



EMH2601 — General-Purpose Switching Device Applications

N-Channel and P-Channel Silicon MOSFETs

Features

- The EMH2601 incorporates an N-channel MOSFET and a P-channel MOSFET that feature low ON-resistance and ultrahigh-speed switching, thereby enabling high-density mounting.
- 1.8V 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_{DSS}		20	-20	V
Gate-to-Source Voltage	V_{GSS}		± 10	± 10	V
Drain Current (DC)	I_D		3	-2	A
Drain Current (Pulse)	I_{DP}	$PW \leq 10\mu\text{s}$, duty cycle $\leq 1\%$	12	-8	A
Allowable Power Dissipation	P_D	Mounted on a ceramic board (900mm \times X0.8mm) 1unit	1.0		W
Total Dissipation	P_T	Mounted on a ceramic board (900mm \times X0.8mm)	1.2		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	$V_{(BR)DSS}$	$I_D=1\text{mA}$, $V_{GS}=0\text{V}$	20			V
Zero-Gate Voltage Drain Current	I_{DSS}	$V_{DS}=20\text{V}$, $V_{GS}=0\text{V}$			1	μA
Gate-to-Source Leakage Current	I_{GSS}	$V_{GS}=\pm 8\text{V}$, $V_{DS}=0\text{V}$			± 10	μA
Cutoff Voltage	$V_{GS(off)}$	$V_{DS}=10\text{V}$, $I_D=1\text{mA}$	0.4		1.3	V
Forward Transfer Admittance	$ y_{fs} $	$V_{DS}=10\text{V}$, $I_D=1.5\text{A}$	2.4	4.0		S
Static Drain-to-Source On-State Resistance	$R_{DS(on)1}$	$I_D=1.5\text{A}$, $V_{GS}=4\text{V}$		58	76	$\text{m}\Omega$
	$R_{DS(on)2}$	$I_D=0.8\text{A}$, $V_{GS}=2.5\text{V}$		71	99	$\text{m}\Omega$
	$R_{DS(on)3}$	$I_D=0.3\text{A}$, $V_{GS}=1.8\text{V}$		98	150	$\text{m}\Omega$
Input Capacitance	C_{iss}	$V_{DS}=10\text{V}$, $f=1\text{MHz}$		365		pF
Output Capacitance	C_{oss}	$V_{DS}=10\text{V}$, $f=1\text{MHz}$		77		pF
Reverse Transfer Capacitance	C_{rss}	$V_{DS}=10\text{V}$, $f=1\text{MHz}$		67		pF

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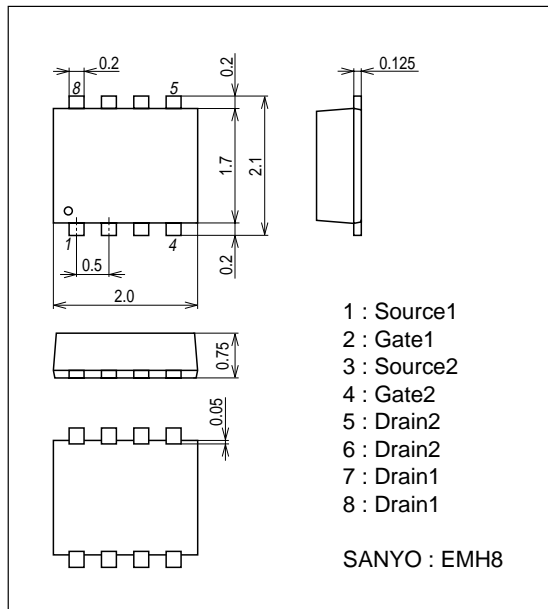
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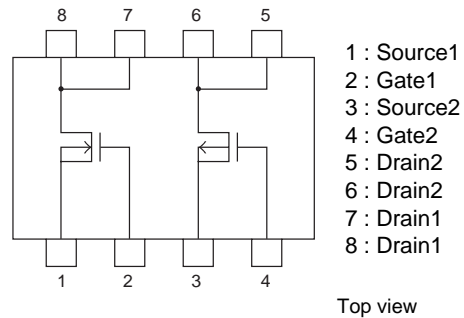
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Turn-ON Delay Time	$t_{d(on)}$	See specified Test Circuit.		11.2		ns
Rise Time	t_r	See specified Test Circuit.		45		ns
Turn-OFF Delay Time	$t_{d(off)}$	See specified Test Circuit.		42		ns
Fall Time	t_f	See specified Test Circuit.		46		ns
Total Gate Charge	Qg	$V_{DS}=10V, V_{GS}=4V, I_D=3A$		4.9		nC
Gate-to-Source Charge	Qgs	$V_{DS}=10V, V_{GS}=4V, I_D=3A$		0.7		nC
Gate-to-Drain "Miller" Charge	Qgd	$V_{DS}=10V, V_{GS}=4V, I_D=3A$		2.0		nC
Diode Forward Voltage	V_{SD}	$I_S=3A, V_{GS}=0V$		0.85	1.2	V
[P-channel]						
Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	$I_D=-1mA, V_{GS}=0V$	-20			V
Zero-Gate Voltage Drain Current	I_{DSS}	$V_{DS}=-20V, V_{GS}=0V$			-1	μA
Gate-to-Source Leakage Current	I_{GSS}	$V_{GS}=\pm 8V, V_{DS}=0V$			± 10	μA
Cutoff Voltage	$V_{GS(off)}$	$V_{DS}=-10V, I_D=-1mA$	-0.4		-1.4	V
Forward Transfer Admittance	$ y_{fs} $	$V_{DS}=-10V, I_D=-1A$	1.9	3.2		S
Static Drain-to-Source On-State Resistance	$R_{DS(on)1}$	$I_D=-1A, V_{GS}=-4V$		115	150	$m\Omega$
	$R_{DS(on)2}$	$I_D=-0.5A, V_{GS}=-2.5V$		165	235	$m\Omega$
	$R_{DS(on)3}$	$I_D=-0.3A, V_{GS}=1.8V$		260	520	$m\Omega$
Input Capacitance	C_{iss}	$V_{DS}=-10V, f=1MHz$		420		pF
Output Capacitance	C_{oss}	$V_{DS}=-10V, f=1MHz$		73		pF
Reverse Transfer Capacitance	C_{rss}	$V_{DS}=-10V, f=1MHz$		60		pF
Turn-ON Delay Time	$t_{d(on)}$	See specified Test Circuit.		11.8		ns
Rise Time	t_r	See specified Test Circuit.		33		ns
Turn-OFF Delay Time	$t_{d(off)}$	See specified Test Circuit.		48		ns
Fall Time	t_f	See specified Test Circuit.		43		ns
Total Gate Charge	Qg	$V_{DS}=-10V, V_{GS}=-4V, I_D=-2A$		4.7		nC
Gate-to-Source Charge	Qgs	$V_{DS}=-10V, V_{GS}=-4V, I_D=-2A$		0.75		nC
Gate-to-Drain "Miller" Charge	Qgd	$V_{DS}=-10V, V_{GS}=-4V, I_D=-2A$		1.6		nC
Diode Forward Voltage	V_{SD}	$I_S=-2A, V_{GS}=0V$		-0.83	-1.2	V

Package Dimensions

unit : mm (typ)
7045-002



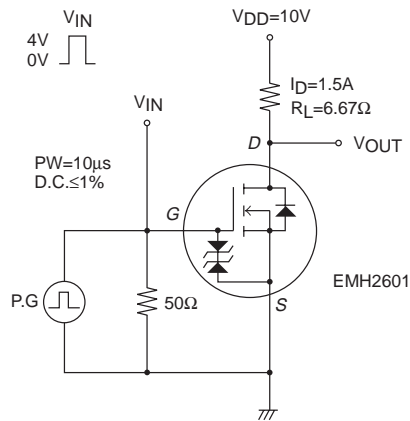
Electrical Connection



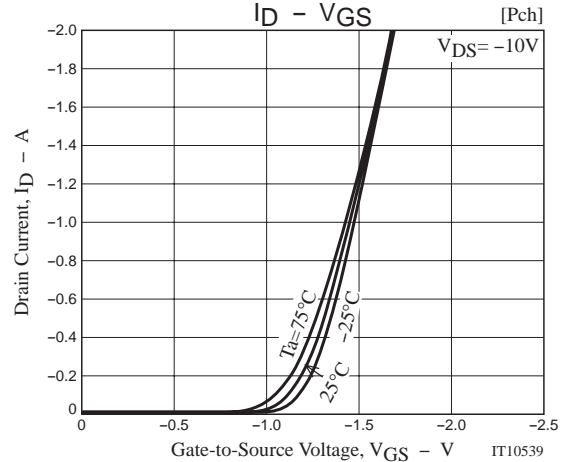
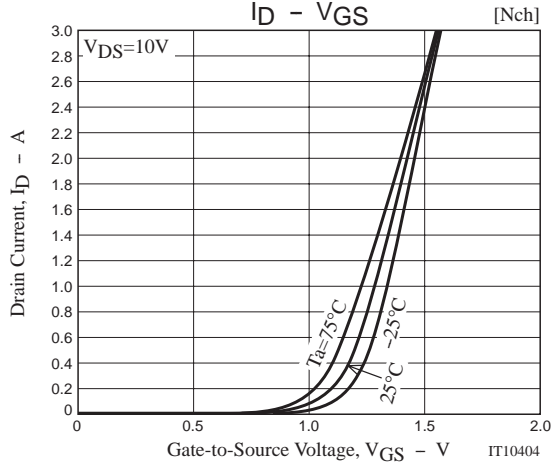
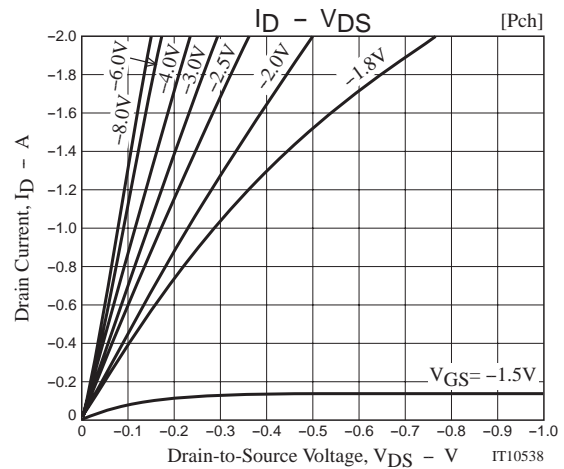
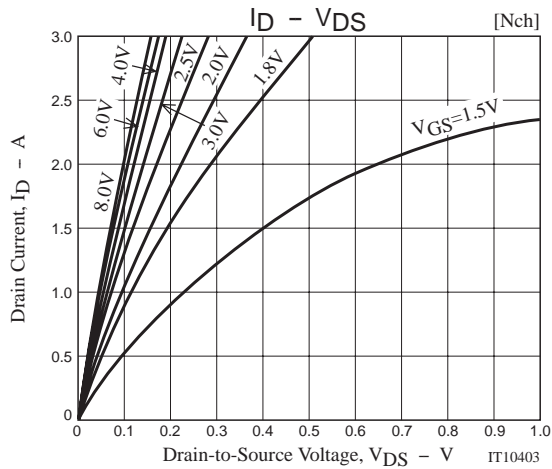
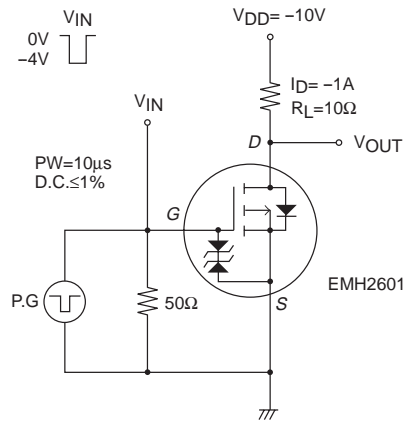
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Switching Time Test Circuit

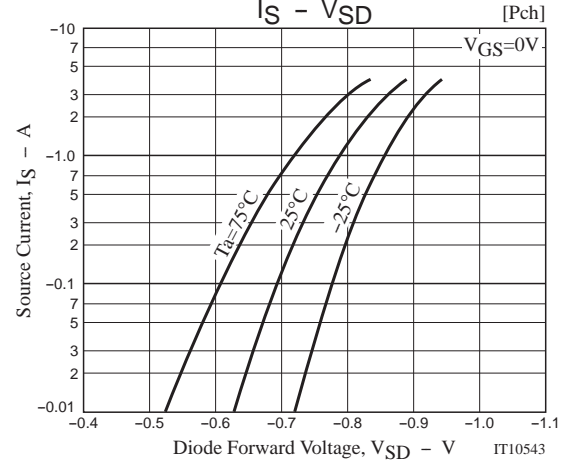
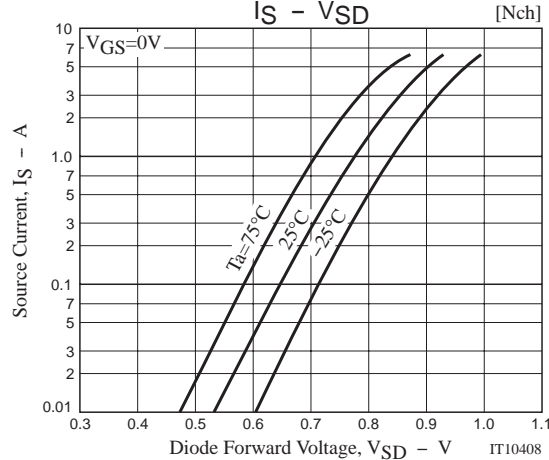
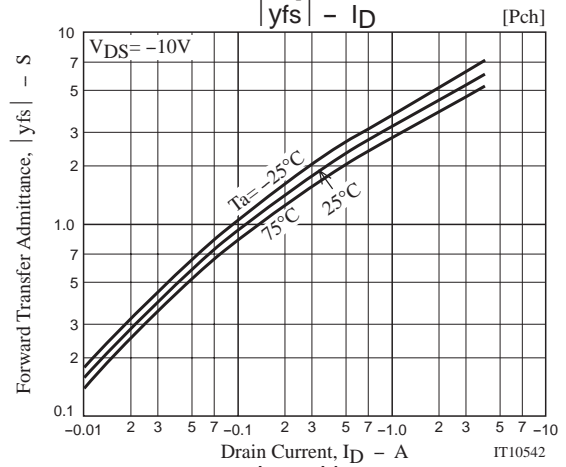
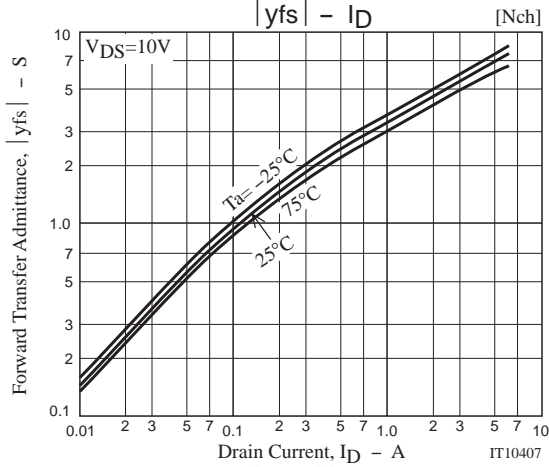
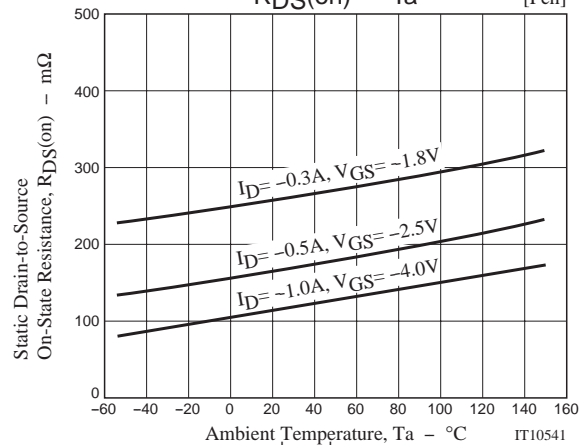
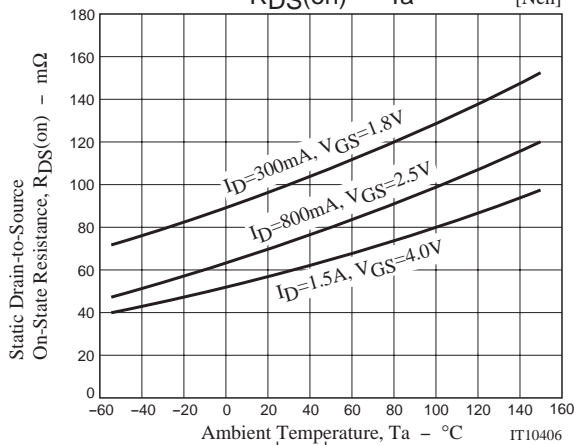
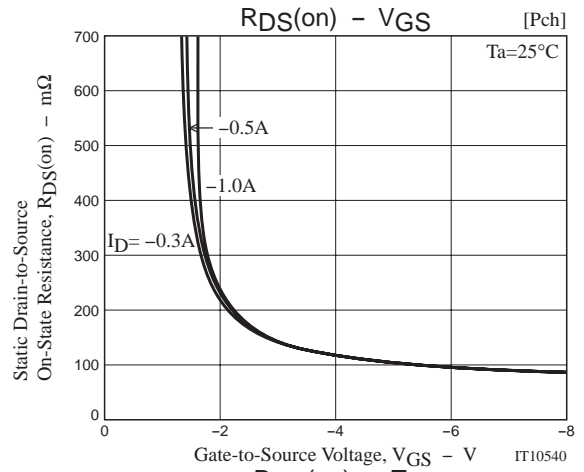
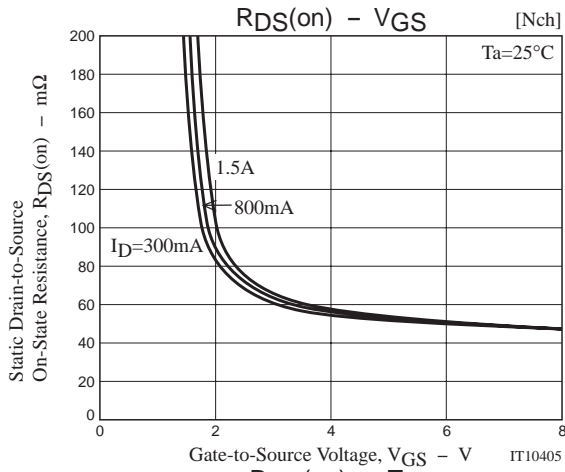
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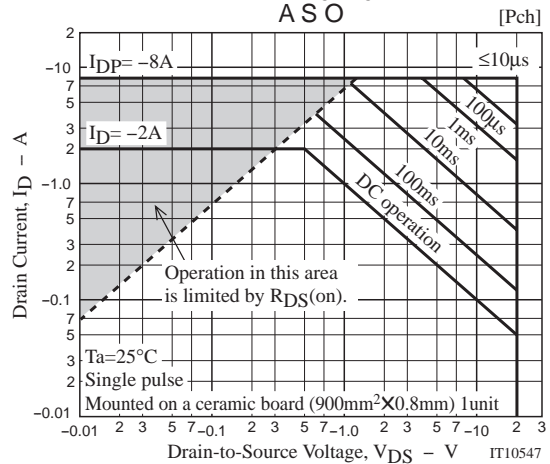
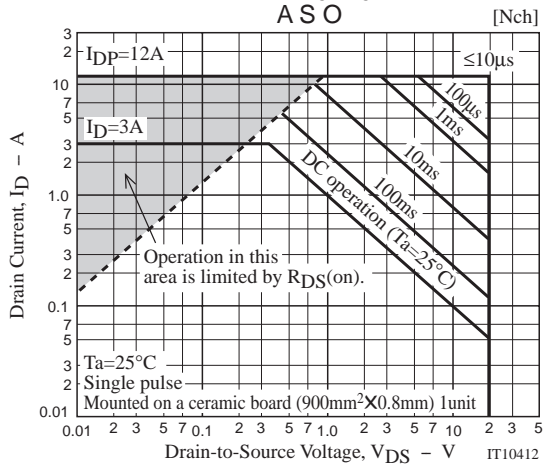
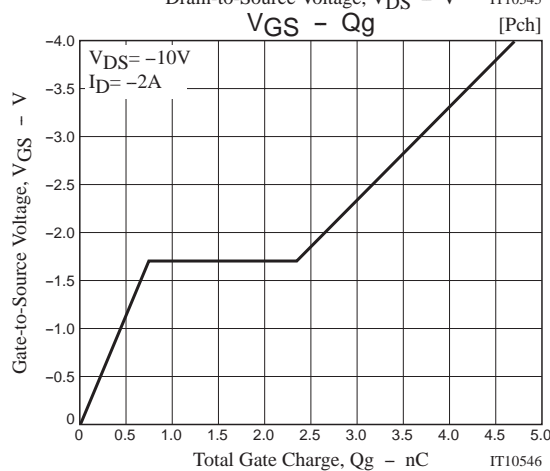
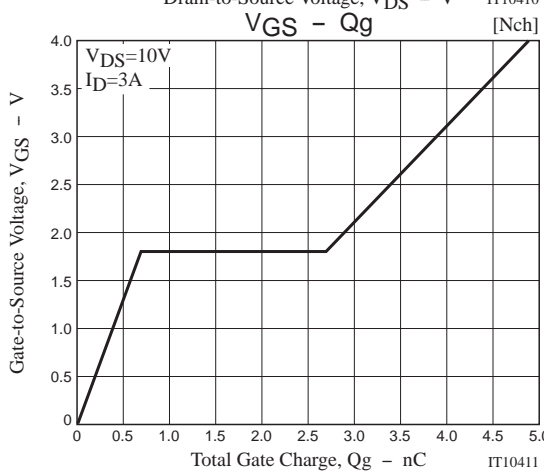
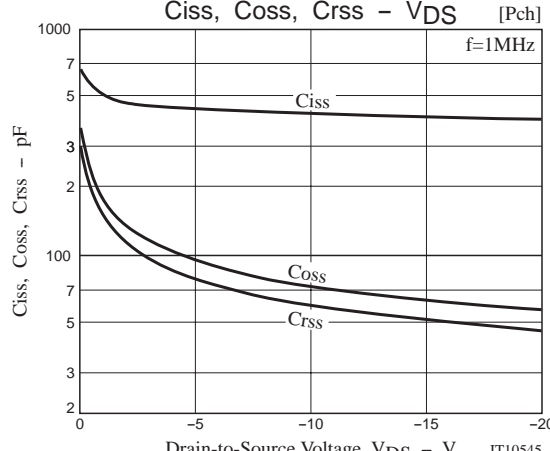
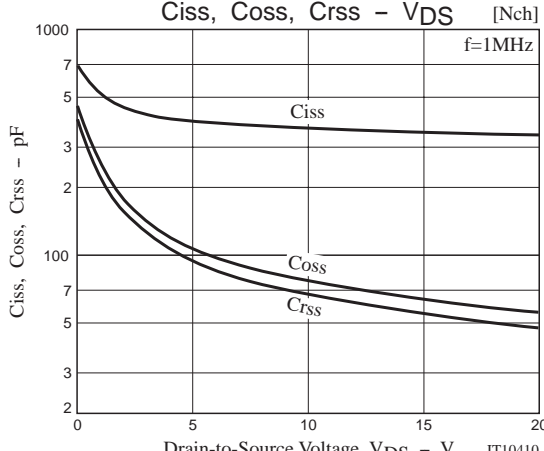
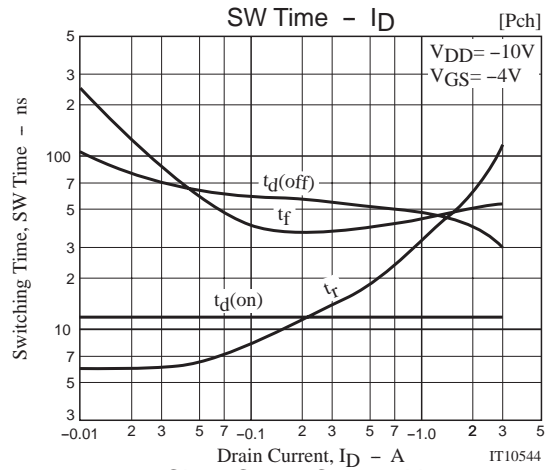
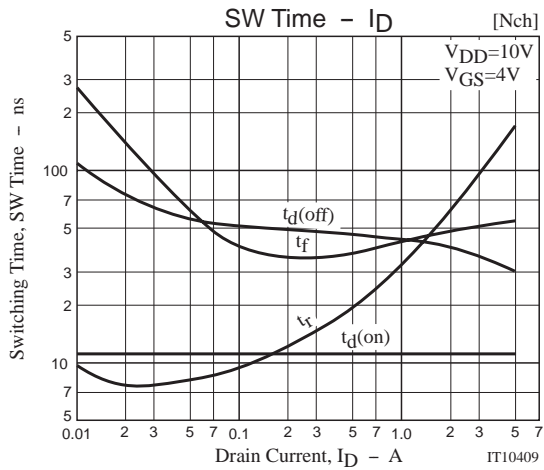


[P-channel]

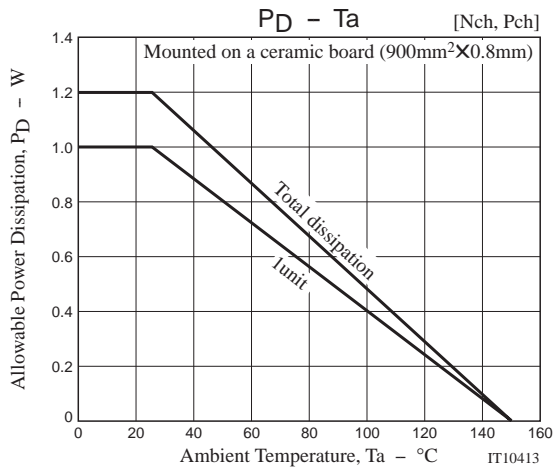


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