

**MCH6631**

Ultrahigh-Speed Switching Applications

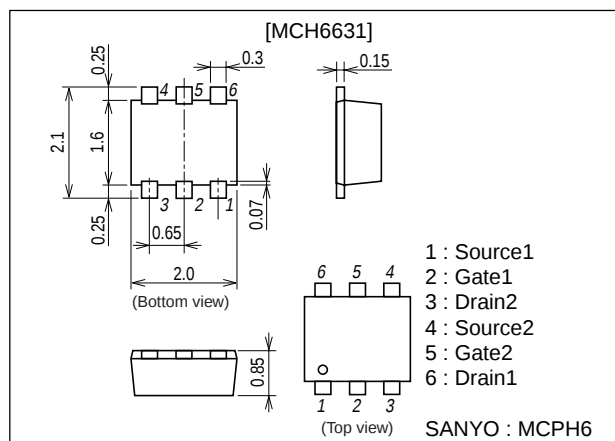
Features

- The MCH6631 incorporates a N-channel MOSFET and a P-channel MOSFET that feature low ON-resistance and high-speed switching, thereby enabling high-density mounting.
- Excellent ON-resistance characteristic.
- 2.5V drive(N-ch), 1.8V drive(P-ch).

Package Dimensions

unit : mm

2173A



Specifications

Absolute Maximum Ratings at Ta=25°C

Parameter	Symbol	Conditions	N-channel	P-channel	Unit
Drain-to-Source Voltage	V_{DS}		30	-12	V
Gate-to-Source Voltage	V_{GS}		±10	±10	V
Drain Current (DC)	I_D		0.35	-1.5	A
Drain Current (Pulse)	I_{DP}	$PW \leq 10\mu s$, duty cycle $\leq 1\%$	1.4	-6	A
Allowable Power Dissipation	P_D	Mounted on a ceramic board (900mm ² ×0.8mm)1unit	0.8		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}	$V_{GS}=\pm 8V, V_{DS}=0$			± 10	μA
Cutoff Voltage	$V_{GS(off)}$	$V_{DS}=10V, I_D=100\mu A$	0.4		1.3	V
Forward Transfer Admittance	$ y_{fs} $	$V_{DS}=10V, I_D=80mA$	150	220		mS
Static Drain-to-Source On-State Resistance	$R_{DS(on)1}$	$I_D=80mA, V_{GS}=4V$		2.9	3.7	Ω
	$R_{DS(on)2}$	$I_D=40mA, V_{GS}=2.5V$		3.7	5.2	Ω
	$R_{DS(on)3}$	$I_D=10mA, V_{GS}=1.5V$		6.4	12.8	Ω

Marking : WF

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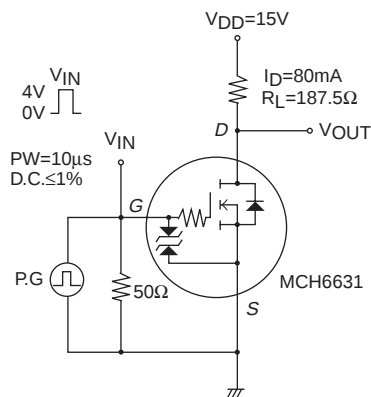
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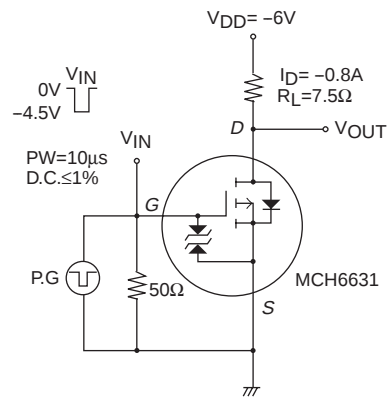
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Input Capacitance	Ciss	$V_{DS}=10V, f=1MHz$		7.0		pF
Output Capacitance	Coss	$V_{DS}=10V, f=1MHz$		5.9		pF
Reverse Transfer Capacitance	Crss	$V_{DS}=10V, f=1MHz$		2.3		pF
Turn-ON Delay Time	$t_d(on)$	See specified Test Circuit.		19		ns
Rise Time	t_r	See specified Test Circuit.		65		ns
Turn-OFF Delay Time	$t_d(off)$	See specified Test Circuit.		155		ns
Fall Time	t_f	See specified Test Circuit.		120		ns
Total Gate Charge	Qg	$V_{DS}=10V, V_{GS}=10V, I_D=150mA$		1.58		nC
Gate-to-Source Charge	Qgs	$V_{DS}=10V, V_{GS}=10V, I_D=150mA$		0.26		nC
Gate-to-Drain "Miller" Charge	Qgd	$V_{DS}=10V, V_{GS}=10V, I_D=150mA$		0.31		nC
Diode Forward Voltage	V_{SD}	$I_S=150mA, V_{GS}=0$		0.87	1.2	V
[P-channel]						
Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	$I_D=-1mA, V_{GS}=0$	-12			V
Zero-Gate Voltage Drain Current	I_{DSS}	$V_{DS}=-12V, V_{GS}=0$			-10	μA
Gate-to-Source Leakage Current	I_{GSS}	$V_{GS}=\pm 8V, V_{DS}=0$			± 10	μA
Cutoff Voltage	$V_{GS(off)}$	$V_{DS}=-6V, I_D=-1mA$	-0.3		-1.0	V
Forward Transfer Admittance	$ y_{fs} $	$V_{DS}=-6V, I_D=-0.8A$	1.3	1.8		S
Static Drain-to-Source On-State Resistance	$R_{DS(on)1}$	$I_D=-0.8A, V_{GS}=-4.5V$		220	290	m Ω
	$R_{DS(on)2}$	$I_D=-0.4A, V_{GS}=-2.5V$		320	450	m Ω
	$R_{DS(on)3}$	$I_D=-0.1A, V_{GS}=-1.8V$		430	650	m Ω
	$R_{DS(on)4}$	$I_D=-50mA, V_{GS}=-1.5V$		0.75	1.25	Ω
Input Capacitance	Ciss	$V_{DS}=-6V, f=1MHz$		160		pF
Output Capacitance	Coss	$V_{DS}=-6V, f=1MHz$		45		pF
Reverse Transfer Capacitance	Crss	$V_{DS}=-6V, f=1MHz$		35		pF
Turn-ON Delay Time	$t_d(on)$	See specified Test Circuit.		11		ns
Rise Time	t_r	See specified Test Circuit.		45		ns
Turn-OFF Delay Time	$t_d(off)$	See specified Test Circuit.		29		ns
Fall Time	t_f	See specified Test Circuit.		30		ns
Total Gate Charge	Qg	$V_{DS}=-6V, V_{GS}=-4.5V, I_D=-1.5A$		2.6		nC
Gate-to-Source Charge	Qgs	$V_{DS}=-6V, V_{GS}=-4.5V, I_D=-1.5A$		0.25		nC
Gate-to-Drain "Miller" Charge	Qgd	$V_{DS}=-6V, V_{GS}=-4.5V, I_D=-1.5A$		0.65		nC
Diode Forward Voltage	V_{SD}	$I_S=-1.5A, V_{GS}=0$		-0.92	-1.5	V

Switching Time Test Circuit

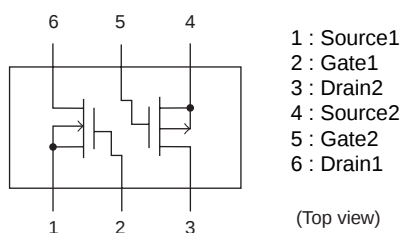
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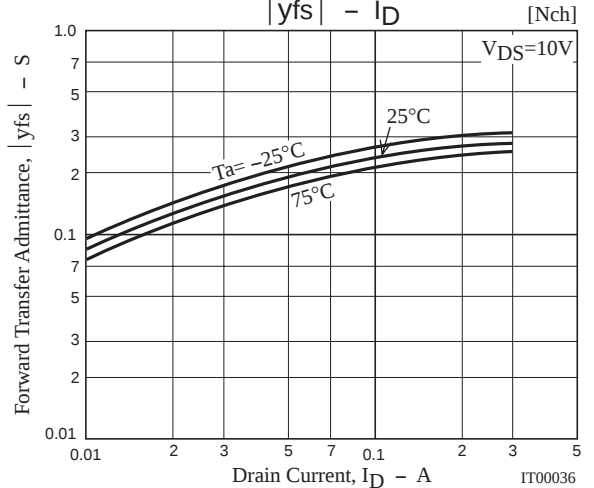
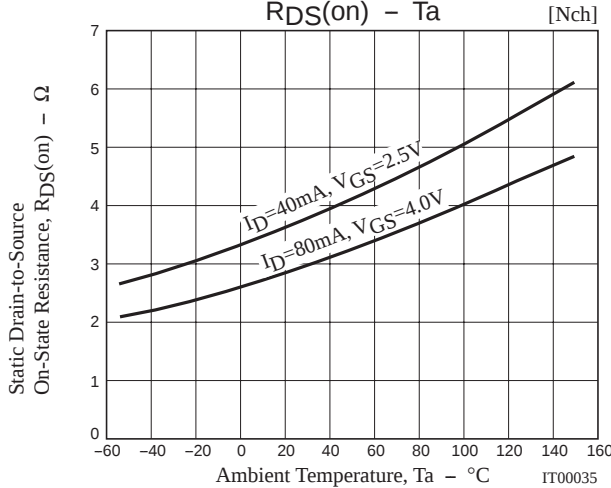
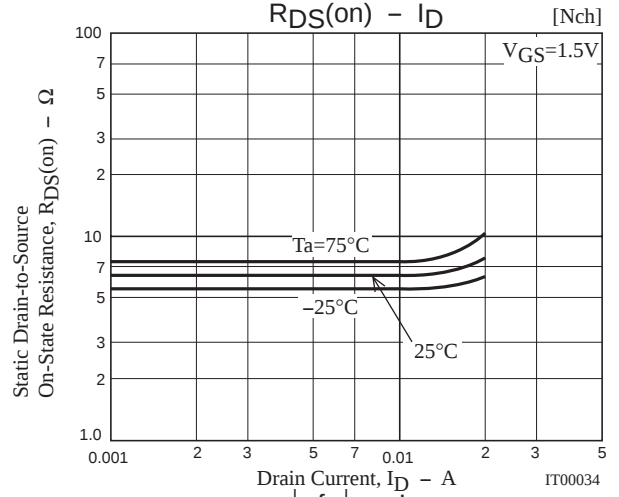
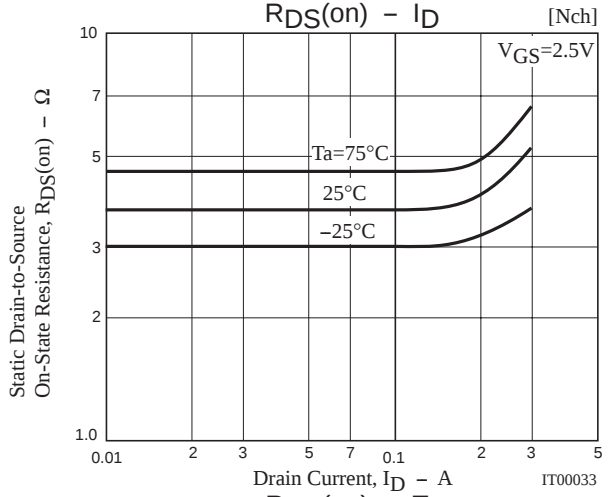
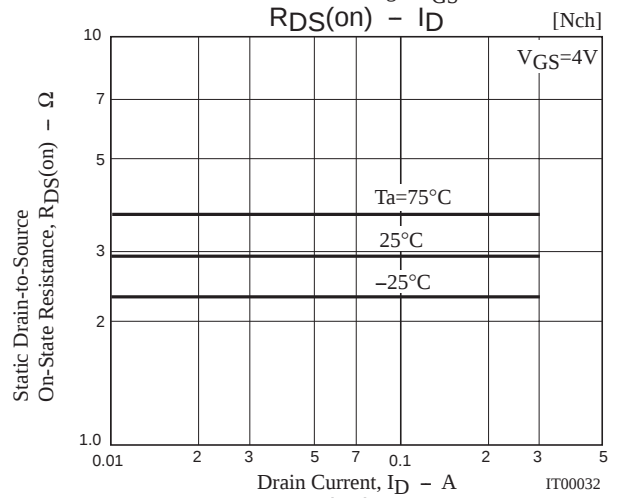
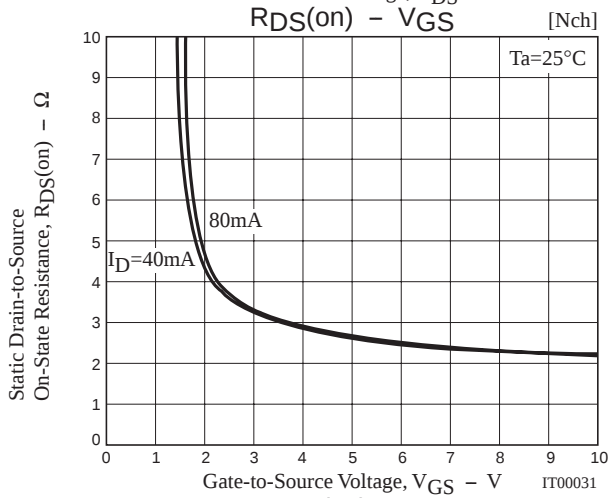
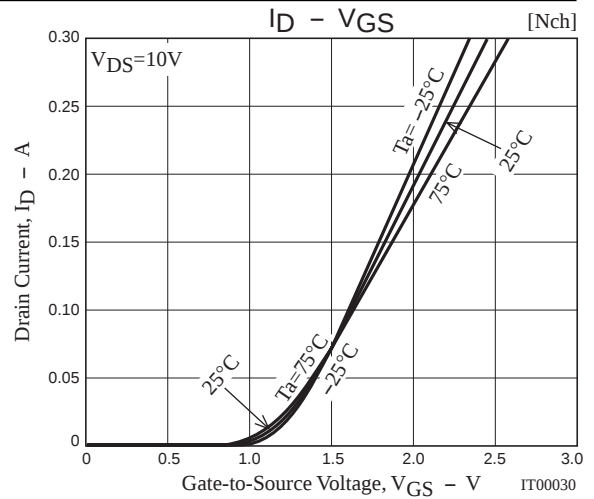
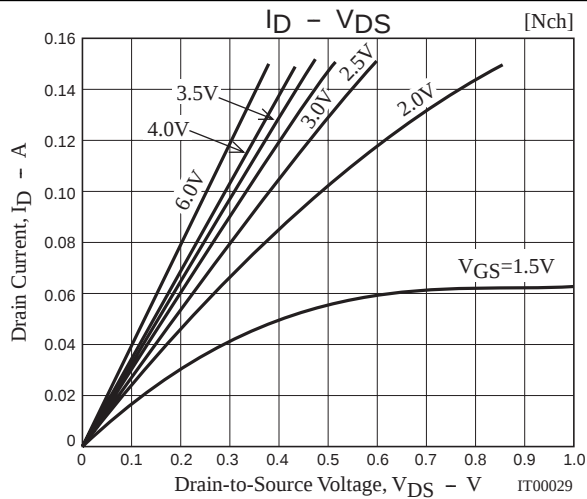


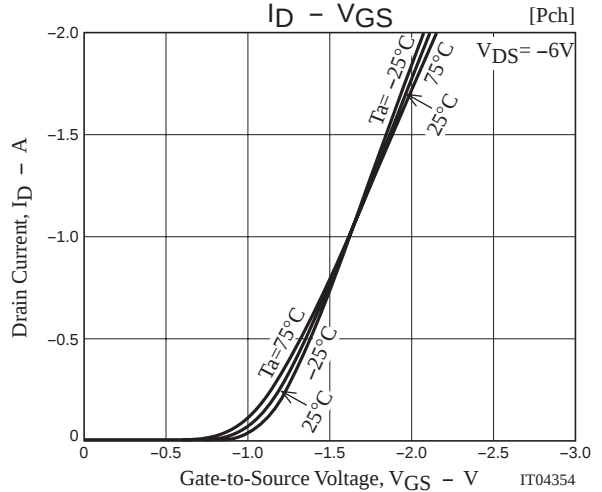
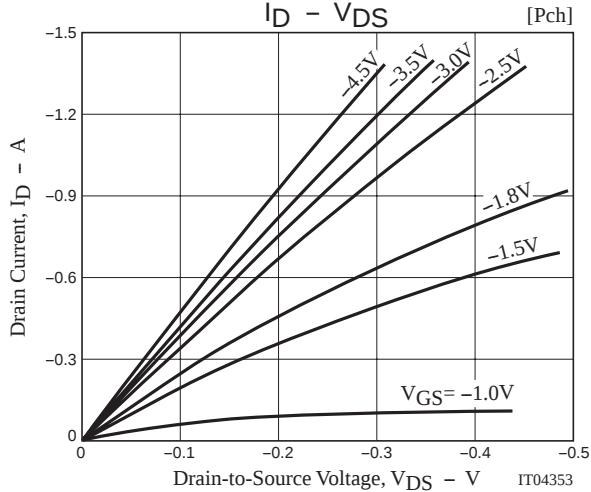
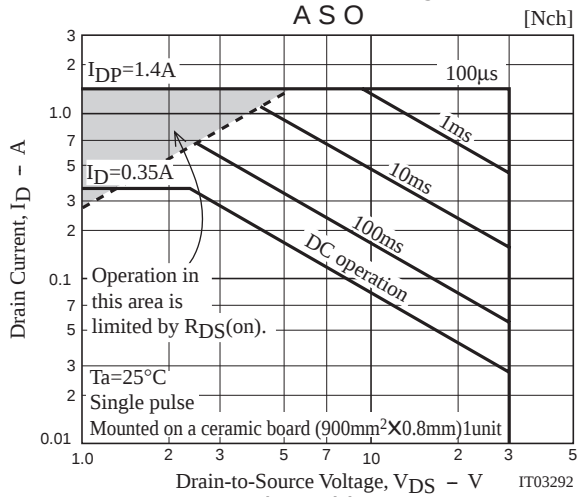
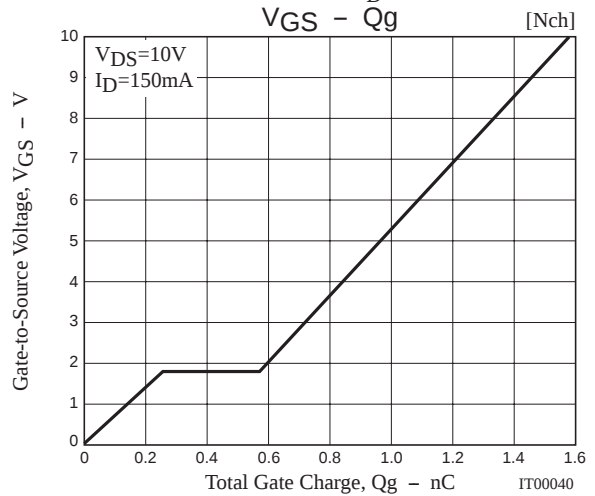
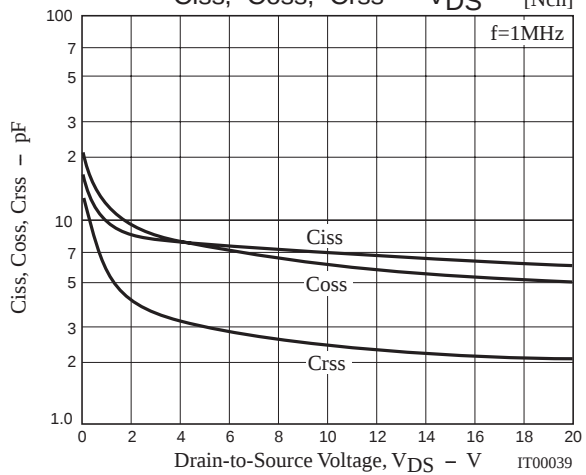
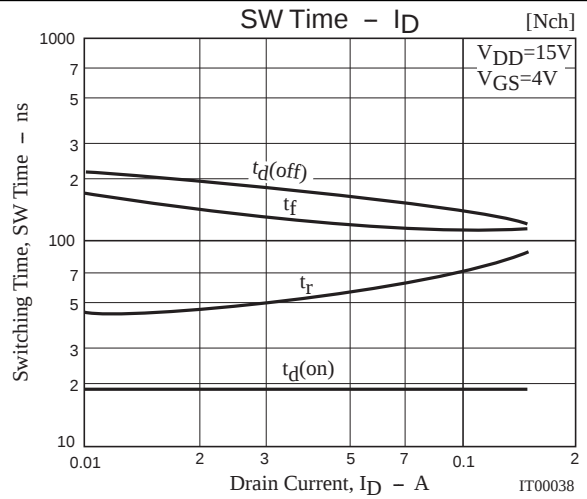
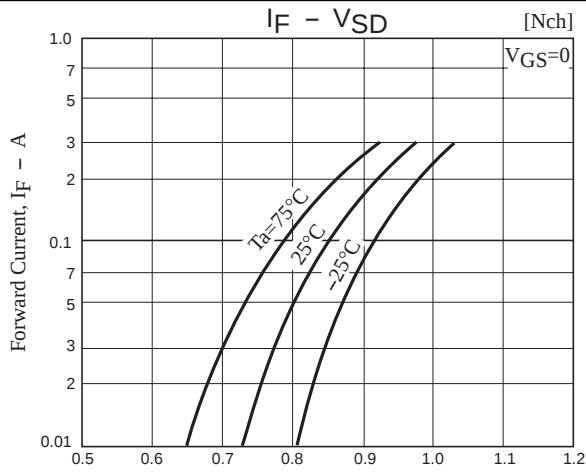
[P-channel]



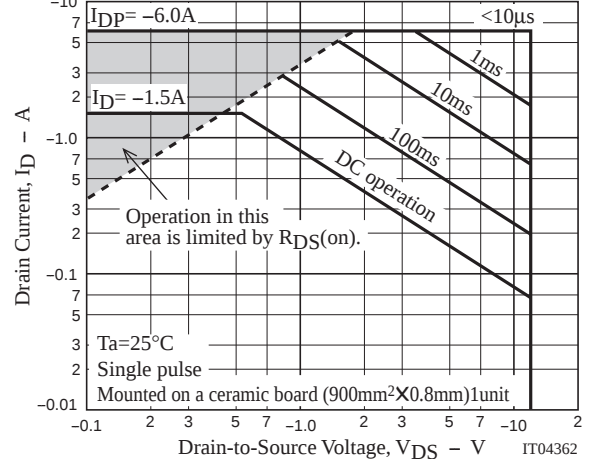
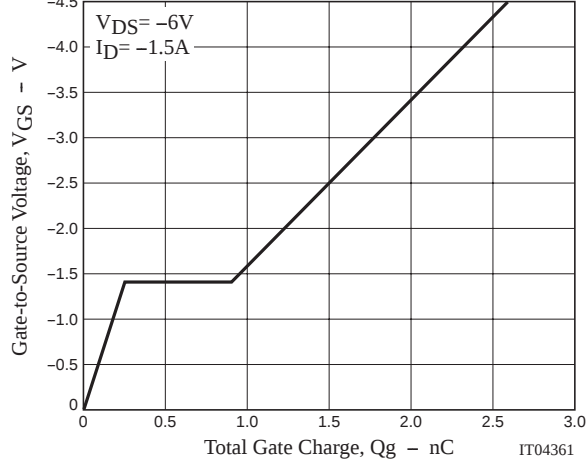
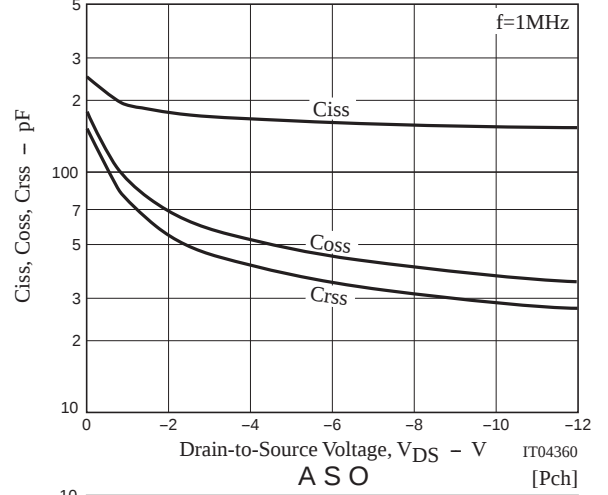
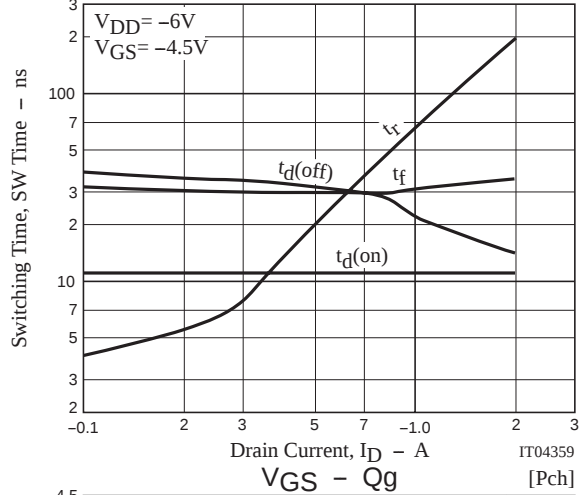
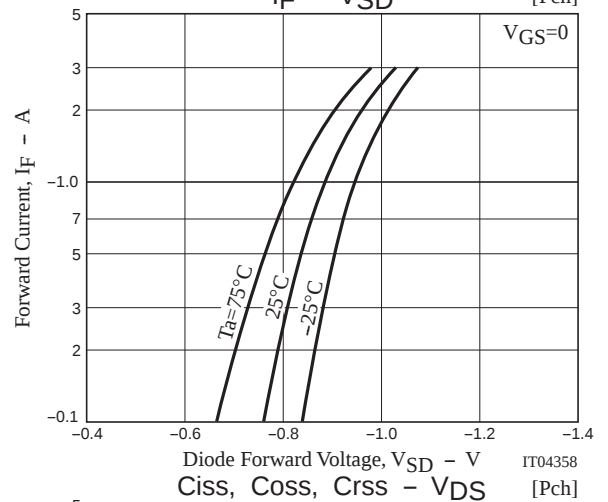
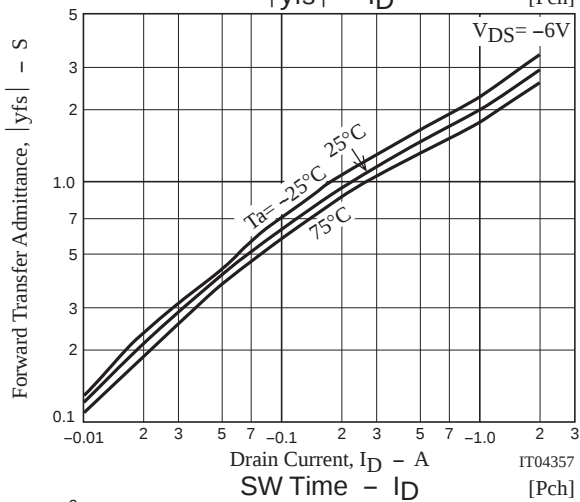
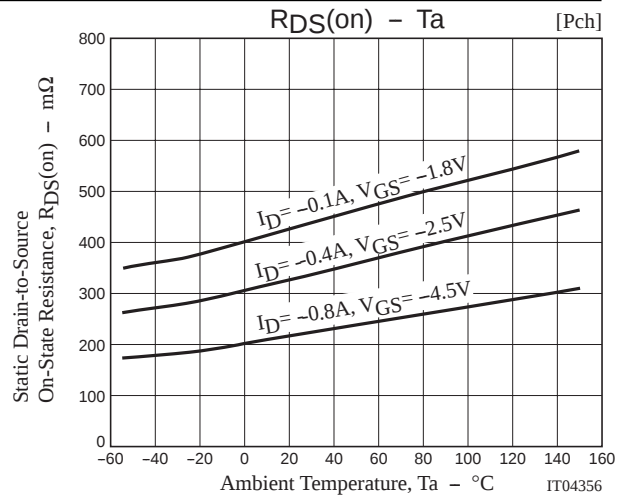
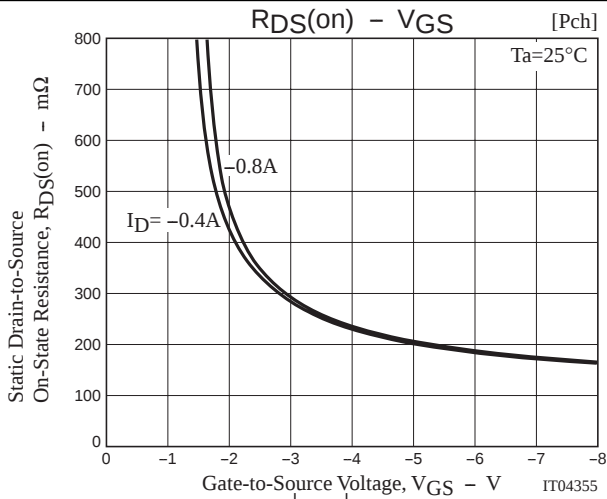
Electrical Connection

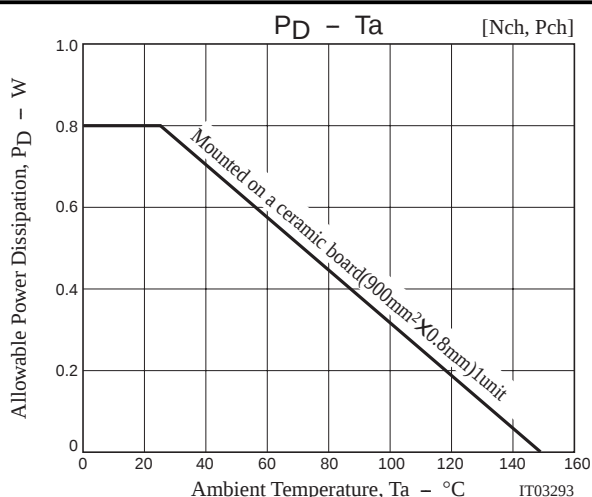






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