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**ON Semiconductor**  
**DATA SHEET****ECH8619** — N-Channel and P-Channel Silicon MOSFETs  
**General-Purpose Switching Device Applications****Features**

- The ECH8619 incorporates an N-channel MOSFET and a P-channel MOSFET that feature low ON-resistance and ultrahigh-speed switching, thereby enabling high-density mounting.
- 4V drive.

**Specifications****Absolute Maximum Ratings** at  $T_a=25^\circ\text{C}$ 

Parameter	Symbol	Conditions	N-channel	P-channel	Unit
Drain-to-Source Voltage	$V_{DS}$		60	-60	V
Gate-to-Source Voltage	$V_{GS}$		$\pm 20$	$\pm 20$	V
Drain Current (DC)	$I_D$		3	-2	A
Drain Current (Pulse)	$I_{DP}$	$PW \leq 10\mu\text{s}$ , duty cycle $\leq 1\%$	20	-20	A
Allowable Power Dissipation	$P_D$	Mounted on a ceramic board (900mm <sup>2</sup> ×0.8mm) 1unit	1.3		W
Total Dissipation	$P_T$	Mounted on a ceramic board (900mm <sup>2</sup> ×0.8mm)	1.5		W
Channel Temperature	$T_{ch}$		150		$^\circ\text{C}$
Storage Temperature	$T_{stg}$		-55 to +150		$^\circ\text{C}$

**Electrical Characteristics** at  $T_a=25^\circ\text{C}$ 

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
[N-channel]						
Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	$I_D=1\text{mA}$ , $V_{GS}=0\text{V}$	60			V
Zero-Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=60\text{V}$ , $V_{GS}=0\text{V}$			1	$\mu\text{A}$
Gate-to-Source Leakage Current	$I_{GSS}$	$V_{GS}=\pm 16\text{V}$ , $V_{DS}=0\text{V}$			$\pm 10$	$\mu\text{A}$
Cutoff Voltage	$V_{GS(off)}$	$V_{DS}=10\text{V}$ , $I_D=1\text{mA}$	1.2		2.6	V
Forward Transfer Admittance	$ y_{fs} $	$V_{DS}=10\text{V}$ , $I_D=1.5\text{A}$	2.2	3.8		S
Static Drain-to-Source On-State Resistance	$R_{DS(on)1}$	$I_D=1.5\text{A}$ , $V_{GS}=10\text{V}$		70	93	$\text{m}\Omega$
	$R_{DS(on)2}$	$I_D=0.5\text{A}$ , $V_{GS}=4\text{V}$		92	133	$\text{m}\Omega$

Marking : FM

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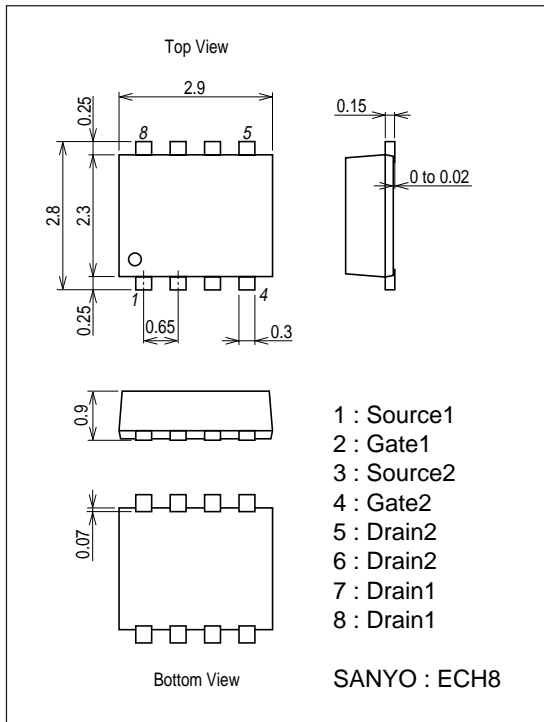
# ECH8619

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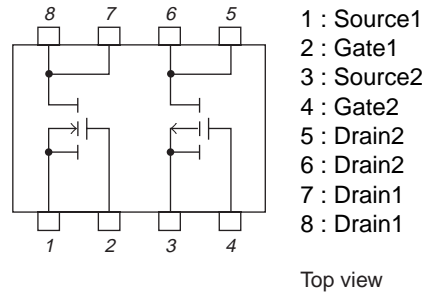
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Input Capacitance	Ciss	V <sub>DS</sub> =20V, f=1MHz		560		pF
Output Capacitance	Coss	V <sub>DS</sub> =20V, f=1MHz		60		pF
Reverse Transfer Capacitance	Crss	V <sub>DS</sub> =20V, f=1MHz		41		pF
Turn-ON Delay Time	t <sub>d(on)</sub>	See specified Test Circuit.		11		ns
Rise Time	t <sub>r</sub>	See specified Test Circuit.		11		ns
Turn-OFF Delay Time	t <sub>d(off)</sub>	See specified Test Circuit.		61		ns
Fall Time	t <sub>f</sub>	See specified Test Circuit.		32		ns
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =30V, V <sub>GS</sub> =10V, I <sub>D</sub> =3A		12.8		nC
Gate-to-Source Charge	Q <sub>gs</sub>	V <sub>DS</sub> =30V, V <sub>GS</sub> =10V, I <sub>D</sub> =3A		2.1		nC
Gate-to-Drain "Miller" Charge	Q <sub>gd</sub>	V <sub>DS</sub> =30V, V <sub>GS</sub> =10V, I <sub>D</sub> =3A		2.7		nC
Diode Forward Voltage	V <sub>SD</sub>	I <sub>S</sub> =3A, V <sub>GS</sub> =0V		0.81	1.2	V
[P-channel]						
Drain-to-Source Breakdown Voltage	V <sub>(BR)DSS</sub>	I <sub>D</sub> =-1mA, V <sub>GS</sub> =0V	-60			V
Zero-Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =-60V, V <sub>GS</sub> =0V			-1	μA
Gate-to-Source Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> =±16V, V <sub>DS</sub> =0V			±10	μA
Cutoff Voltage	V <sub>GS(off)</sub>	V <sub>DS</sub> =-10V, I <sub>D</sub> =-1mA	-1.2		-2.6	V
Forward Transfer Admittance	y <sub>fs</sub>	V <sub>DS</sub> =-10V, I <sub>D</sub> =-1A	2.1	3.5		S
Static Drain-to-Source On-State Resistance	R <sub>DS(on)1</sub>	I <sub>D</sub> =-1A, V <sub>GS</sub> =-10V		160	210	mΩ
	R <sub>DS(on)2</sub>	I <sub>D</sub> =-0.5A, V <sub>GS</sub> =-4V		210	295	mΩ
Input Capacitance	Ciss	V <sub>DS</sub> =-20V, f=1MHz		660		pF
Output Capacitance	Coss	V <sub>DS</sub> =-20V, f=1MHz		54		pF
Reverse Transfer Capacitance	Crss	V <sub>DS</sub> =-20V, f=1MHz		42		pF
Turn-ON Delay Time	t <sub>d(on)</sub>	See specified Test Circuit.		10.5		ns
Rise Time	t <sub>r</sub>	See specified Test Circuit.		7.0		ns
Turn-OFF Delay Time	t <sub>d(off)</sub>	See specified Test Circuit.		93		ns
Fall Time	t <sub>f</sub>	See specified Test Circuit.		30		ns
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =-30V, V <sub>GS</sub> =-10V, I <sub>D</sub> =-2A		15		nC
Gate-to-Source Charge	Q <sub>gs</sub>	V <sub>DS</sub> =-30V, V <sub>GS</sub> =-10V, I <sub>D</sub> =-2A		2.1		nC
Gate-to-Drain "Miller" Charge	Q <sub>gd</sub>	V <sub>DS</sub> =-30V, V <sub>GS</sub> =-10V, I <sub>D</sub> =-2A		2.7		nC
Diode Forward Voltage	V <sub>SD</sub>	I <sub>S</sub> =-2A, V <sub>GS</sub> =0V		-0.82	-1.2	V

## Package Dimensions

unit : mm (typ)  
7011A-001

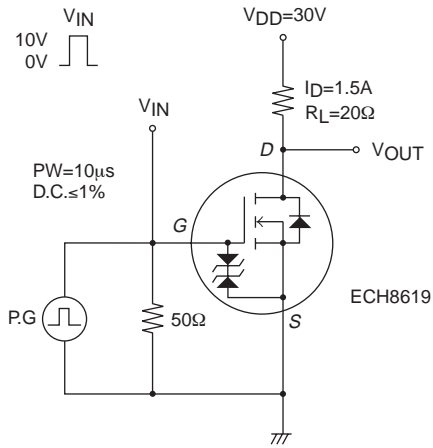


## Electrical Connection

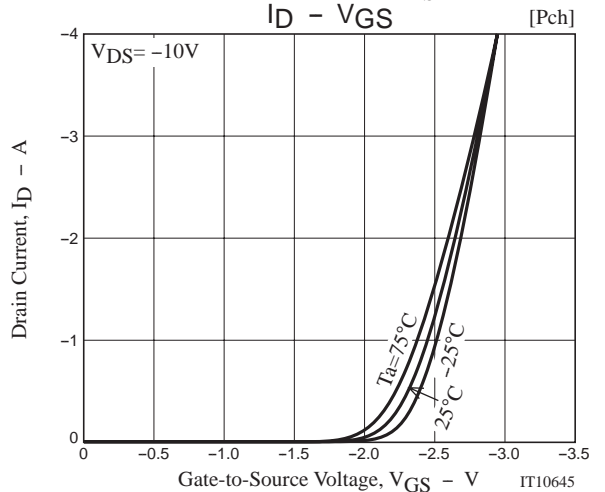
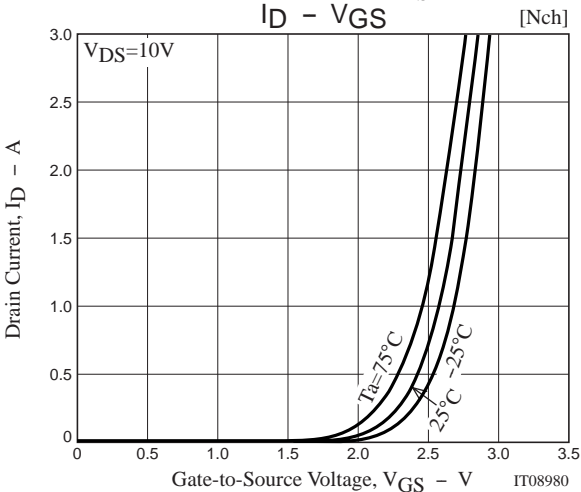
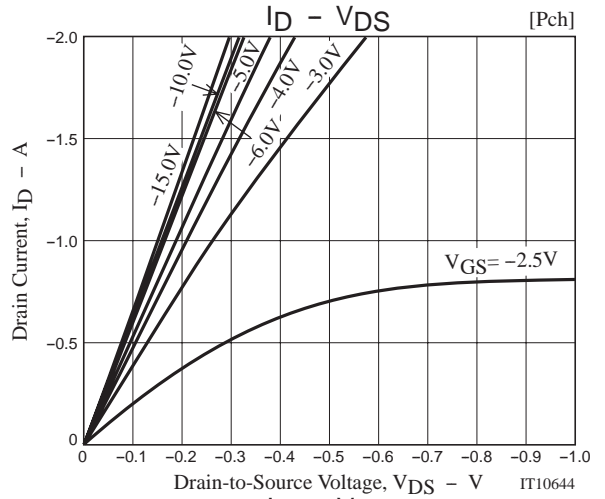
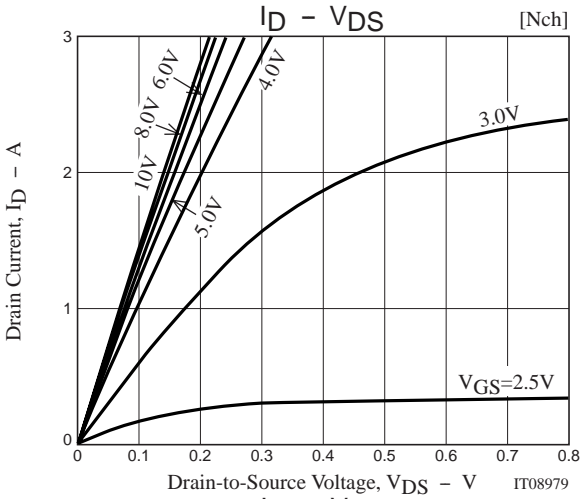
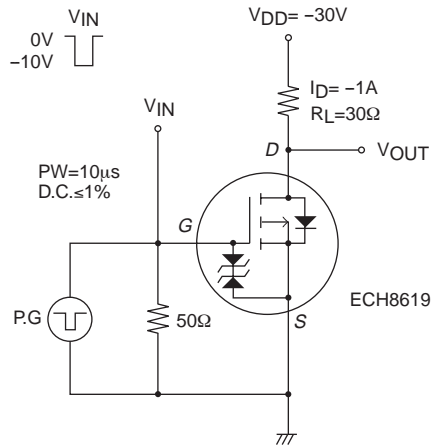


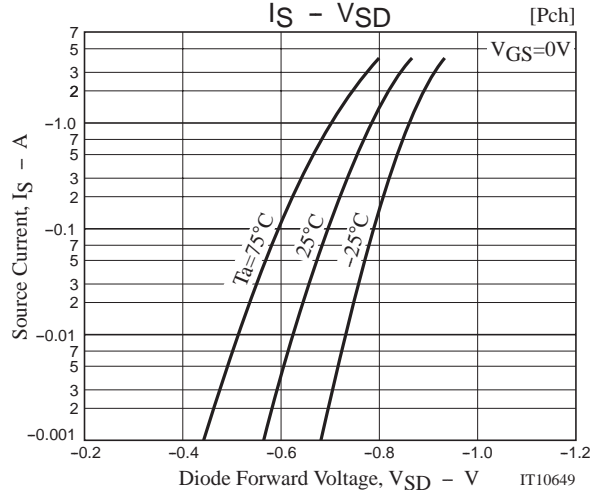
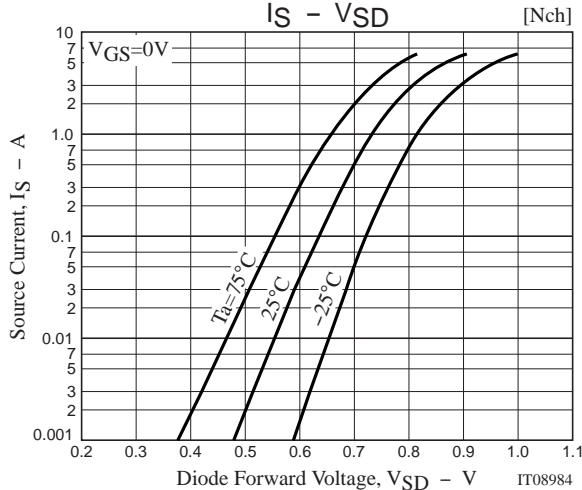
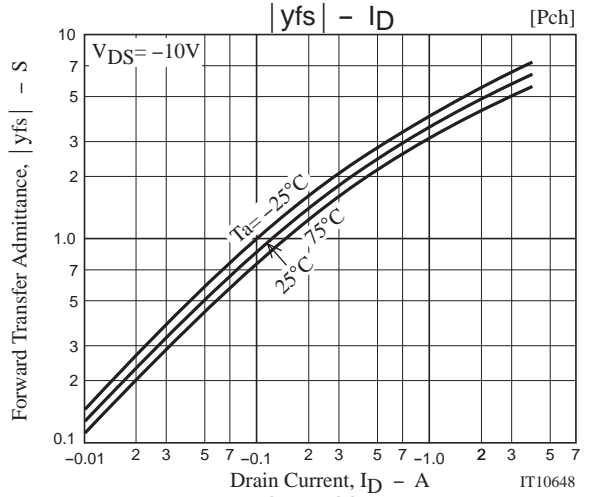
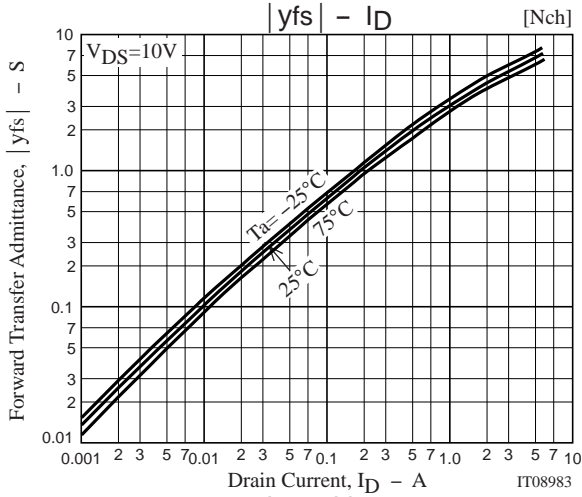
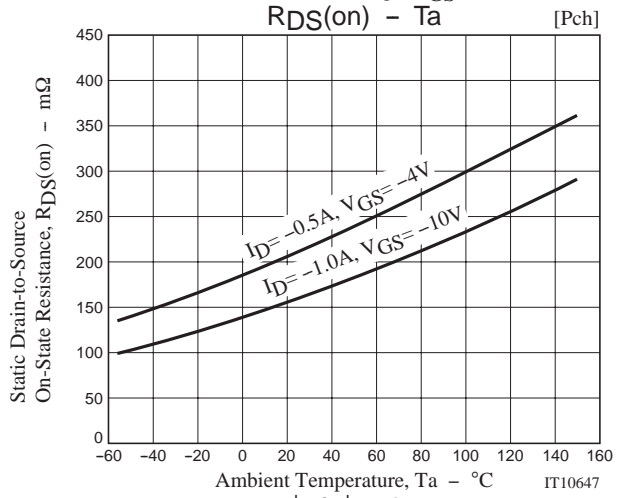
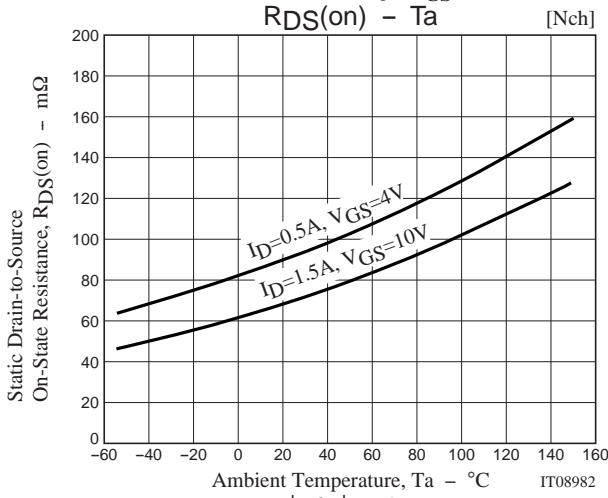
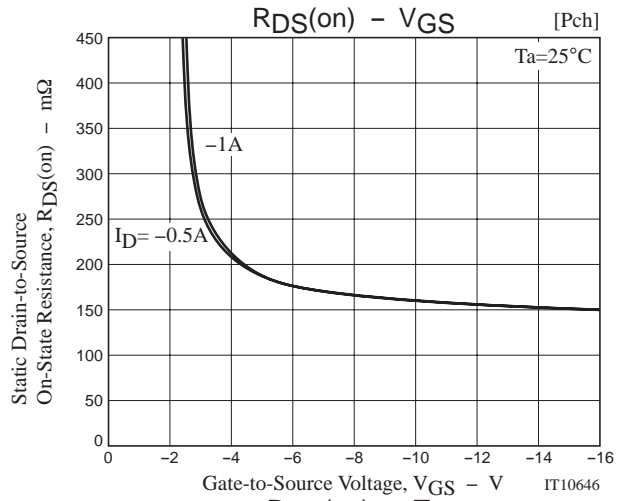
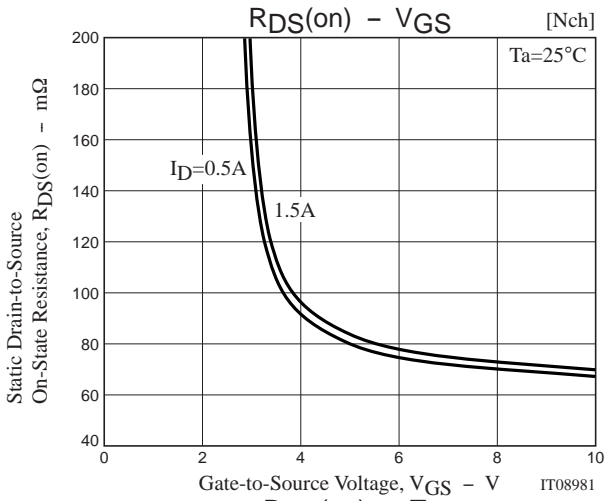
Switching Time Test Circuit

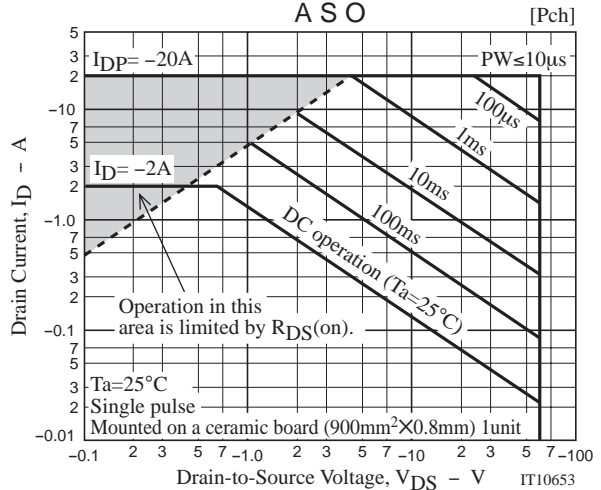
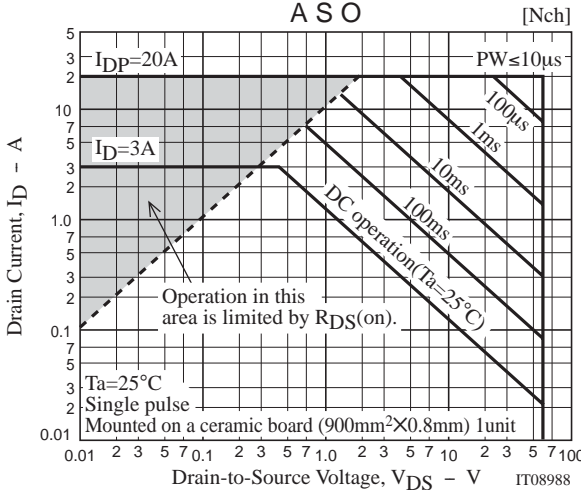
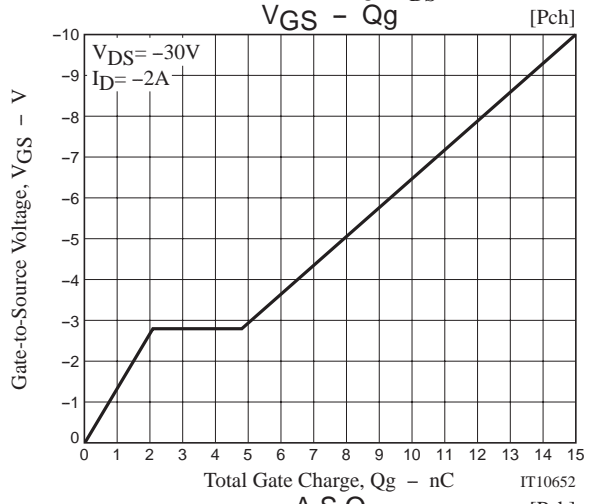
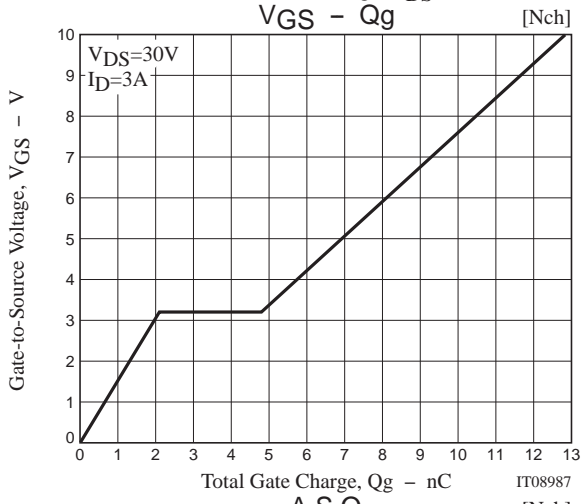
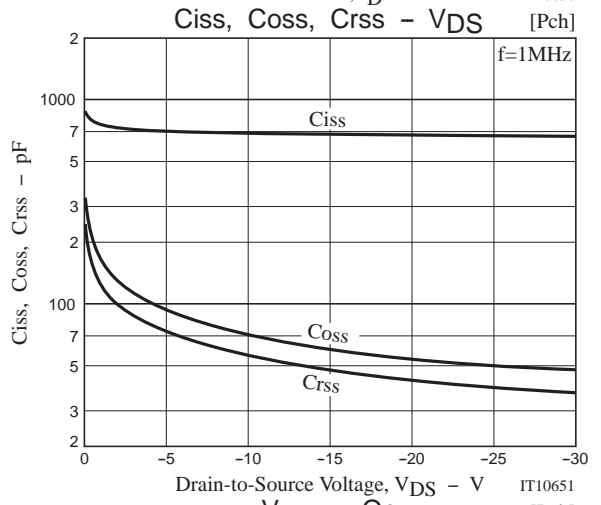
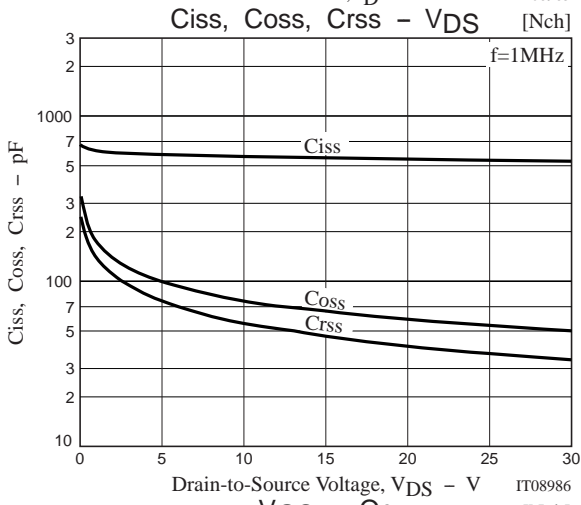
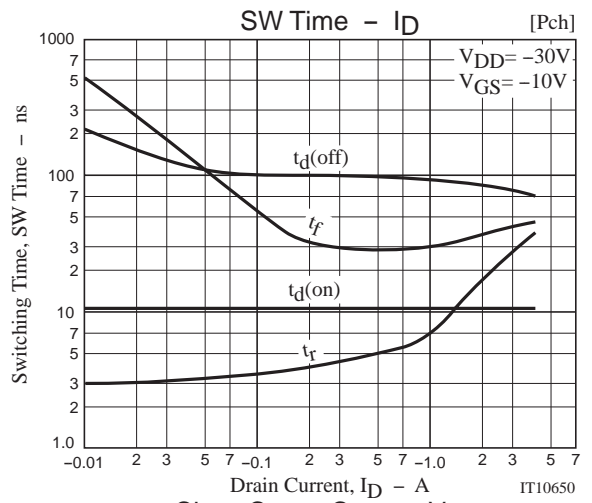
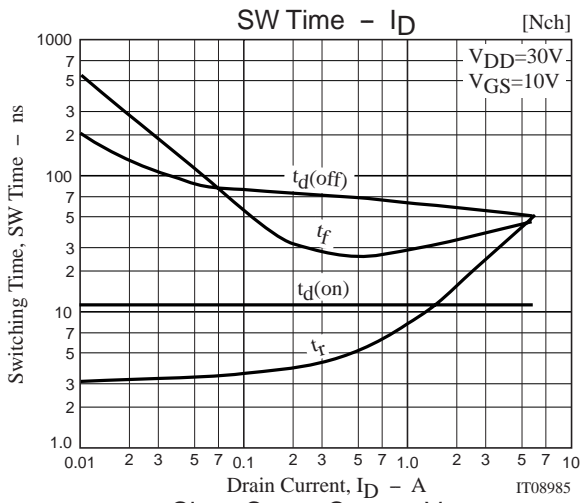
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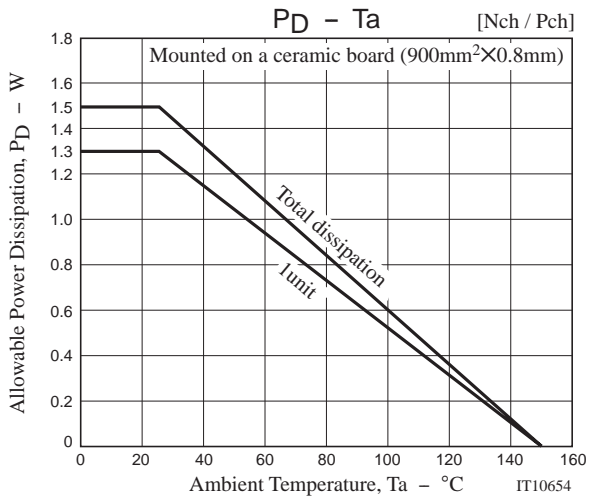


[P-channel]









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