



# FW349 — N-Channel and P-Channel Silicon MOSFETs

## General-Purpose Switching Device Applications

### Features

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

### Specifications

#### Absolute Maximum Ratings at Ta=25°C

Parameter	Symbol	Conditions	N-channel	P-channel	Unit
Drain-to-Source Voltage	V <sub>DSS</sub>		45	-45	V
Gate-to-Source Voltage	V <sub>GSS</sub>		±20	±20	V
Drain Current (DC)	I <sub>D</sub>		5	-4.5	A
Drain Current (PW≤10s)	I <sub>D</sub>	duty cycle≤1%	6	-5	A
Drain Current (PW≤10μs)	I <sub>DP</sub>	duty cycle≤1%	20	-18	A
Allowable Power Dissipation	P <sub>D</sub>	Mounted on a ceramic board (1500mm <sup>2</sup> ×0.8mm)1unit, PW≤10s	1.8		W
Total Dissipation	P <sub>T</sub>	Mounted on a ceramic board (1500mm <sup>2</sup> ×0.8mm), PW≤10s	2.2		W
Channel Temperature	T <sub>ch</sub>		150		°C
Storage Temperature	T <sub>stg</sub>		-55 to +150		°C

Marking : W349

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# FW349

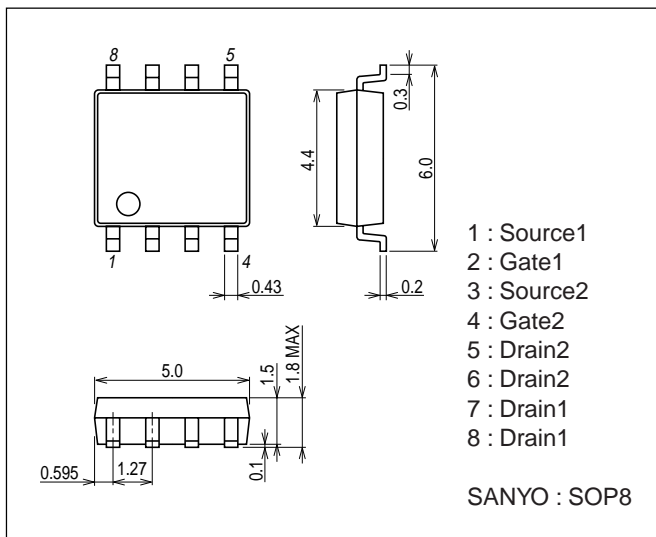
## Electrical Characteristics at Ta=25°C

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
[N-channel]						
Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	$I_D=1mA, V_{GS}=0V$	45			V
Zero-Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=45V, V_{GS}=0V$			1	$\mu A$
Gate-to-Source Leakage Current	$I_{GSS}$	$V_{GS}=\pm 16V, V_{DS}=0V$			$\pm 10$	$\mu A$
Cutoff Voltage	$V_{GS(off)}$	$V_{DS}=10V, I_D=1mA$	1.2		2.6	V
Forward Transfer Admittance	$ y_{fs} $	$V_{DS}=10V, I_D=5A$	4.2	7.1		S
Static Drain-to-Source On-State Resistance	$R_{DS(on)1}$	$I_D=5A, V_{GS}=10V$		28	37	$m\Omega$
	$R_{DS(on)2}$	$I_D=3A, V_{GS}=4V$		47	66	$m\Omega$
Input Capacitance	$C_{iss}$	$V_{DS}=20V, f=1MHz$		860		pF
Output Capacitance	$C_{oss}$	$V_{DS}=20V, f=1MHz$		105		pF
Reverse Transfer Capacitance	$C_{rss}$	$V_{DS}=20V, f=1MHz$		75		pF
Turn-ON Delay Time	$t_d(on)$	See specified Test Circuit.		14		ns
Rise Time	$t_r$	See specified Test Circuit.		64		ns
Turn-OFF Delay Time	$t_d(off)$	See specified Test Circuit.		60		ns
Fall Time	$t_f$	See specified Test Circuit.		65		ns
Total Gate Charge	$Q_g$	$V_{DS}=24V, V_{GS}=10V, I_D=5A$		18.1		nC
Gate-to-Source Charge	$Q_{gs}$	$V_{DS}=24V, V_{GS}=10V, I_D=5A$		2.6		nC
Gate-to-Drain "Miller" Charge	$Q_{gd}$	$V_{DS}=24V, V_{GS}=10V, I_D=5A$		4.0		nC
Diode Forward Voltage	$V_{SD}$	$I_S=5A, V_{GS}=0V$		0.83	1.2	V
[P-channel]						
Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	$I_D=-1mA, V_{GS}=0V$	-45			V
Zero-Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=-45V, V_{GS}=0V$			-1	$\mu A$
Gate-to-Source Leakage Current	$I_{GSS}$	$V_{GS}=\pm 16V, V_{DS}=0V$			$\pm 10$	$\mu A$
Cutoff Voltage	$V_{GS(off)}$	$V_{DS}=-10V, I_D=-1mA$	-1.2		-2.6	V
Forward Transfer Admittance	$ y_{fs} $	$V_{DS}=-10V, I_D=-4.5A$	4.5	7.6		S
Static Drain-to-Source On-State Resistance	$R_{DS(on)1}$	$I_D=-4.5A, V_{GS}=-10V$		47	62	$m\Omega$
	$R_{DS(on)2}$	$I_D=-3A, V_{GS}=-4V$		76	106	$m\Omega$
Input Capacitance	$C_{iss}$	$V_{DS}=-20V, f=1MHz$		1275		pF
Output Capacitance	$C_{oss}$	$V_{DS}=-20V, f=1MHz$		150		pF
Reverse Transfer Capacitance	$C_{rss}$	$V_{DS}=-20V, f=1MHz$		110		pF
Turn-ON Delay Time	$t_d(on)$	See specified Test Circuit.		14		ns
Rise Time	$t_r$	See specified Test Circuit.		50		ns
Turn-OFF Delay Time	$t_d(off)$	See specified Test Circuit.		123		ns
Fall Time	$t_f$	See specified Test Circuit.		75		ns
Total Gate Charge	$Q_g$	$V_{DS}=-24V, V_{GS}=-10V, I_D=-4.5A$		26		nC
Gate-to-Source Charge	$Q_{gs}$	$V_{DS}=-24V, V_{GS}=-10V, I_D=-4.5A$		2.4		nC
Gate-to-Drain "Miller" Charge	$Q_{gd}$	$V_{DS}=-24V, V_{GS}=-10V, I_D=-4.5A$		5.7		nC
Diode Forward Voltage	$V_{SD}$	$I_S=-4.5A, V_{GS}=0V$		-0.86	-1.2	V

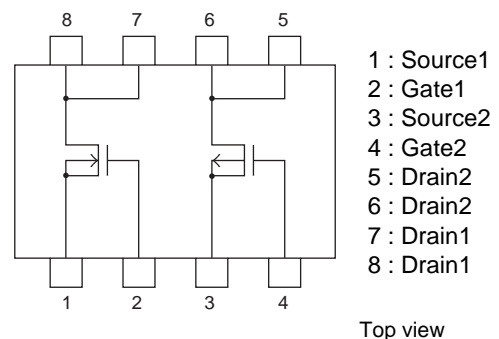
### Package Dimensions

unit : mm (typ)

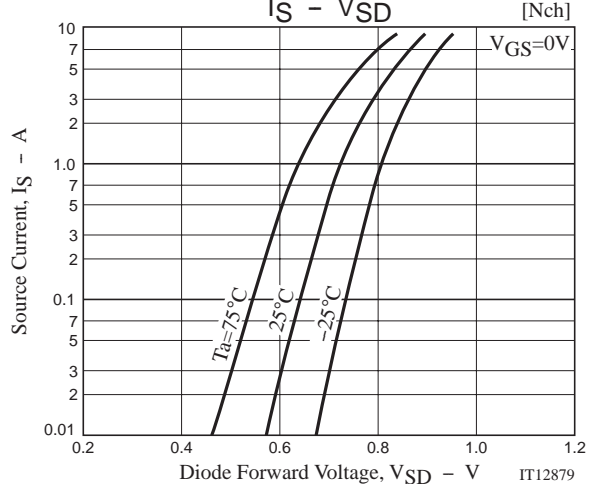
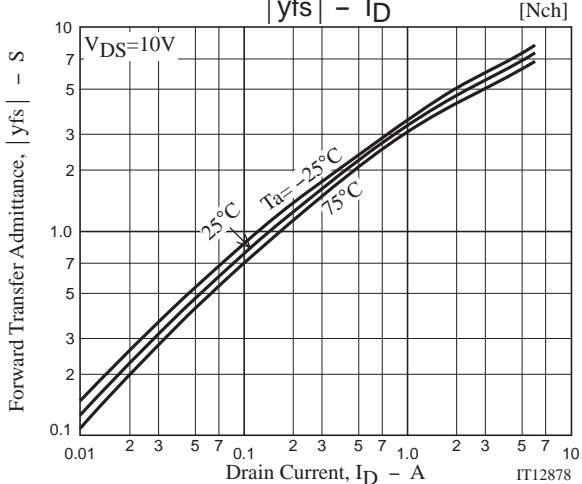
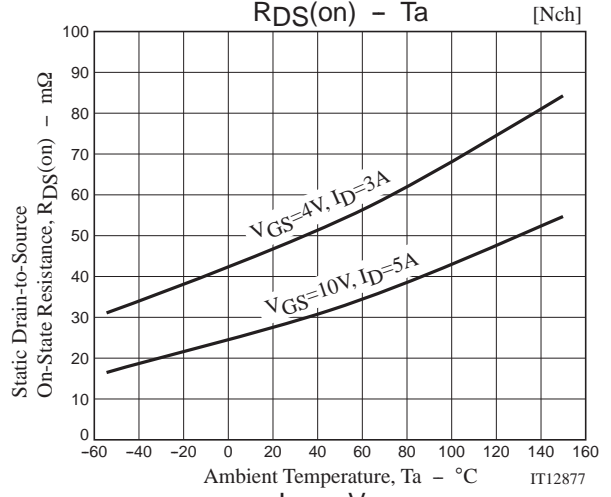
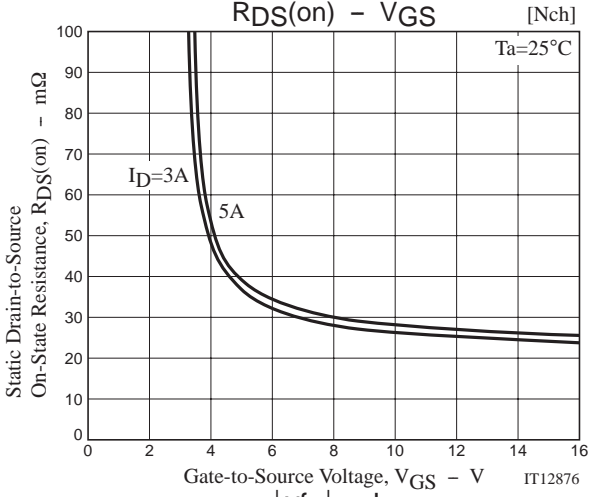
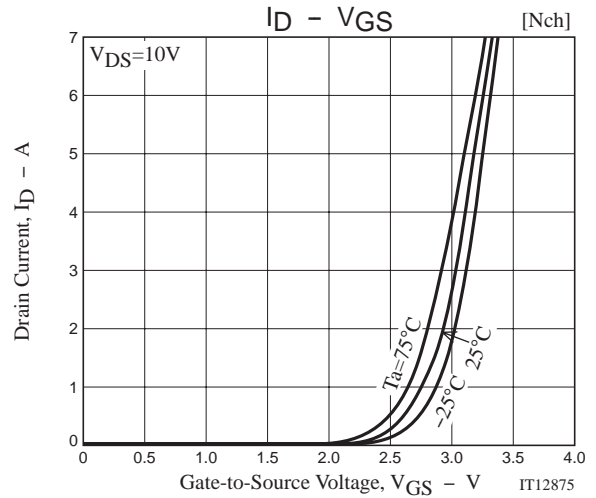
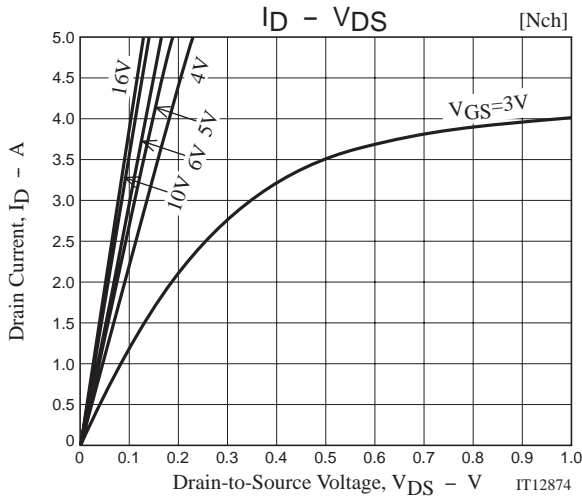
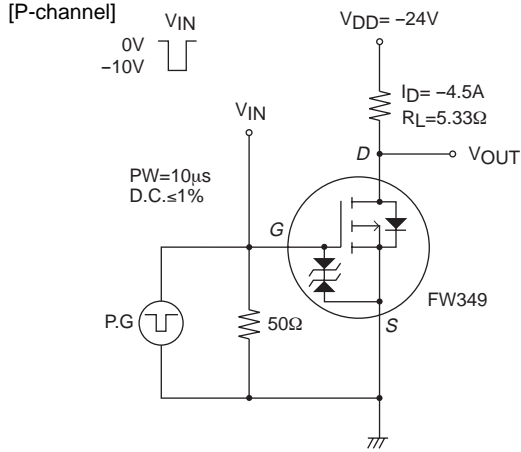
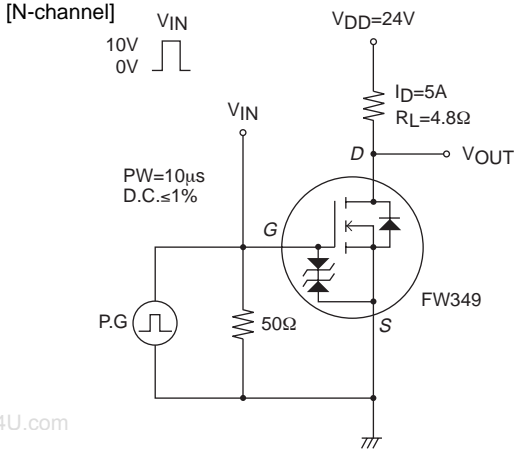
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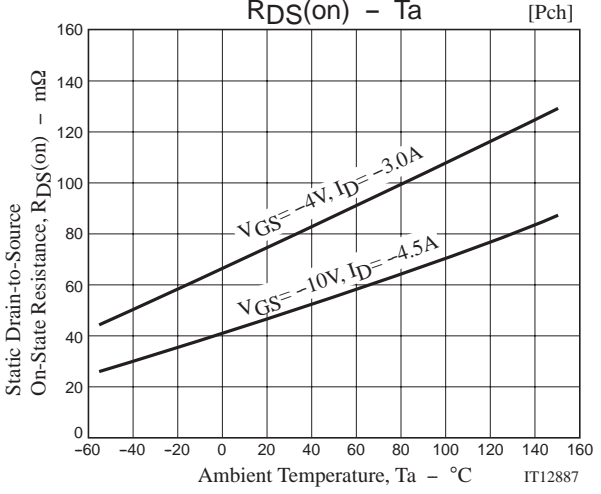
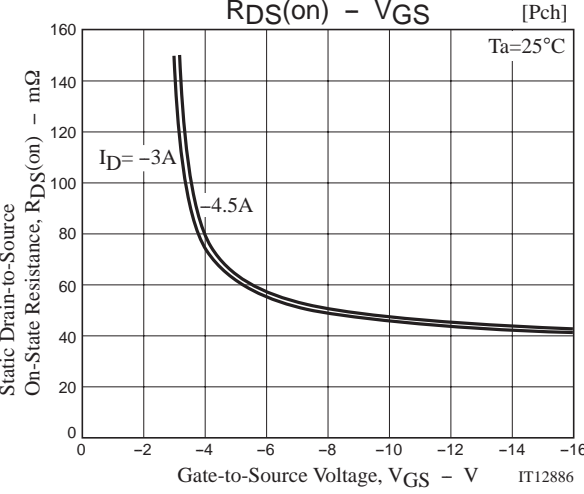
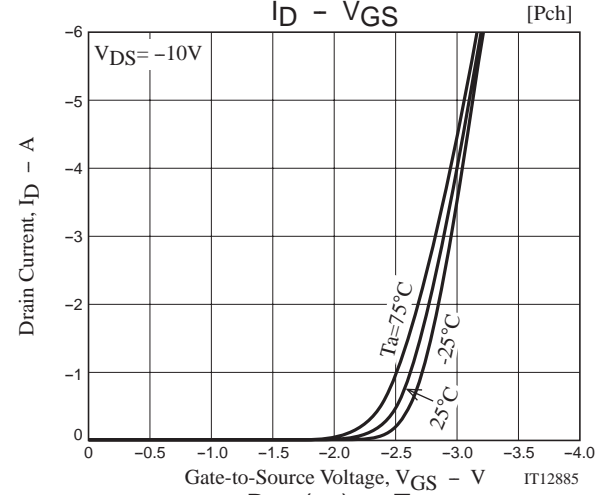
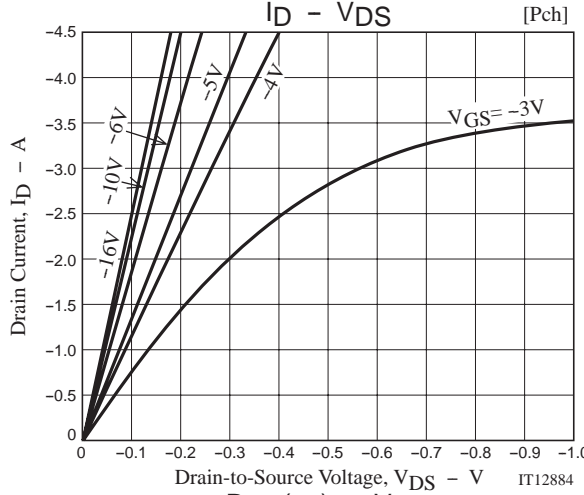
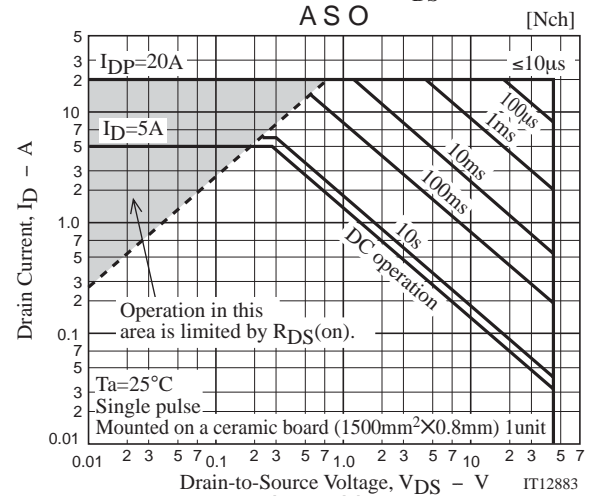
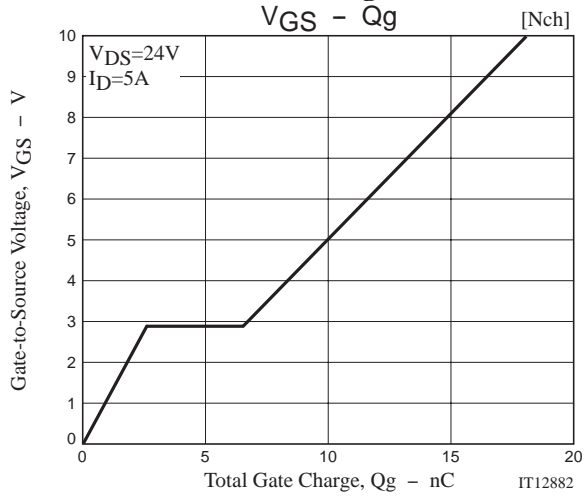
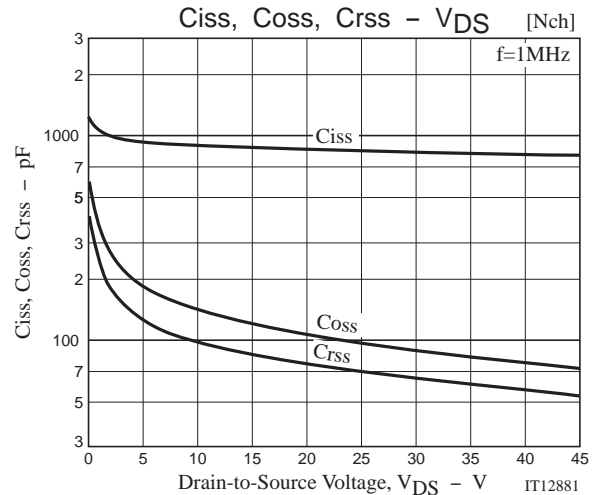
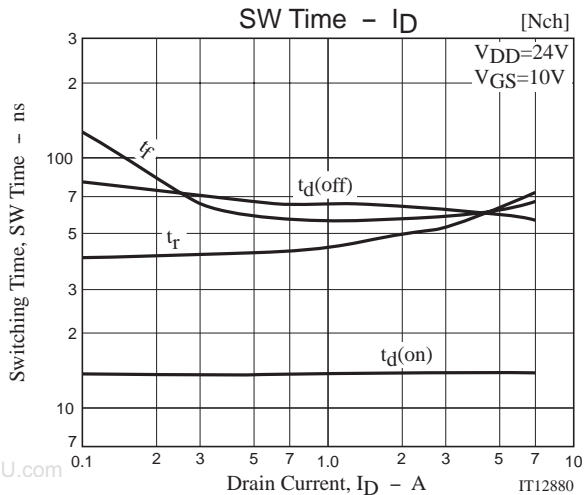


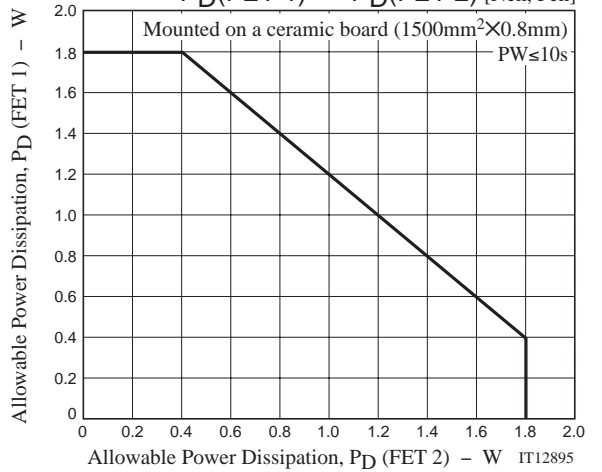
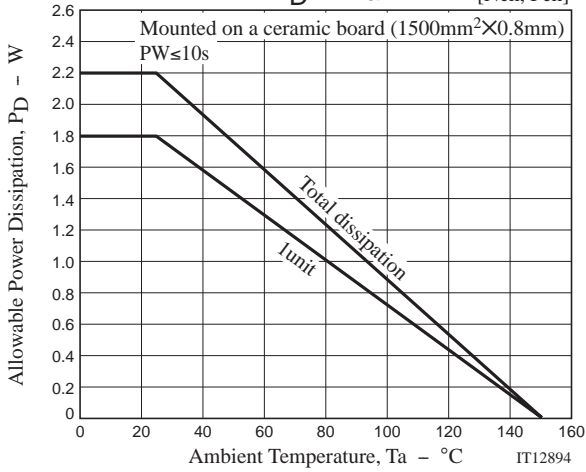
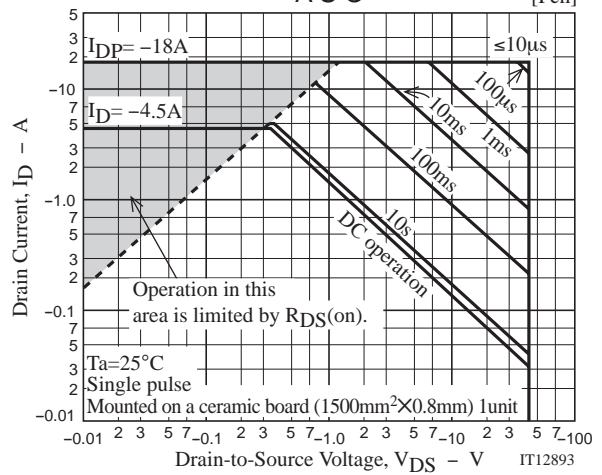
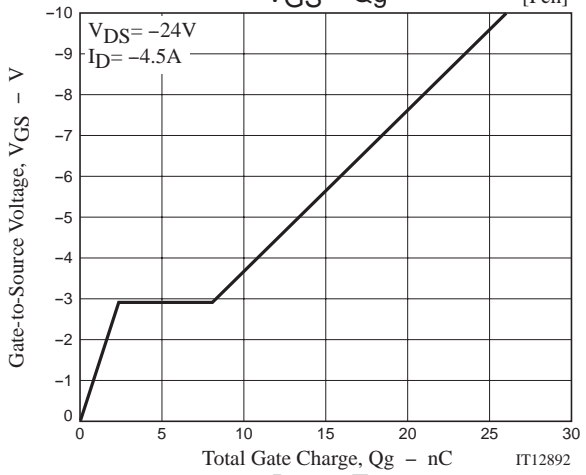
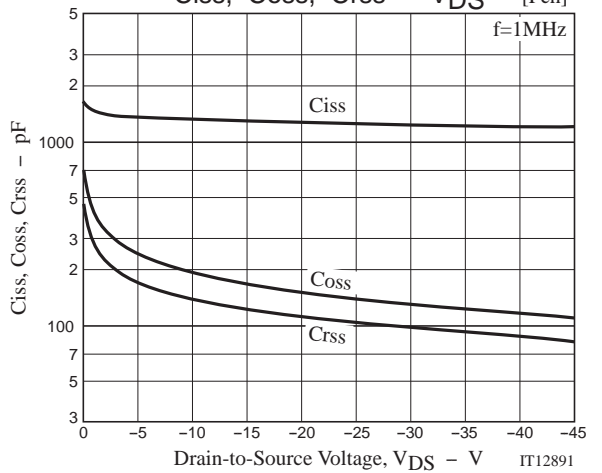
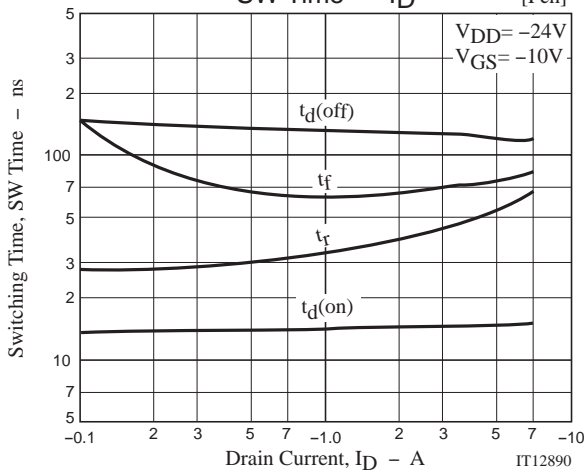
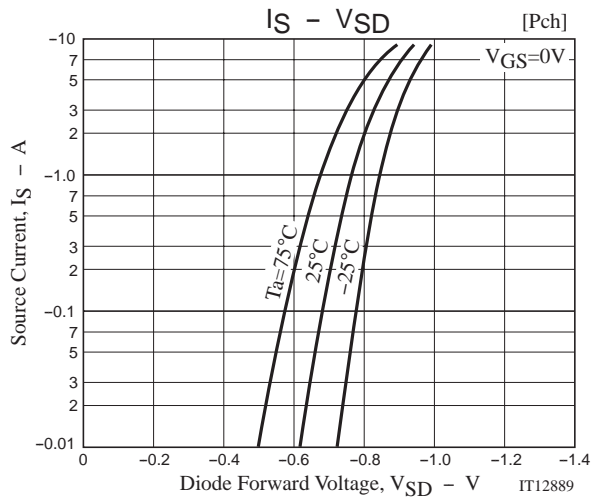
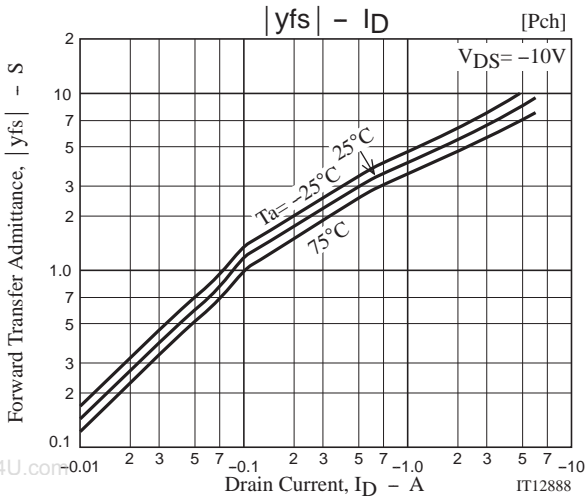
### Electrical Connection



Switching Time Test Circuit







Note on usage : Since the FW349 is a MOSFET product, please avoid using this device in the vicinity of highly charged objects.

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