ
	$R_{DS(on)2}$	$I_D=4A$, $V_{GS}=4V$		37	50	mΩ

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30300TS (KOTO) TA-2373 No.6389-1/6

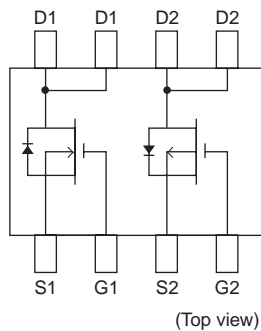
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Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Input Capacitance	C _{iss}	V _{DS} =10V, f=1MHz		700		pF
Output Capacitance	C _{oss}	V _{DS} =10V, f=1MHz		380		pF
Reverse Transfer Capacitance	C _{rss}	V _{DS} =10V, f=1MHz		180		pF
Turn-ON 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} =±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	mΩ
	R _{DS(on)2}	I _D =-2A, V _{GS} =-4V		85	120	mΩ
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

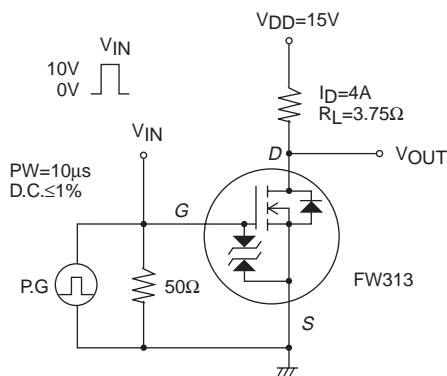
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Electrical Connection



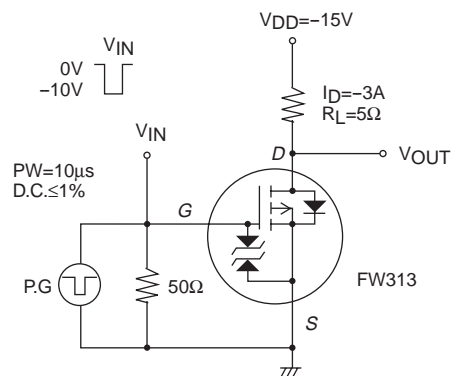
Switching Time Test Circuit

[N-channel]

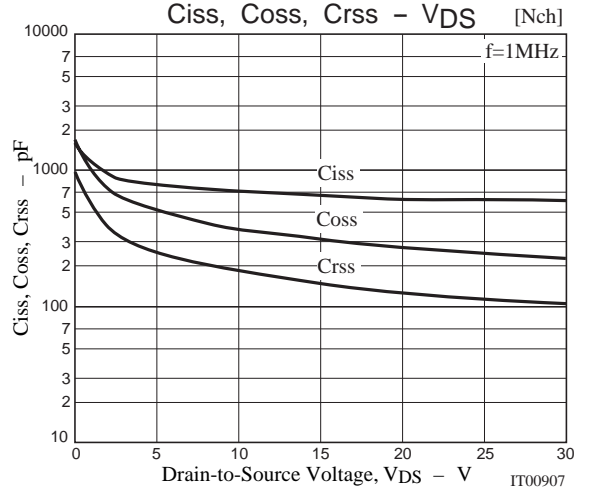
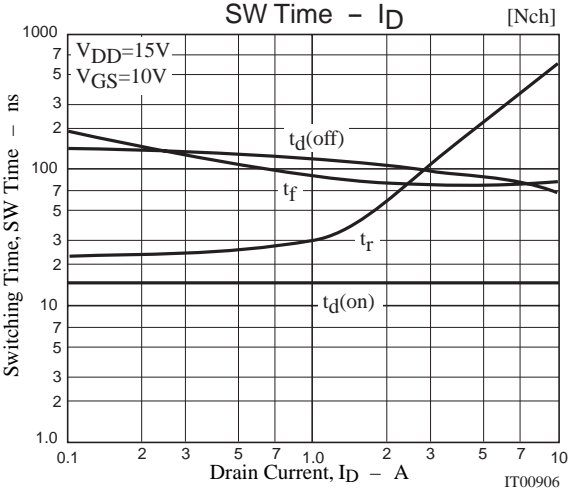
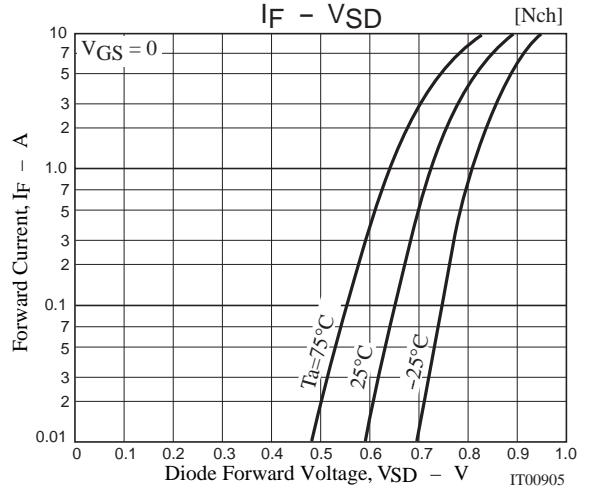
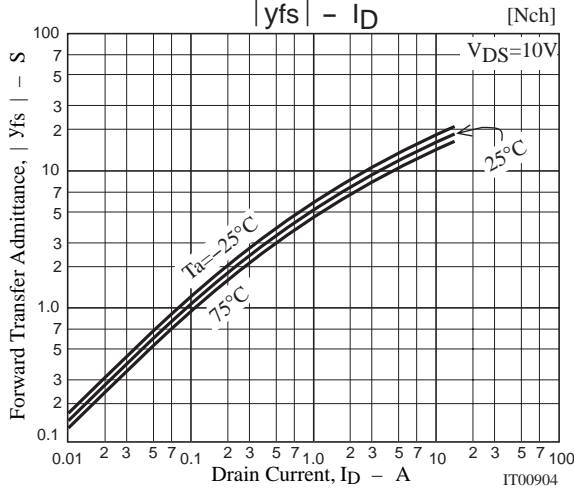
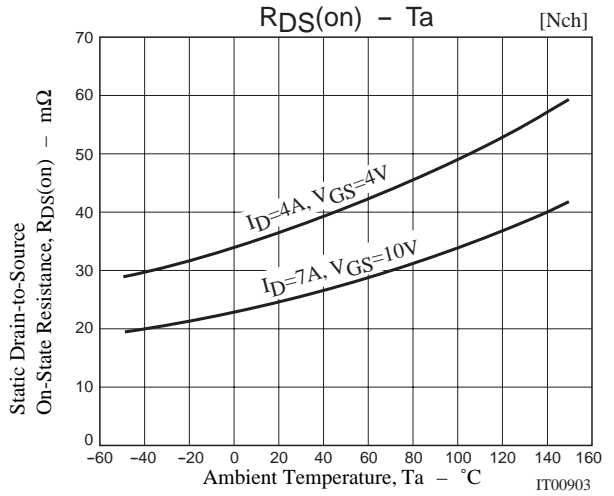
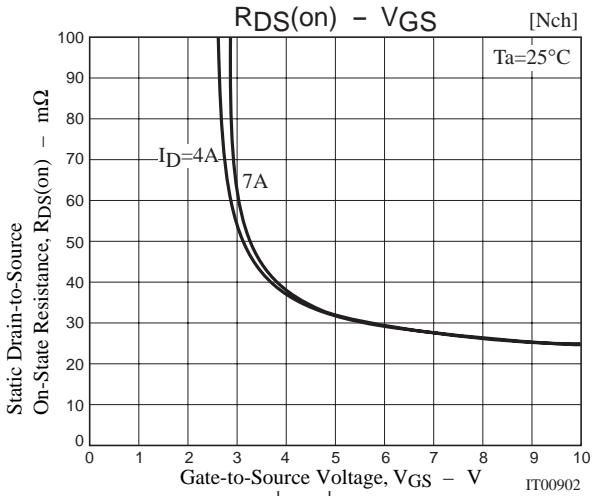
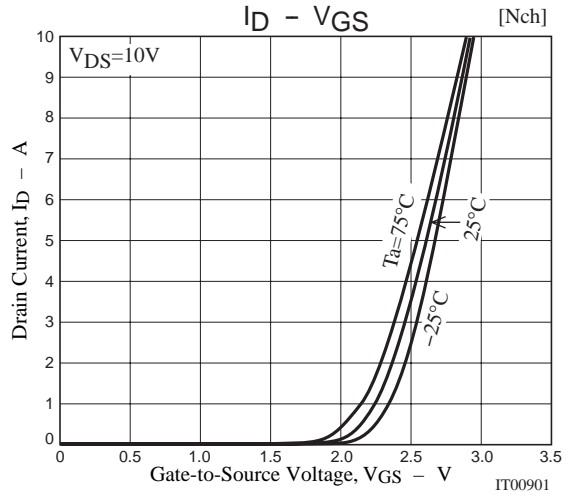
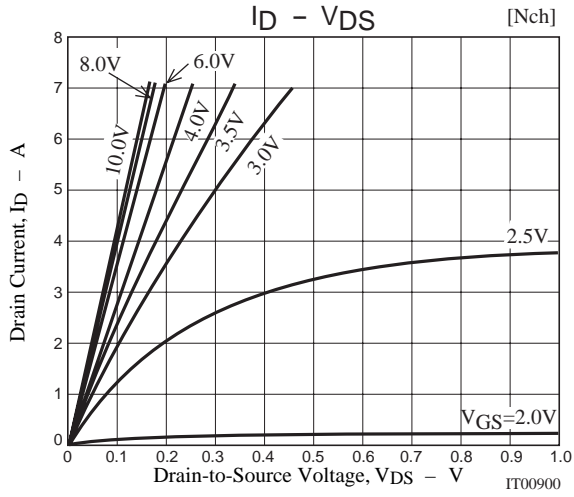


Switching Time Test Circuit

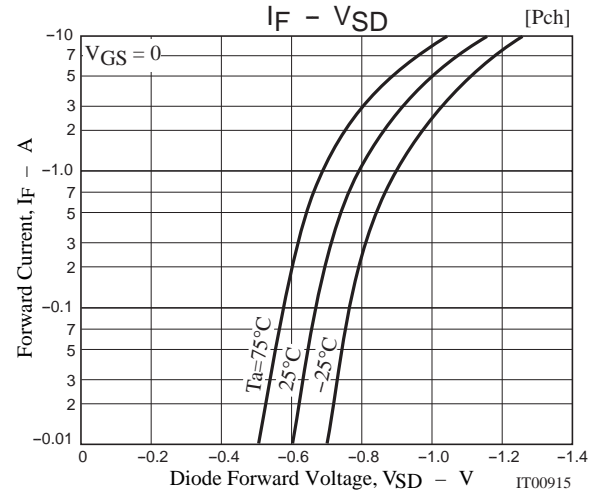
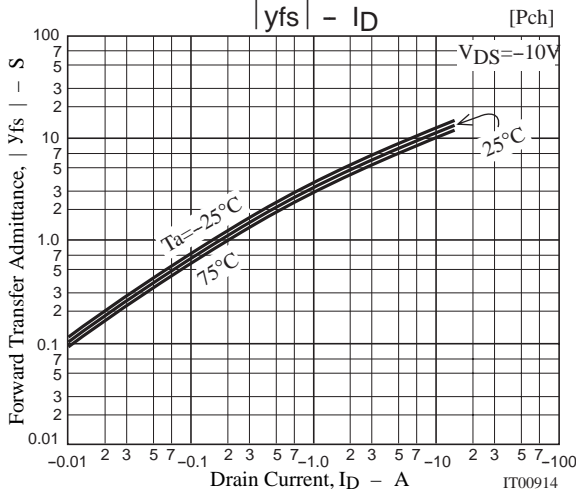
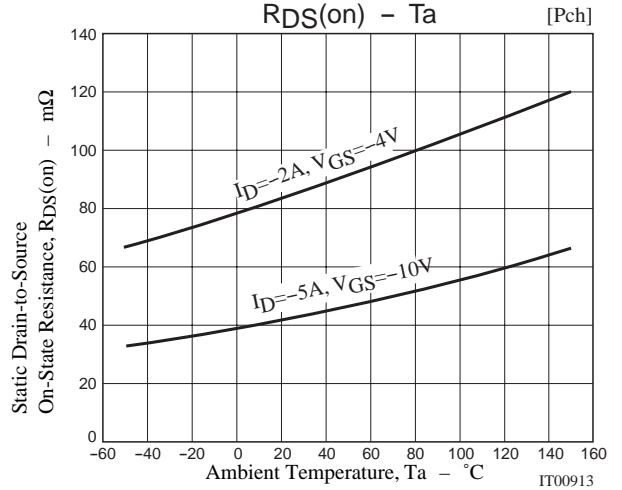
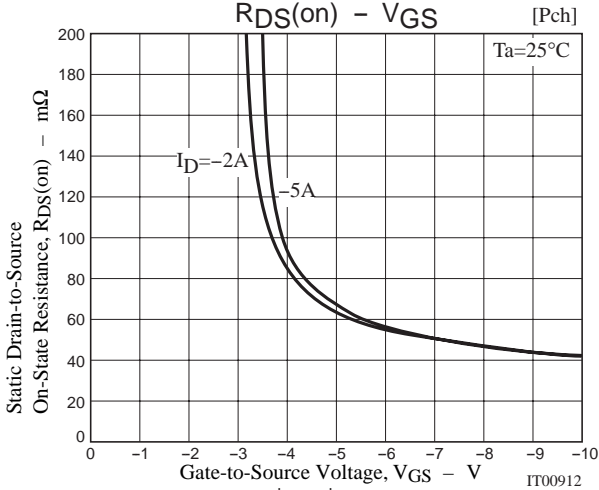
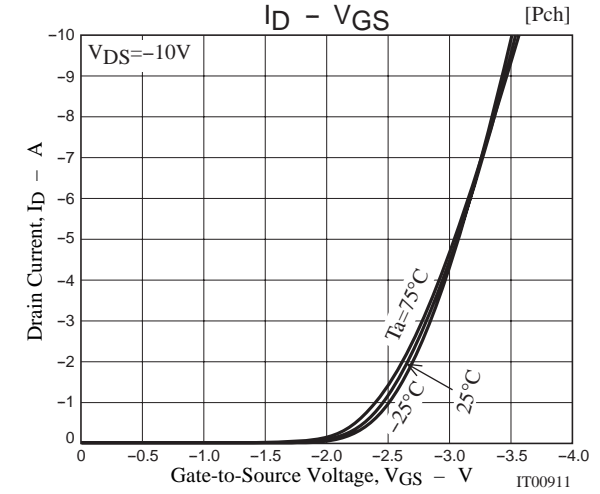
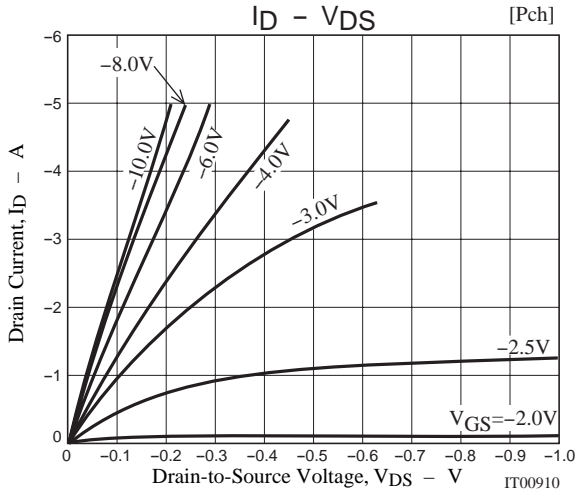
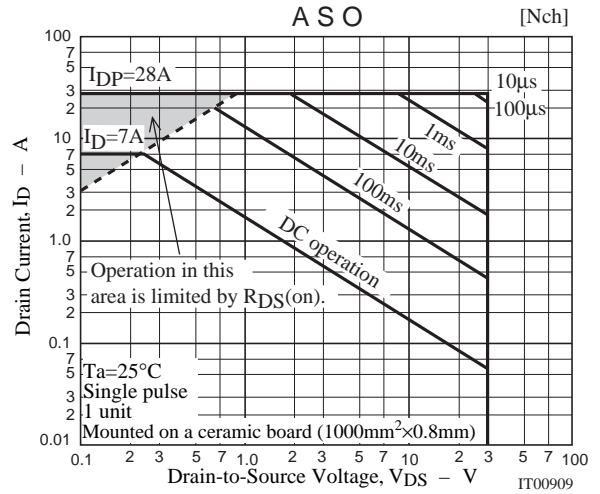
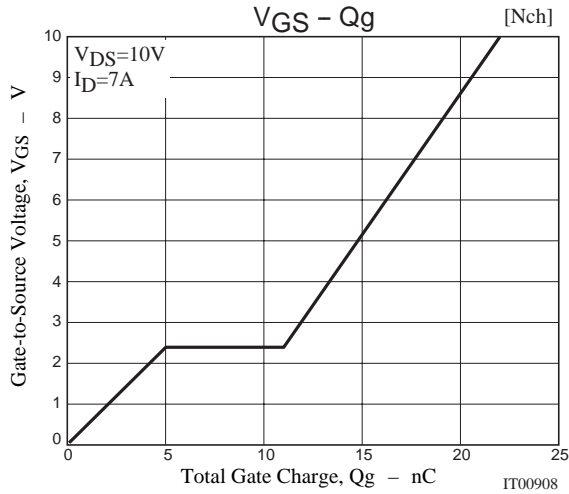
[P-channel]



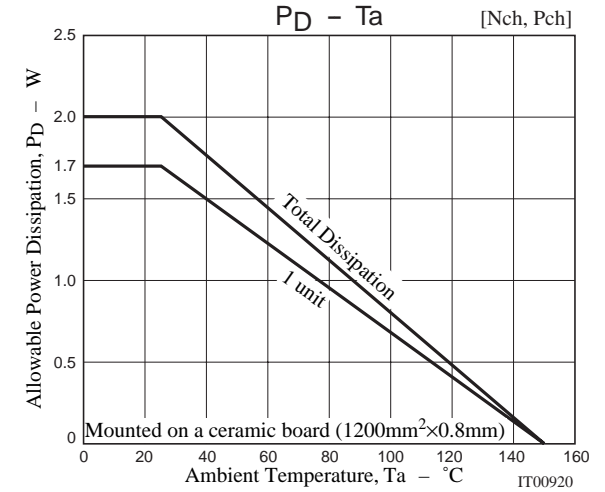
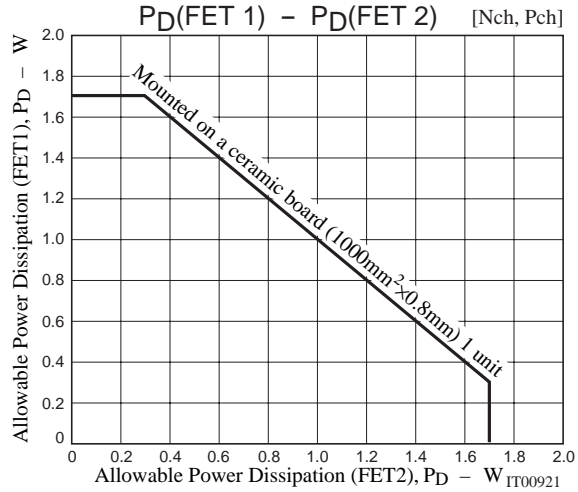
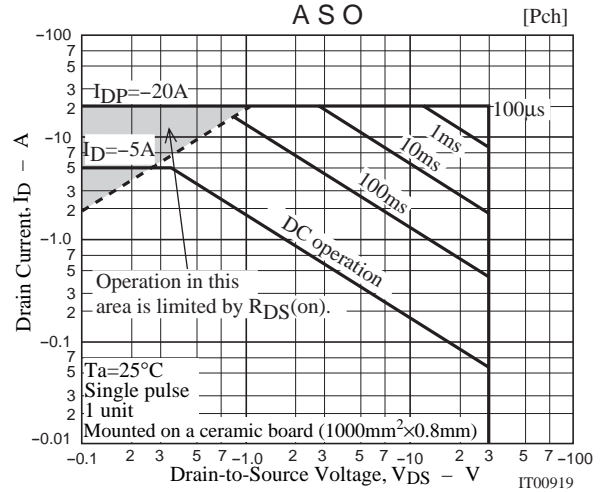
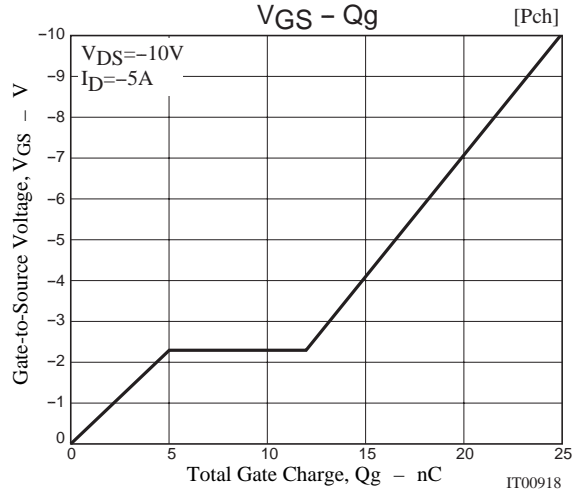
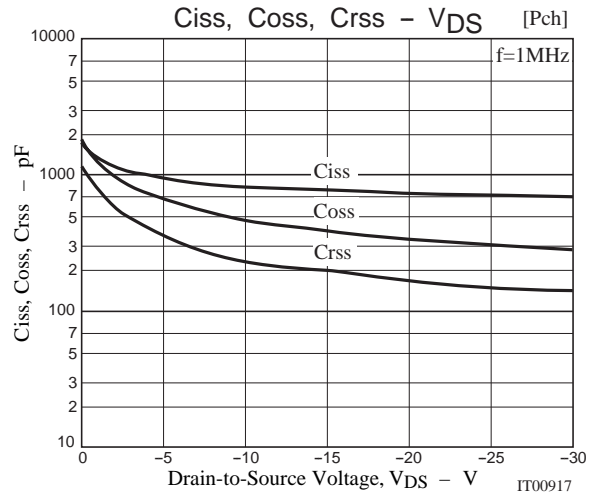
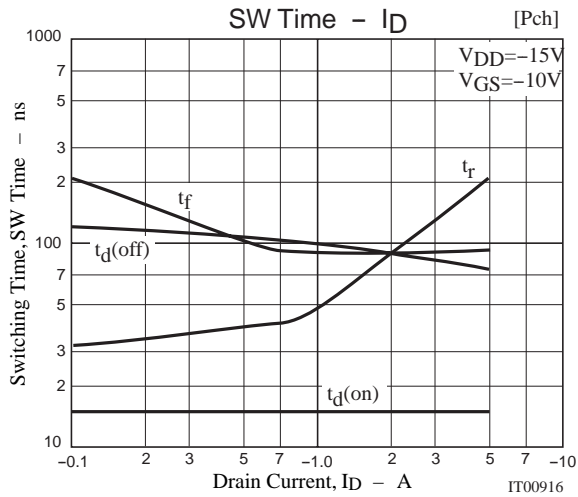
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