



# MCH6613

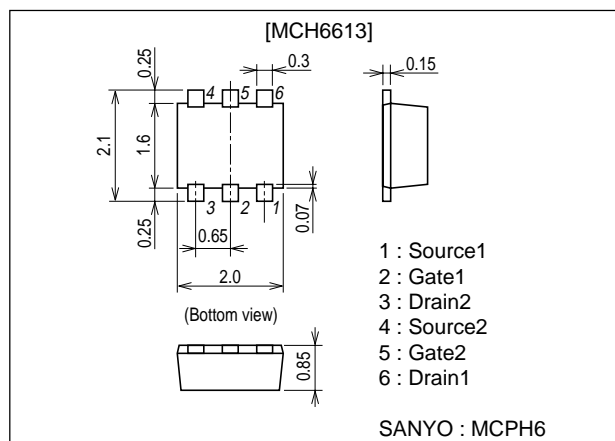
## Ultrahigh-Speed Switching Applications

### Features

- The MCH6613 incorporates an 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.

### 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	$V_{DSS}$		30	-30	V
Gate-to-Source Voltage	$V_{GSS}$		$\pm 10$	$\pm 10$	V
Drain Current (DC)	$I_D$		0.35	-0.2	A
Drain Current (Pulse)	$I_{DP}$	$PW \leq 10\mu s$ , duty cycle $\leq 1\%$	1.4	-0.8	A
Allowable Power Dissipation	$P_D$	Mounted on a ceramic board (900mm <sup>2</sup> X0.8mm)1unit	0.8		W
Channel Temperature	Tch		150		°C
Storage Temperature	Tstg		-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	$\mu A$
Gate-to-Source Leakage Current	$I_{GSS}$	$V_{GS}=\pm 8V$ , $V_{DS}=0$			$\pm 10$	$\mu A$
Cutoff Voltage	$V_{GS(off)}$	$V_{DS}=10V$ , $I_D=100\mu A$	0.4		1.3	V
Forward Transfer Admittance	yfs	$V_{DS}=10V$ , $I_D=80mA$	150	220		mS
Static Drain-to-Source On-State Resistance	$R_{DS(on)1}$	$I_D=80mA$ , $V_{GS}=4V$		2.9	3.7	$\Omega$
	$R_{DS(on)2}$	$I_D=40mA$ , $V_{GS}=2.5V$		3.7	5.2	$\Omega$
	$R_{DS(on)3}$	$I_D=10mA$ , $V_{GS}=1.5V$		6.4	12.8	$\Omega$

Marking : FM

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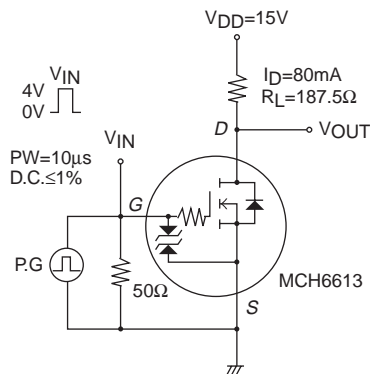
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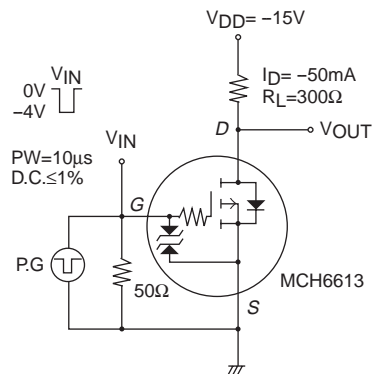
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Input Capacitance	Ciss	$V_{DS}=10V, f=1MHz$		7.0		pF
Output Capacitance	Coss	$V_{DS}=10V, f=1MHz$		5.9		pF
Reverse Transfer Capacitance	Crss	$V_{DS}=10V, f=1MHz$		2.3		pF
Turn-ON Delay Time	$t_d(on)$	See specified Test Circuit		19		ns
Rise Time	$t_r$	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	$V_{(BR)DSS}$	$I_D=-1mA, V_{GS}=0$	-30			V
Zero-Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=-30V, V_{GS}=0$			-10	$\mu A$
Gate-to-Source Leakage Current	$I_{GSS}$	$V_{GS}=\pm 8V, V_{DS}=0$			$\pm 10$	$\mu A$
Cutoff Voltage	$V_{GS(off)}$	$V_{DS}=-10V, I_D=-100\mu A$	-0.4		-1.4	V
Forward Transfer Admittance	$ y_{fs} $	$V_{DS}=-10V, I_D=-50mA$	80	110		mS
Static Drain-to-Source On-State Resistance	$R_{DS(on)1}$	$I_D=-50mA, V_{GS}=-4V$		8	10.4	$\Omega$
	$R_{DS(on)2}$	$I_D=-30mA, V_{GS}=-2.5V$		11	15.4	$\Omega$
	$R_{DS(on)3}$	$I_D=-1mA, V_{GS}=-1.5V$		27	54	$\Omega$
Input Capacitance	Ciss	$V_{DS}=-10V, f=1MHz$		7.5		pF
Output Capacitance	Coss	$V_{DS}=-10V, f=1MHz$		5.7		pF
Reverse Transfer Capacitance	Crss	$V_{DS}=-10V, f=1MHz$		1.8		pF
Turn-ON Delay Time	$t_d(on)$	See specified Test Circuit		24		ns
Rise Time	$t_r$	See specified Test Circuit		55		ns
Turn-OFF Delay Time	$t_d(off)$	See specified Test Circuit		120		ns
Fall Time	$t_f$	See specified Test Circuit		130		ns
Total Gate Charge	Qg	$V_{DS}=-10V, V_{GS}=-10V, I_D=-100mA$		1.43		nC
Gate-to-Source Charge	Qgs	$V_{DS}=-10V, V_{GS}=-10V, I_D=-100mA$		0.18		nC
Gate-to-Drain "Miller" Charge	Qgd	$V_{DS}=-10V, V_{GS}=-10V, I_D=-100mA$		0.25		nC
Diode Forward Voltage	$V_{SD}$	$I_S=-100mA, V_{GS}=0$		-0.83	-1.2	V

## Switching Time Test Circuit

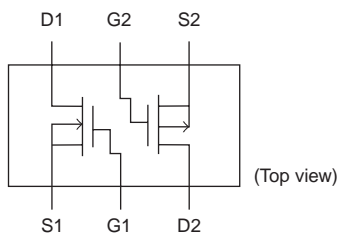
[N-channel]



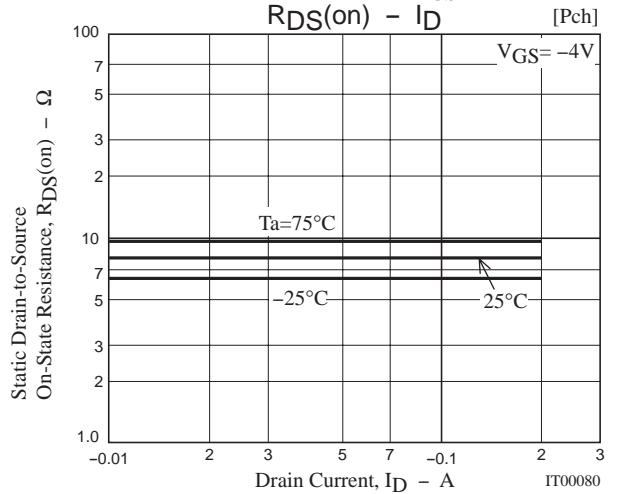
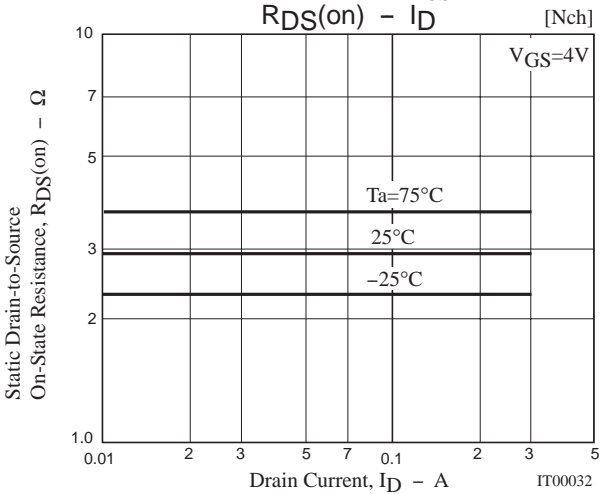
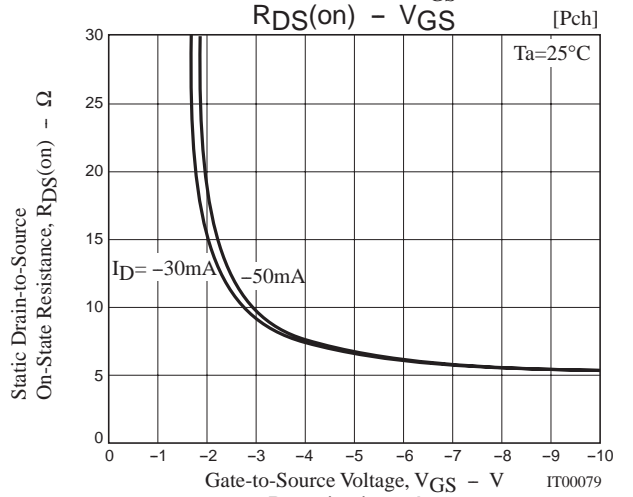
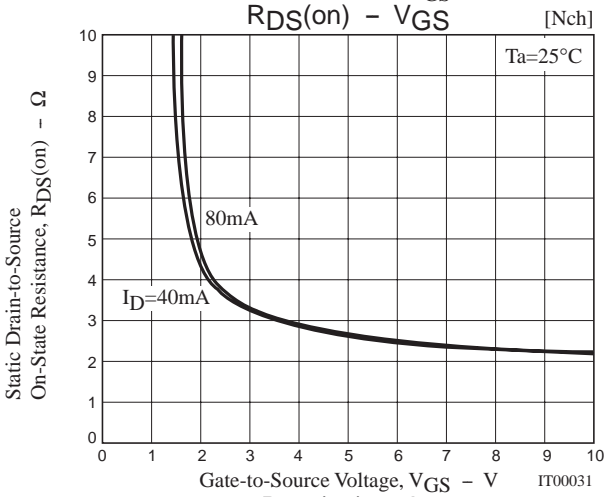
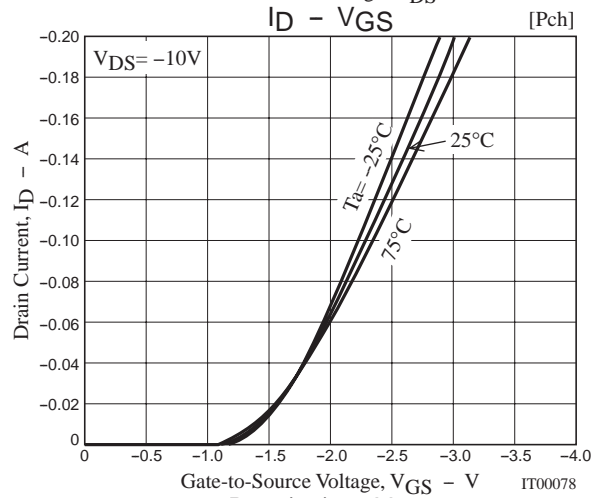
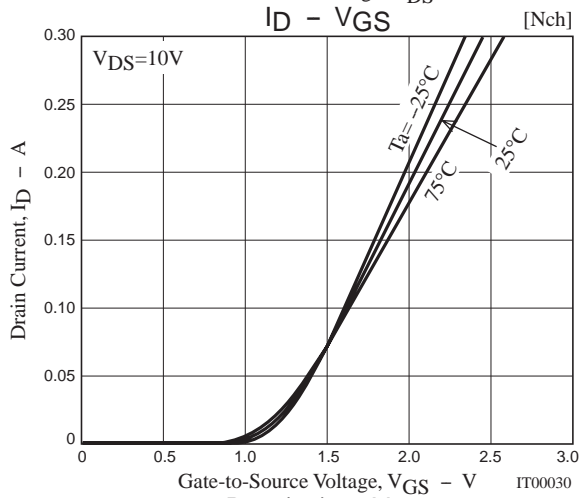
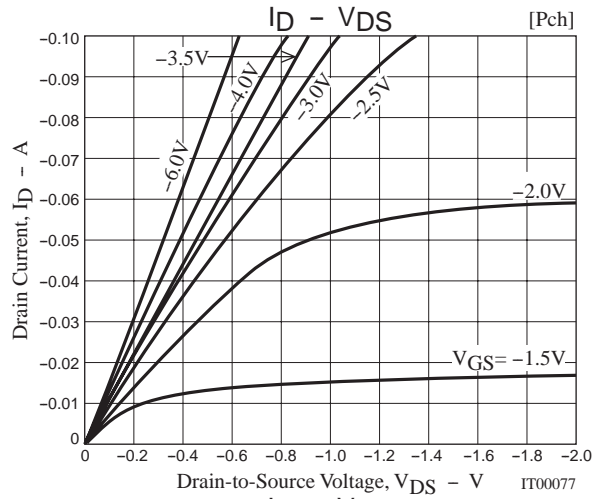
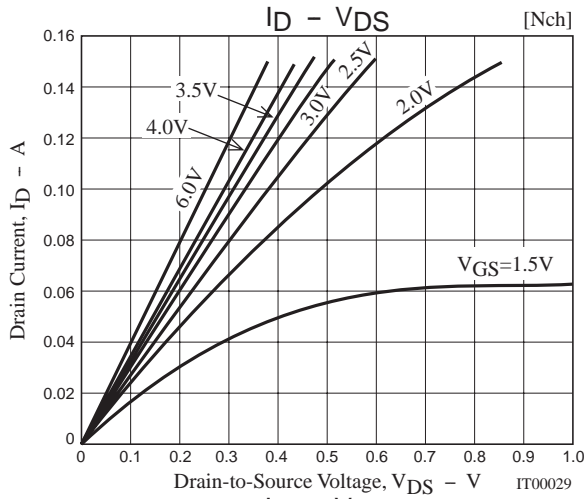
[P-channel]



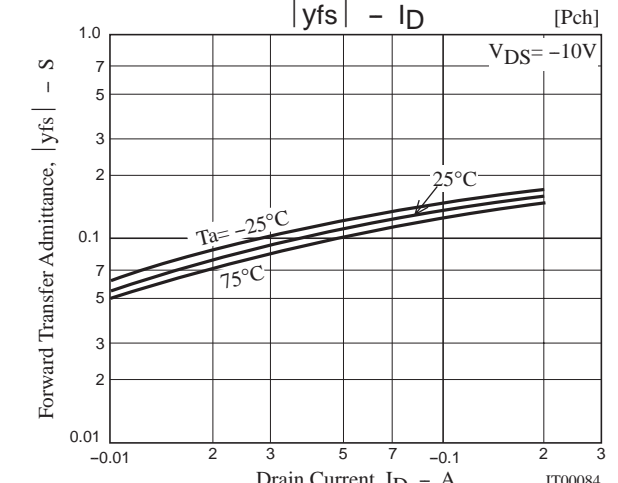
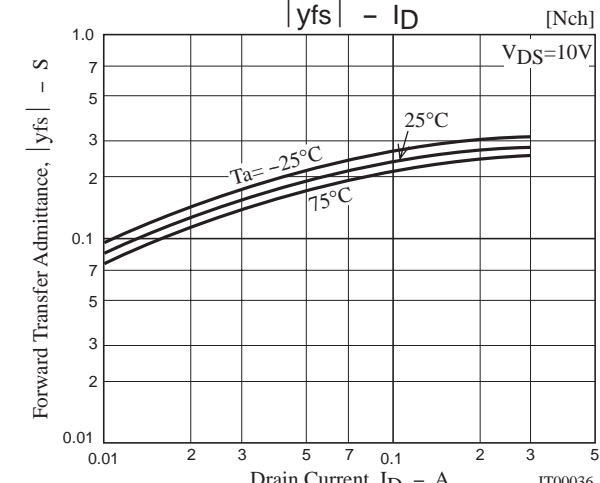
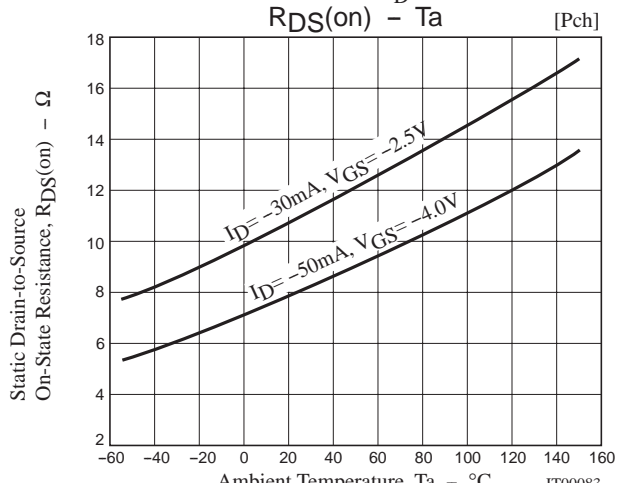
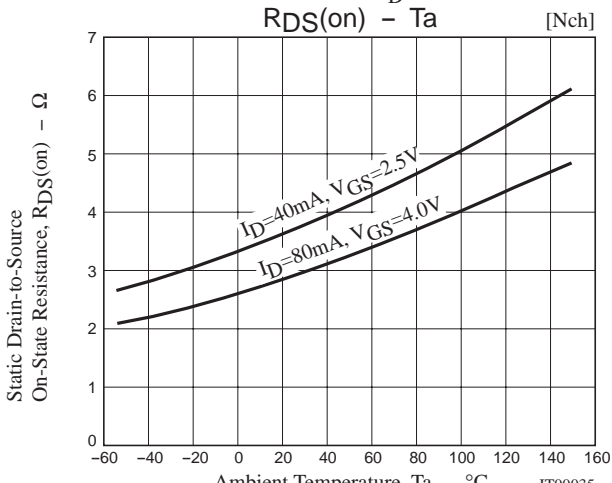
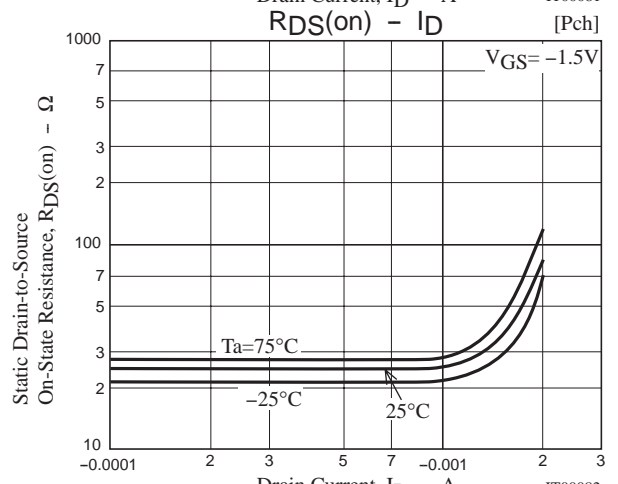
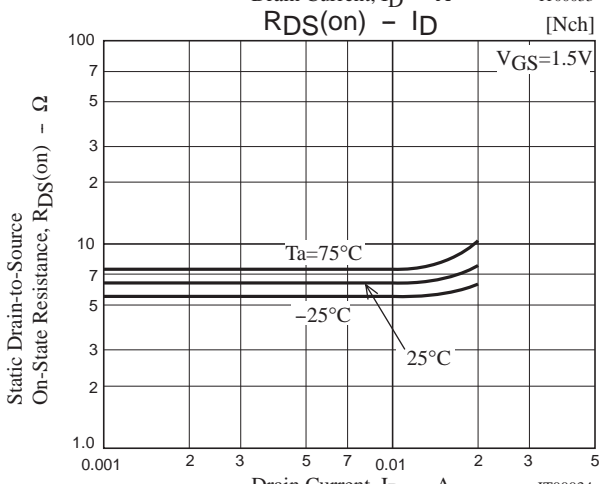
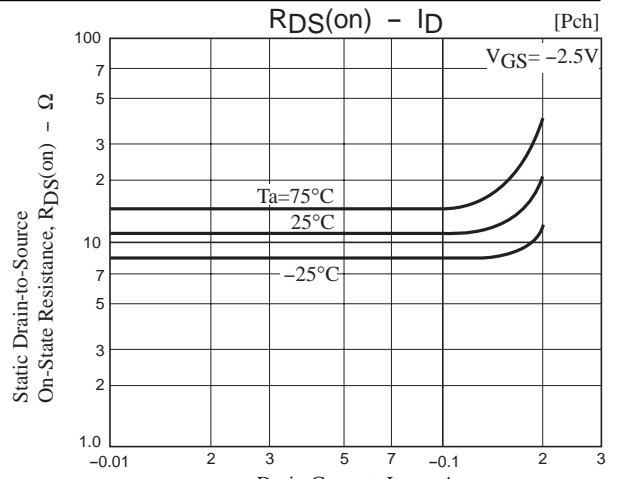
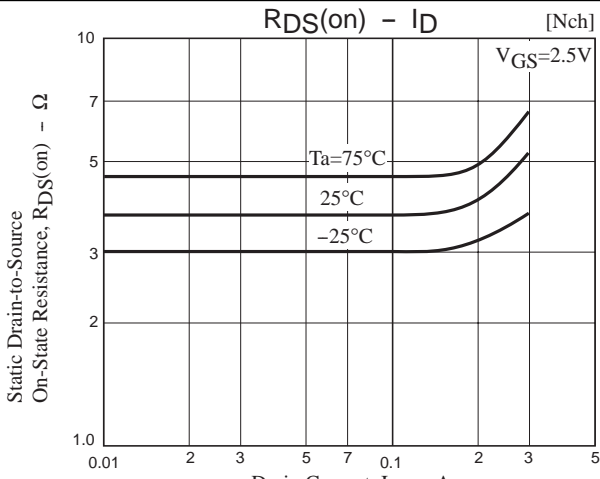
## Electrical Connection



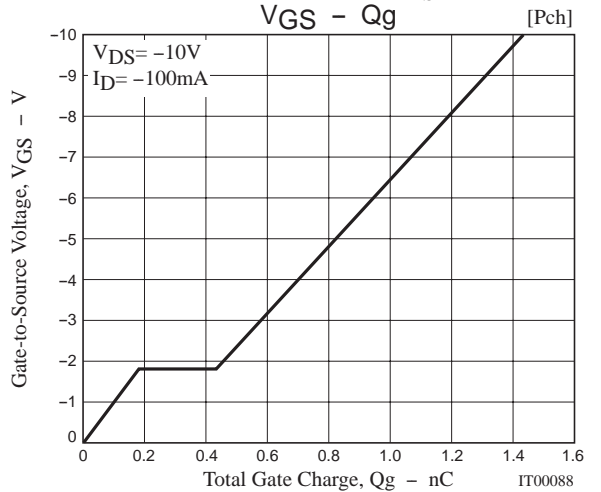
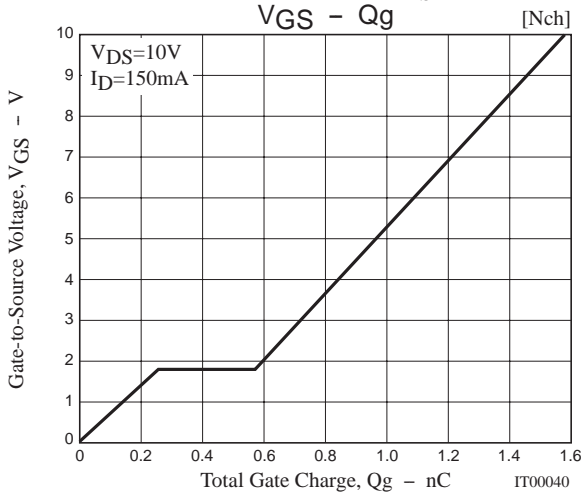
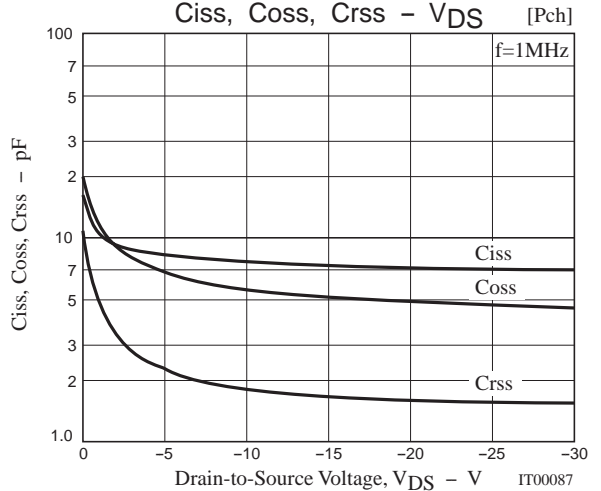
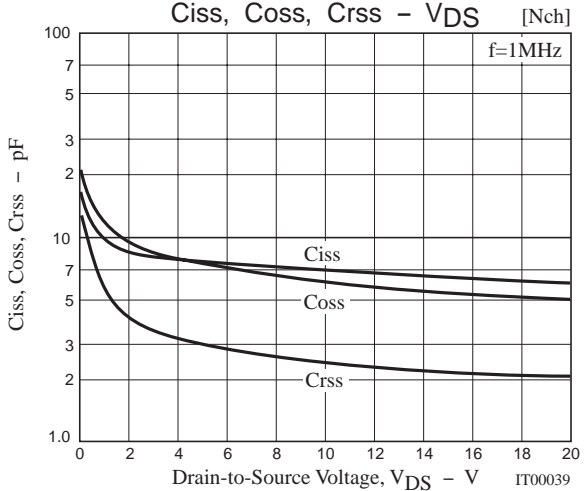
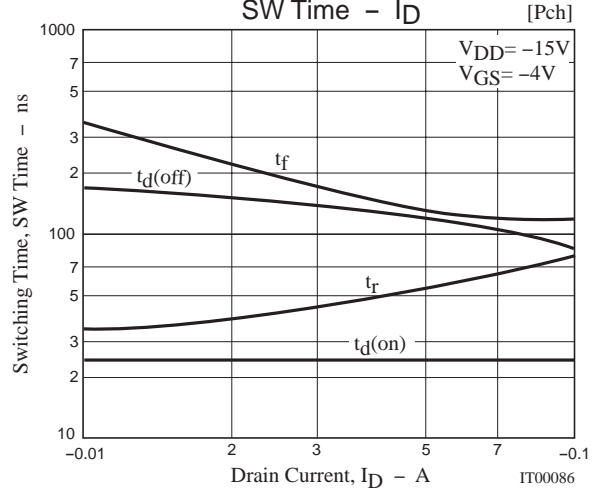
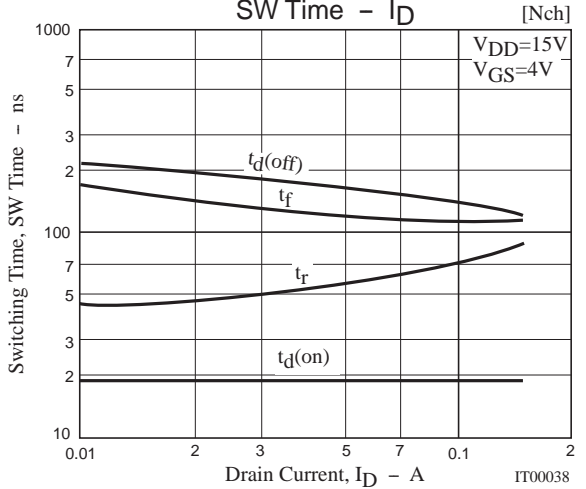
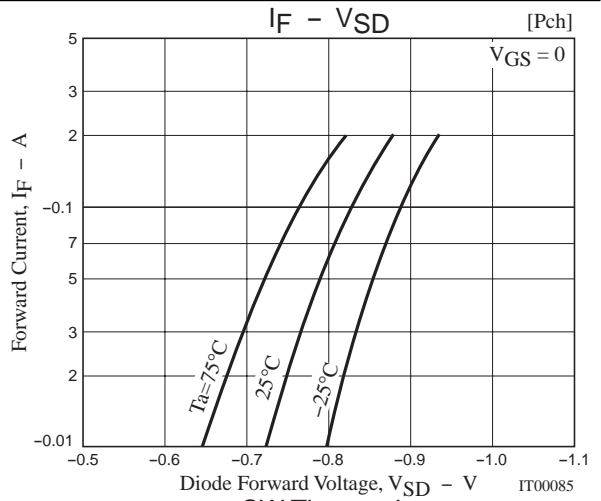
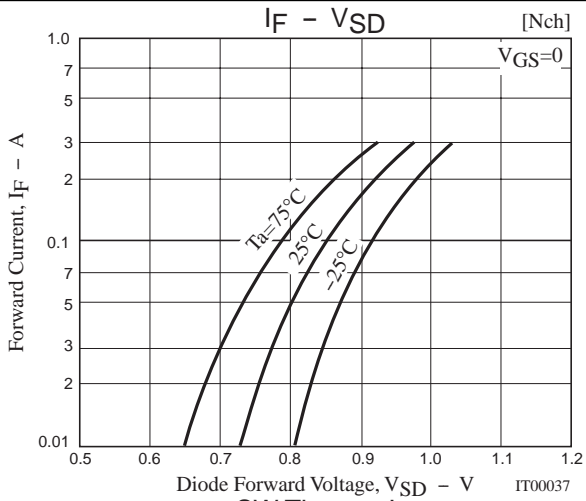
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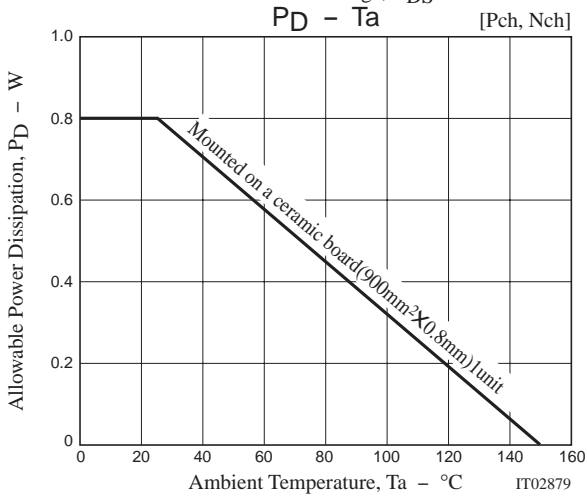
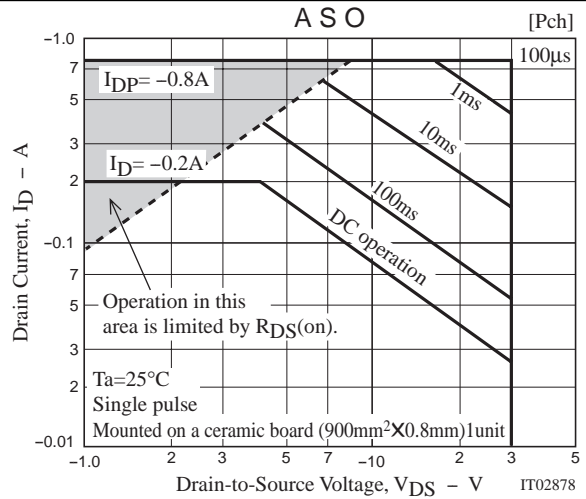
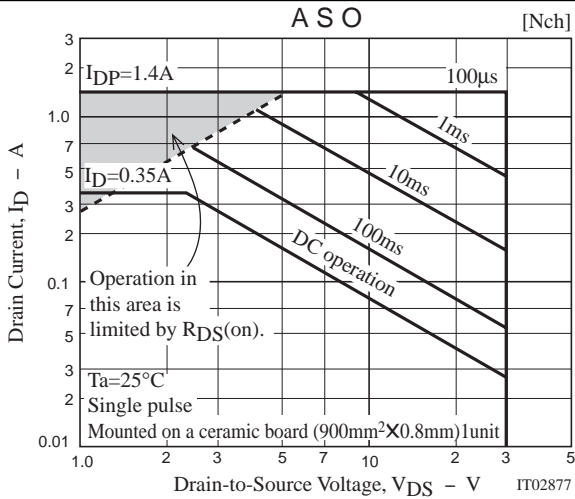
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