



FW356

— N-Channel and P-Channel Silicon MOSFETs

General-Purpose Switching Device Applications

Features

- For motor drives, inverters.
- The FW356 incorporates a N-channel MOSFET and a P-channel MOSFET that feature low ON-resistance, ultrahigh-speed switching, and 4V drive, thereby enabling high-density mounting.

Specifications

Absolute Maximum Ratings at Ta=25°C

Parameter	Symbol	Conditions	N-channel	P-channel	Unit
Drain-to-Source Voltage	V _{DSS}		60	-60	V
Gate-to-Source Voltage	V _{GSS}		±20	±20	V
Drain Current (DC)	I _D		5	-3.5	A
Drain Current (Pulse)	I _{DP}	PW≤10μs, duty cycle≤1%	14	-14	A
Allowable Power Dissipation	P _D	Mounted on a ceramic board (1200mm ² ×0.8mm)1unit, PW≤10s		2.0	W
Total Dissipation	P _T	Mounted on a ceramic board (1200mm ² ×0.8mm), PW≤10s		2.3	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	60			V
Zero-Gate Voltage Drain Current	I _{DSS}	V _{DS} =60V, V _{GS} =0			1	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	1.2		2.6	V
Forward Transfer Admittance	y _{fs}	V _{DS} =10V, I _D =3A	4	6		S
Static Drain-to-Source On-State Resistance	R _{DS(on)1}	I _D =3A, V _{GS} =10V		43	58	mΩ
	R _{DS(on)2}	I _D =3A, V _{GS} =4V		56	84	mΩ
Input Capacitance	C _{iss}	V _{DS} =20V, f=1MHz		790		pF
Output Capacitance	C _{oss}	V _{DS} =20V, f=1MHz		115		pF
Reverse Transfer Capacitance	C _{rss}	V _{DS} =20V, f=1MHz		88		pF

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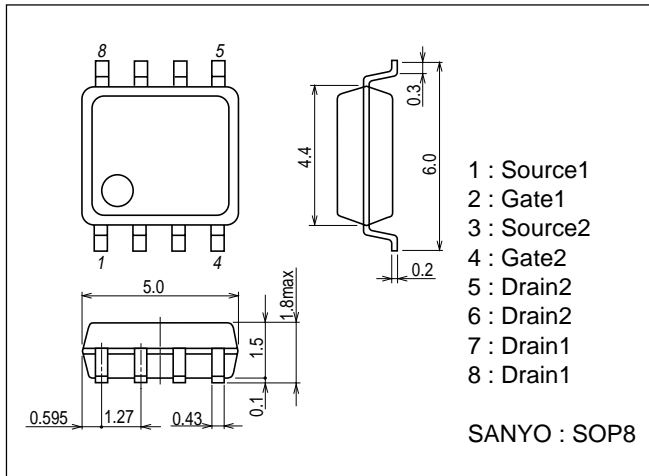
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Turn-ON Delay Time	$t_{d(on)}$	See specified Test Circuit.		10		ns
Rise Time	t_r	See specified Test Circuit.		22		ns
Turn-OFF Delay Time	$t_{d(off)}$	See specified Test Circuit.		74		ns
Fall Time	t_f	See specified Test Circuit.		48		ns
Total Gate Charge	Q_g	$V_{DS}=30V, V_{GS}=10V, I_D=5A$		16		nC
Gate-to-Source Charge	Q_{gs}	$V_{DS}=30V, V_{GS}=10V, I_D=5A$		4		nC
Gate-to-Drain "Miller" Charge	Q_{gd}	$V_{DS}=30V, V_{GS}=10V, I_D=5A$		3.4		nC
Diode Forward Voltage	V_{SD}	$I_S=5A, V_{GS}=0$		0.86	1.2	V
[P-channel]						
Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	$I_D=-1mA, V_{GS}=0$	-60			V
Zero-Gate Voltage Drain Current	I_{DSS}	$V_{DS}=-60V, V_{GS}=0$			-1	μA
Gate-to-Source Leakage Current	I_{GSS}	$V_{GS}=\pm 16V, V_{DS}=0$			± 10	μA
Cutoff Voltage	$V_{GS(off)}$	$V_{DS}=-10V, I_D=-1mA$	-1.2			V
Forward Transfer Admittance	$ y_{fs} $	$V_{DS}=-10V, I_D=-2A$	3	4.6		S
Static Drain-to-Source On-State Resistance	$R_{DS(on)1}$	$I_D=-2A, V_{GS}=-10V$		110	145	$m\Omega$
	$R_{DS(on)2}$	$I_D=-2A, V_{GS}=-4V$		150	210	$m\Omega$
Input Capacitance	C_{iss}	$V_{DS}=-20V, f=1MHz$		990		pF
Output Capacitance	C_{oss}	$V_{DS}=-20V, f=1MHz$		110		pF
Reverse Transfer Capacitance	C_{rss}	$V_{DS}=-20V, f=1MHz$		76		pF
Turn-ON Delay Time	$t_{d(on)}$	See specified Test Circuit.		12		ns
Rise Time	t_r	See specified Test Circuit.		50		ns
Turn-OFF Delay Time	$t_{d(off)}$	See specified Test Circuit.		100		ns
Fall Time	t_f	See specified Test Circuit.		65		ns
Total Gate Charge	Q_g	$V_{DS}=-30V, V_{GS}=-10V, I_D=-3.5A$		22		nC
Gate-to-Source Charge	Q_{gs}	$V_{DS}=-30V, V_{GS}=-10V, I_D=-3.5A$		4		nC
Gate-to-Drain "Miller" Charge	Q_{gd}	$V_{DS}=-30V, V_{GS}=-10V, I_D=-3.5A$		4		nC
Diode Forward Voltage	V_{SD}	$I_S=-3.5A, V_{GS}=0$		-0.86	-1.2	V

Marking : W356

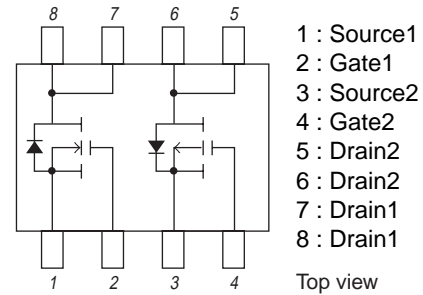
Package Dimensions

unit : mm

2129

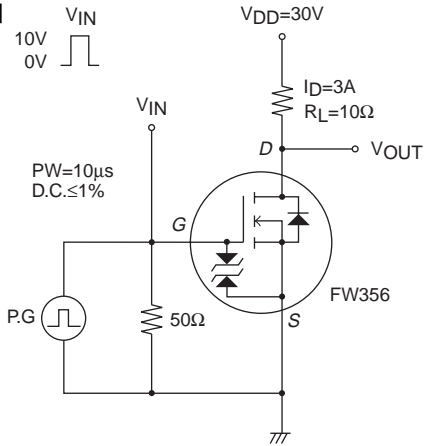


Electrical Connection

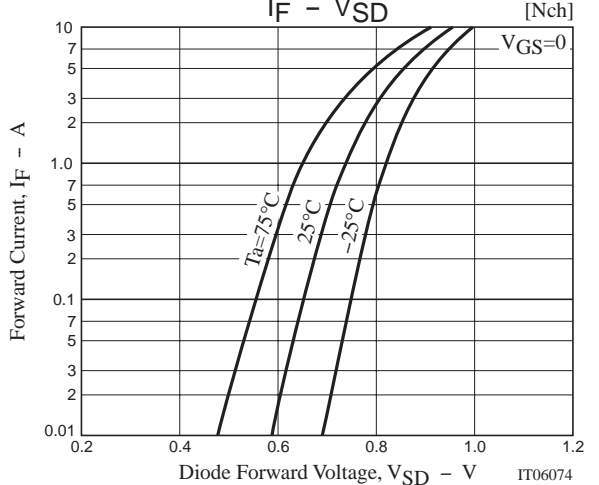
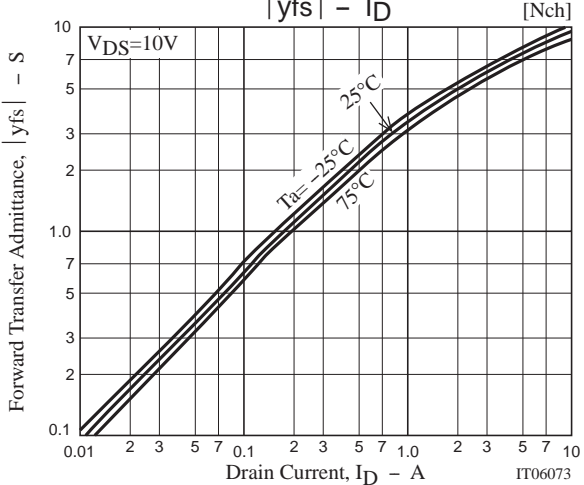
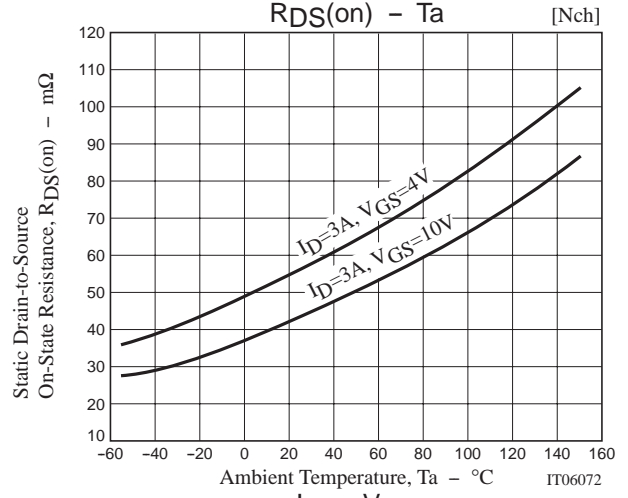
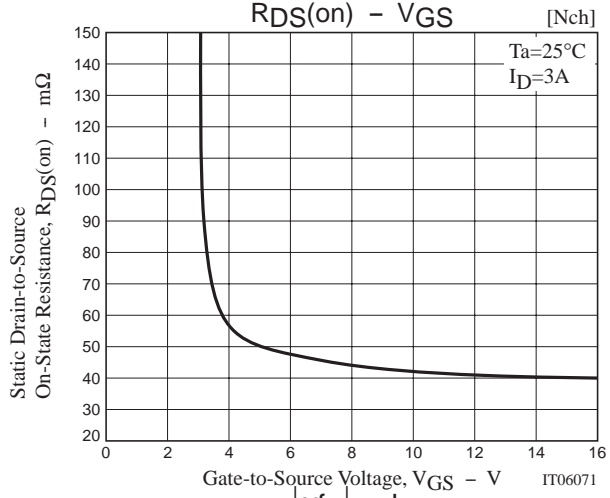
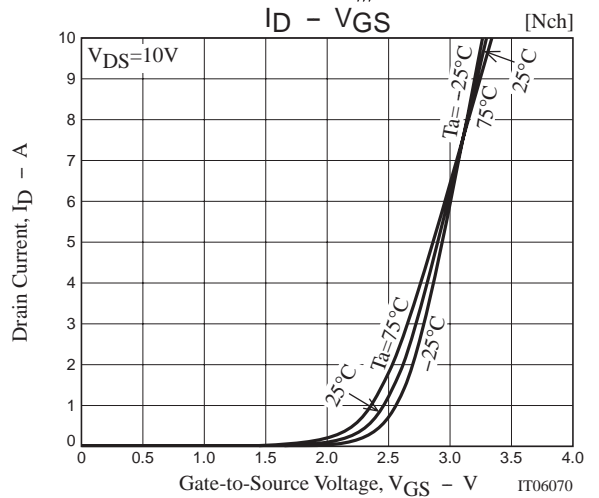
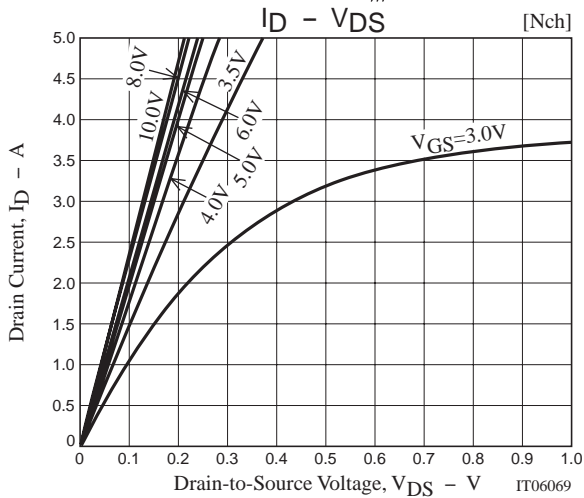
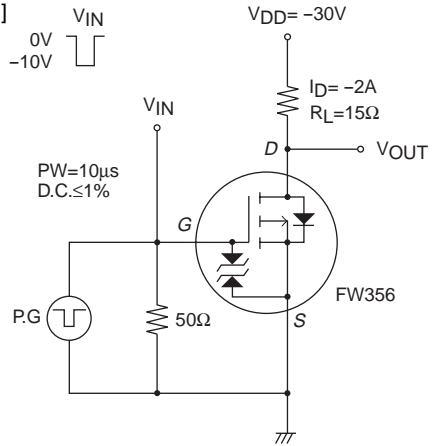


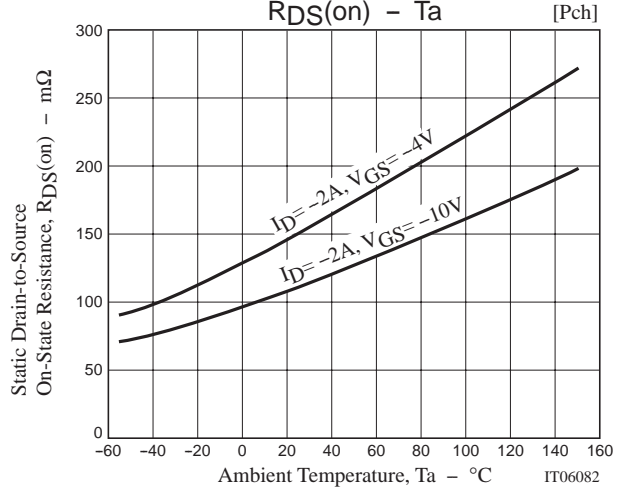
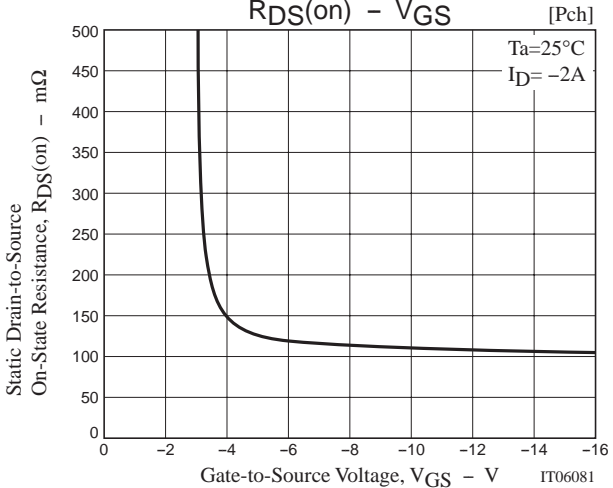
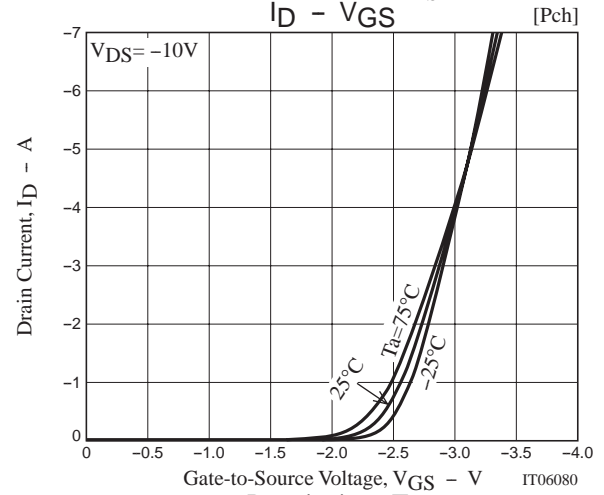
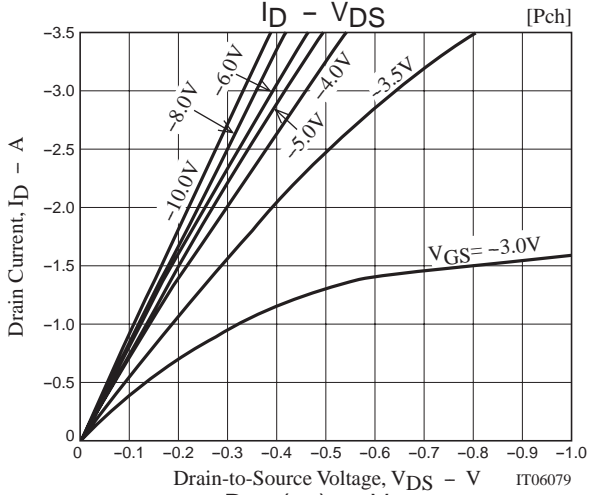
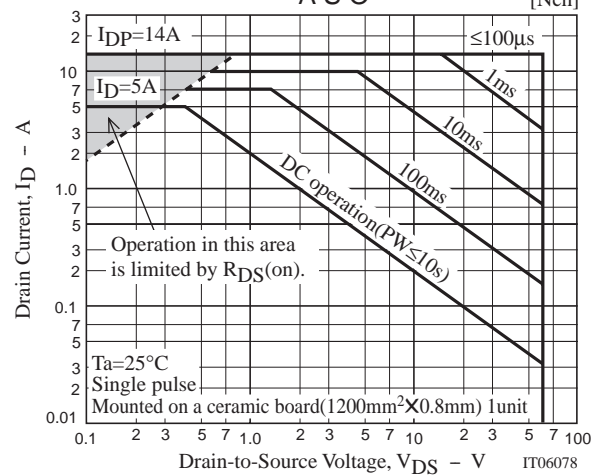
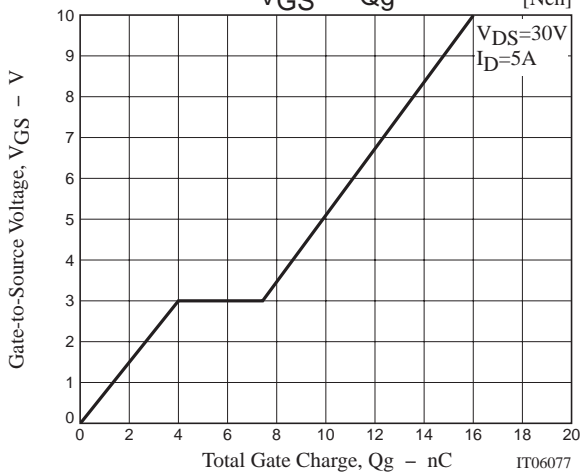
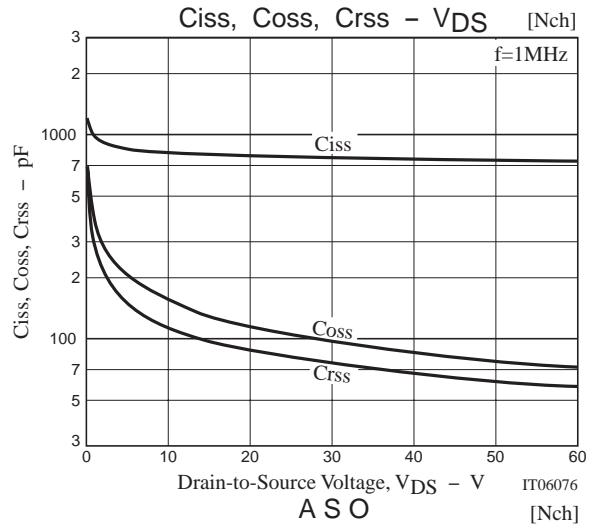
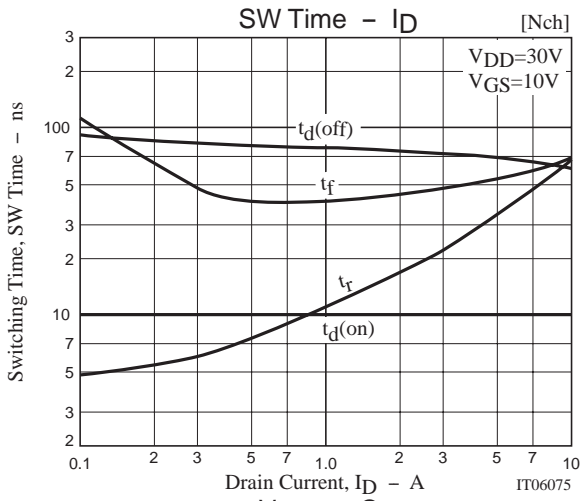
Switching Time Test Circuit

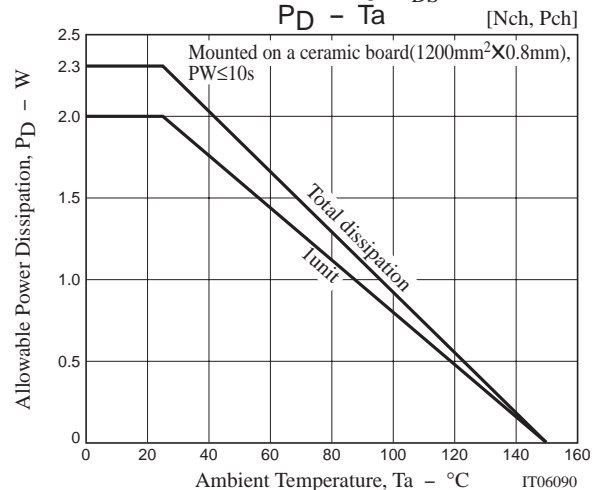
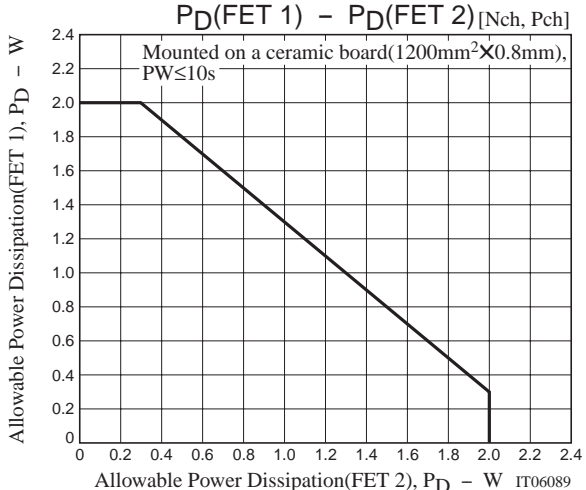
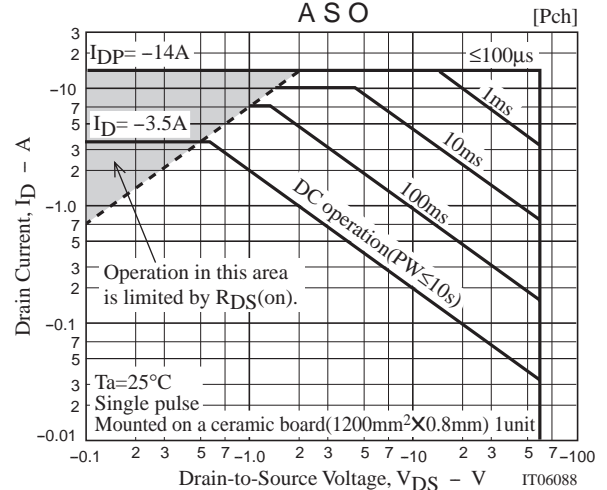
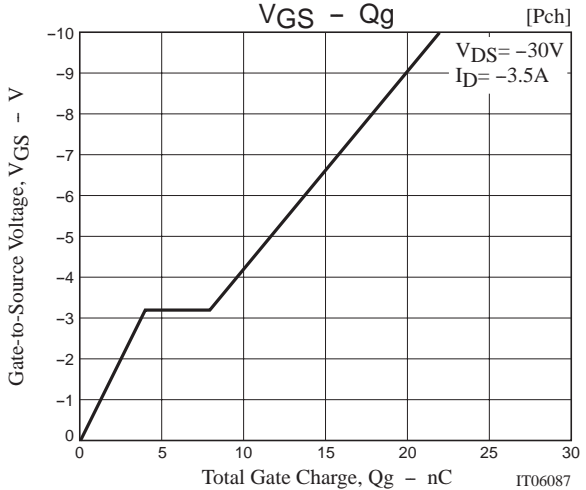
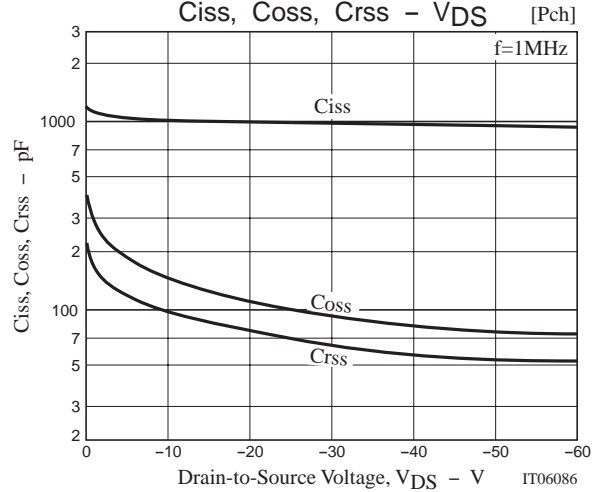
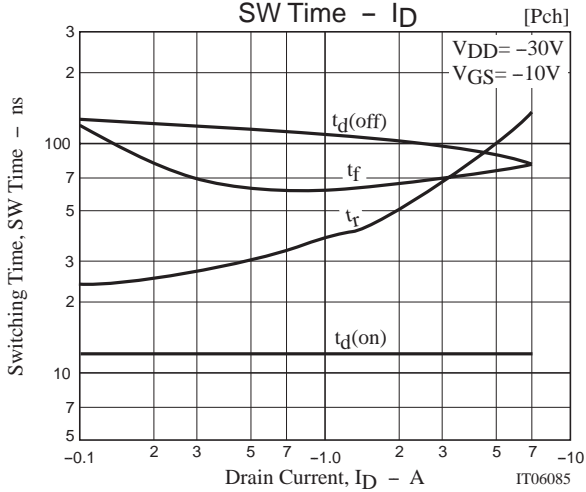
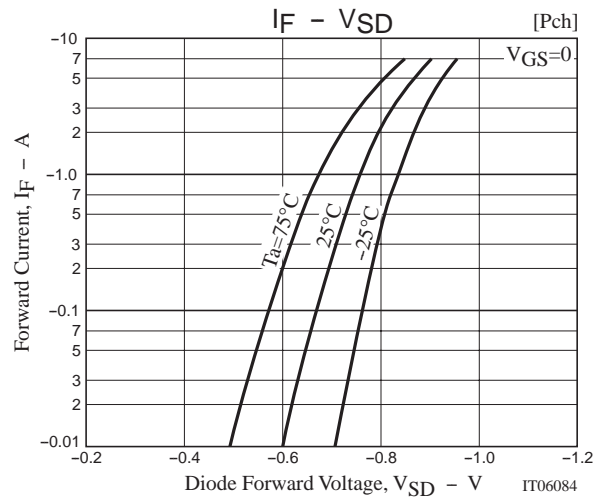
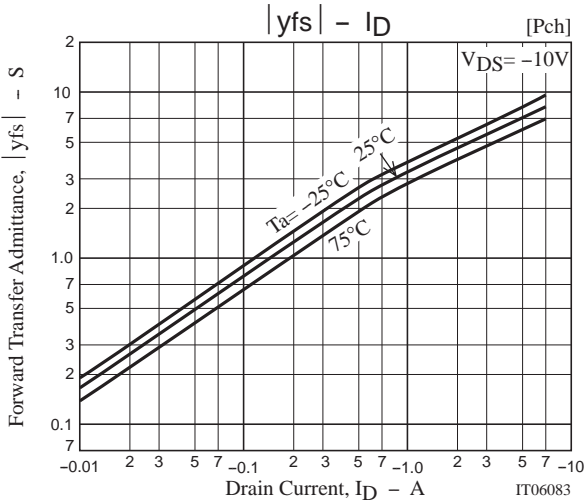
[N-channel]



[P-channel]







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