



# EMH2603 — N-Channel and P-Channel Silicon MOSFETs

## General-Purpose Switching Device Applications

### Features

- The EMH2603 incorporates an N-channel MOSFET and a P-channel MOSFET that feature low ON-resistance and ultrahigh-speed switching, thereby enabling high-density mounting.
- Nch: 2.5V drive.
- Pch: 1.8V drive.

### Specifications

#### Absolute Maximum Ratings at Ta=25°C

Parameter	Symbol	Conditions	N-channel	P-channel	Unit
Drain-to-Source Voltage	V <sub>DSS</sub>		30	-20	V
Gate-to-Source Voltage	V <sub>GSS</sub>		±10	±10	V
Drain Current (DC)	I <sub>D</sub>		0.15	-2	A
Drain Current (Pulse)	I <sub>DP</sub>	PW≤10μs, duty cycle≤1%	0.6	-8	A
Allowable Power Dissipation	P <sub>D</sub>	Mounted on a ceramic board (900mm <sup>2</sup> ×0.8mm) 1unit	0.6	1.1	W
Total Dissipation	P <sub>T</sub>	Mounted on a ceramic board (900mm <sup>2</sup> ×0.8mm)	1.2		W
Channel Temperature	T <sub>ch</sub>		150		°C
Storage Temperature	T <sub>stg</sub>		-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 <sub>(BR)DSS</sub>	I <sub>D</sub> =1mA, V <sub>GS</sub> =0V	30			V
Zero-Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =30V, V <sub>GS</sub> =0V			1	μA
Gate-to-Source Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> =±8V, V <sub>DS</sub> =0V			±10	μA
Cutoff Voltage	V <sub>GS(off)</sub>	V <sub>DS</sub> =10V, I <sub>D</sub> =100μA	0.4		1.3	V
Forward Transfer Admittance	y <sub>fs</sub>	V <sub>DS</sub> =10V, I <sub>D</sub> =80mA	0.13	0.22		S

Marking : FC

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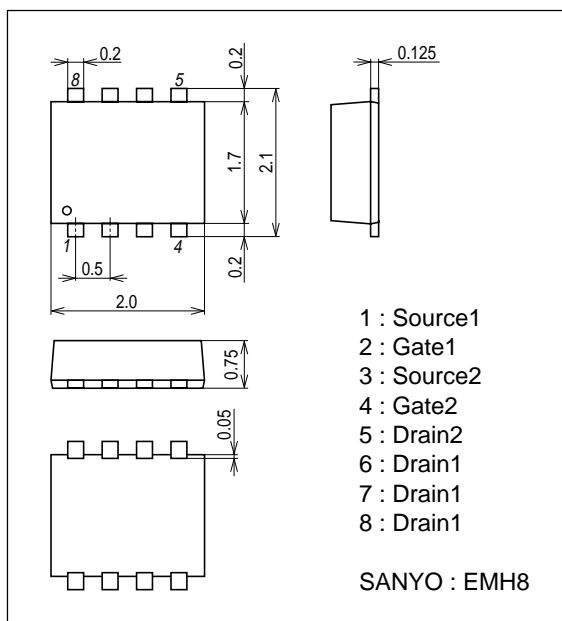
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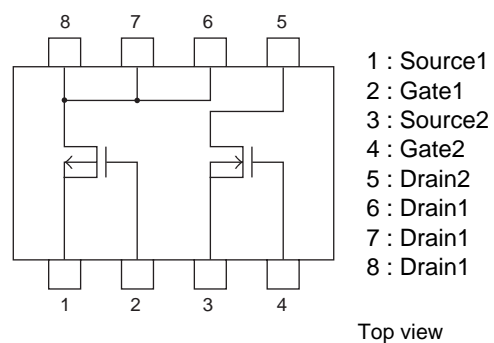
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Static Drain-to-Source On-State Resistance	R <sub>DS(on)1</sub>	I <sub>D</sub> =80mA, V <sub>GS</sub> =4V		2.9	3.7	Ω
	R <sub>DS(on)2</sub>	I <sub>D</sub> =40mA, V <sub>GS</sub> =2.5V		3.7	5.2	Ω
	R <sub>DS(on)3</sub>	I <sub>D</sub> =10mA, V <sub>GS</sub> =1.5V		6.4	12.8	Ω
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =10V, f=1MHz		7.0		pF
Output Capacitance	C <sub>oss</sub>	V <sub>DS</sub> =10V, f=1MHz		5.9		pF
Reverse Transfer Capacitance	C <sub>rss</sub>	V <sub>DS</sub> =10V, f=1MHz		2.3		pF
Turn-ON Delay Time	t <sub>d(on)</sub>	See specified Test Circuit.		19		ns
Rise Time	t <sub>r</sub>	See specified Test Circuit.		65		ns
Turn-OFF Delay Time	t <sub>d(off)</sub>	See specified Test Circuit.		155		ns
Fall Time	t <sub>f</sub>	See specified Test Circuit.		120		ns
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =10V, V <sub>GS</sub> =10V, I <sub>D</sub> =150mA		1.58		nC
Gate-to-Source Charge	Q <sub>gs</sub>	V <sub>DS</sub> =10V, V <sub>GS</sub> =10V, I <sub>D</sub> =150mA		0.26		nC
Gate-to-Drain "Miller" Charge	Q <sub>gd</sub>	V <sub>DS</sub> =10V, V <sub>GS</sub> =10V, I <sub>D</sub> =150mA		0.31		nC
Diode Forward Voltage	V <sub>SD</sub>	I <sub>S</sub> =150mA, V <sub>GS</sub> =0V		0.87	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	-20			V
Zero-Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =-20V, V <sub>GS</sub> =0V			-1	μA
Gate-to-Source Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> =±8V, V <sub>DS</sub> =0V			±10	μA
Cutoff Voltage	V <sub>GS(off)</sub>	V <sub>DS</sub> =-10V, I <sub>D</sub> =-1mA	-0.4		-1.4	V
Forward Transfer Admittance	y <sub>fs</sub>	V <sub>DS</sub> =-10V, I <sub>D</sub> =-1A	1.9	3.2		S
Static Drain-to-Source On-State Resistance	R <sub>DS(on)1</sub>	I <sub>D</sub> =-1A, V <sub>GS</sub> =-4V		115	150	mΩ
	R <sub>DS(on)2</sub>	I <sub>D</sub> =-0.5A, V <sub>GS</sub> =-2.5V		165	235	mΩ
	R <sub>DS(on)3</sub>	I <sub>D</sub> =-0.3A, V <sub>GS</sub> =-1.8V		260	520	mΩ
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =-10V, f=1MHz		420		pF
Output Capacitance	C <sub>oss</sub>	V <sub>DS</sub> =-10V, f=1MHz		73		pF
Reverse Transfer Capacitance	C <sub>rss</sub>	V <sub>DS</sub> =-10V, f=1MHz		60		pF
Turn-ON Delay Time	t <sub>d(on)</sub>	See specified Test Circuit.		11.8		ns
Rise Time	t <sub>r</sub>	See specified Test Circuit.		33		ns
Turn-OFF Delay Time	t <sub>d(off)</sub>	See specified Test Circuit.		48		ns
Fall Time	t <sub>f</sub>	See specified Test Circuit.		43		ns
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =-10V, V <sub>GS</sub> =-4V, I <sub>D</sub> =-2A		4.7		nC
Gate-to-Source Charge	Q <sub>gs</sub>	V <sub>DS</sub> =-10V, V <sub>GS</sub> =-4V, I <sub>D</sub> =-2A		0.75		nC
Gate-to-Drain "Miller" Charge	Q <sub>gd</sub>	V <sub>DS</sub> =-10V, V <sub>GS</sub> =-4V, I <sub>D</sub> =-2A		1.6		nC
Diode Forward Voltage	V <sub>SD</sub>	I <sub>S</sub> =-2A, V <sub>GS</sub> =0V		-0.83	-1.2	V

## Package Dimensions

unit : mm (typ)  
7045-005



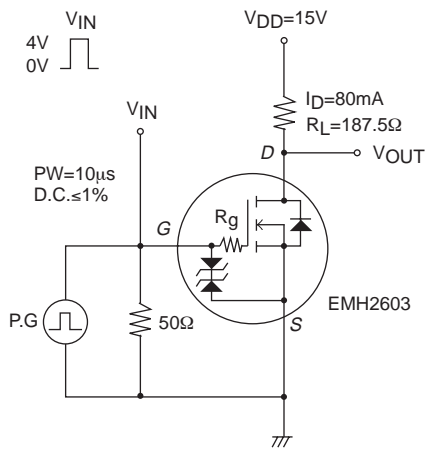
## Electrical Connection



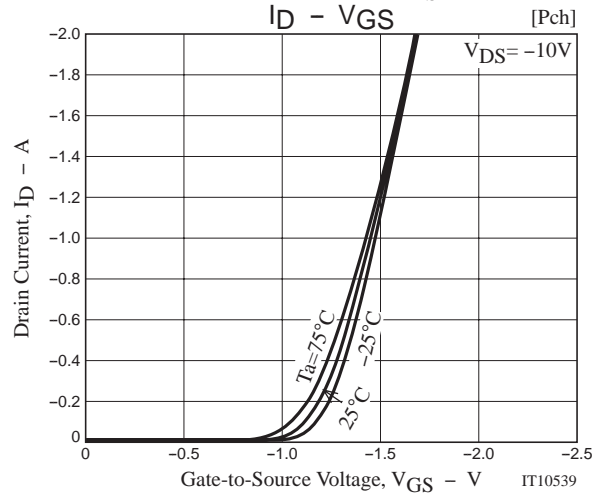
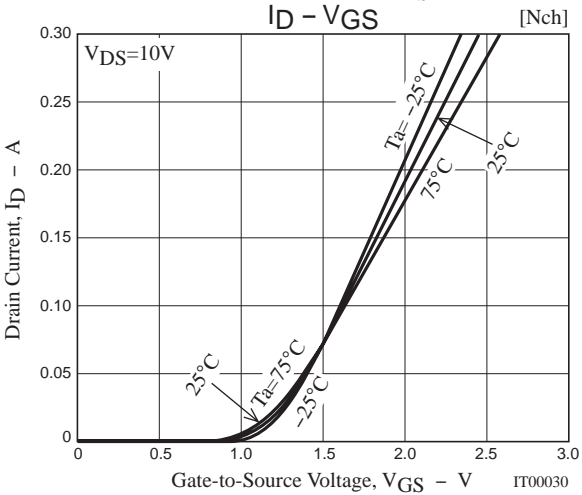
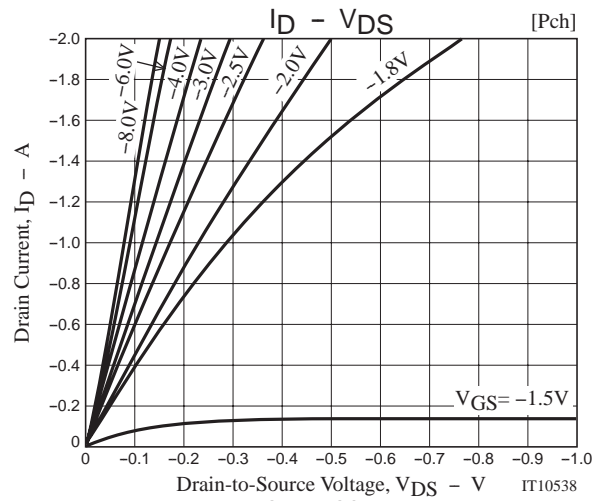
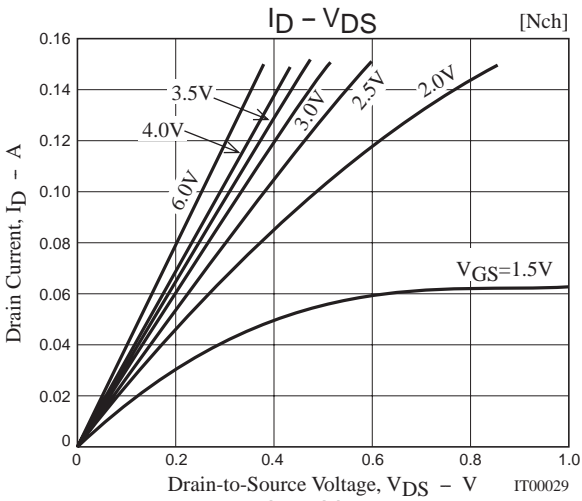
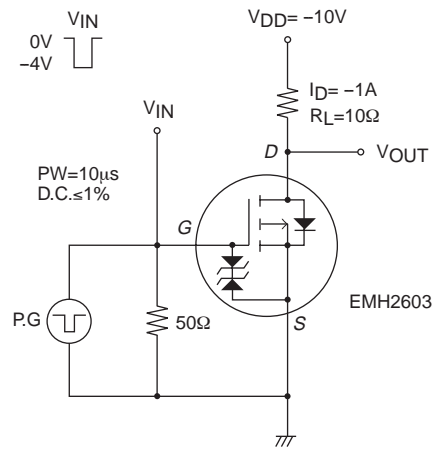
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## Switching Time Test Circuit

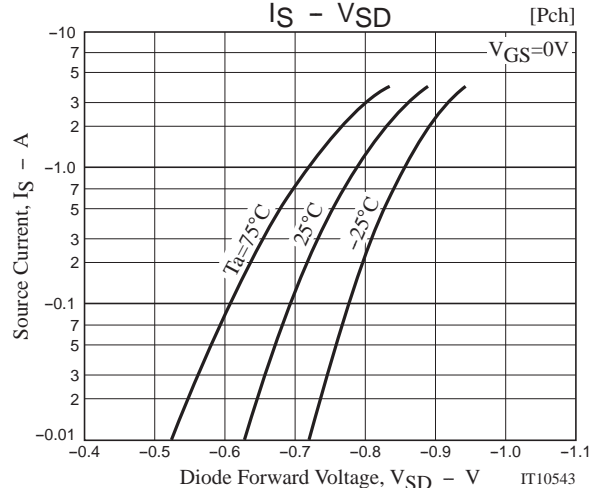
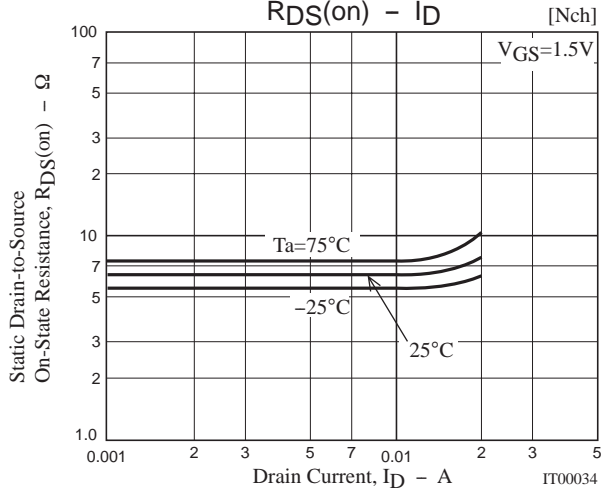
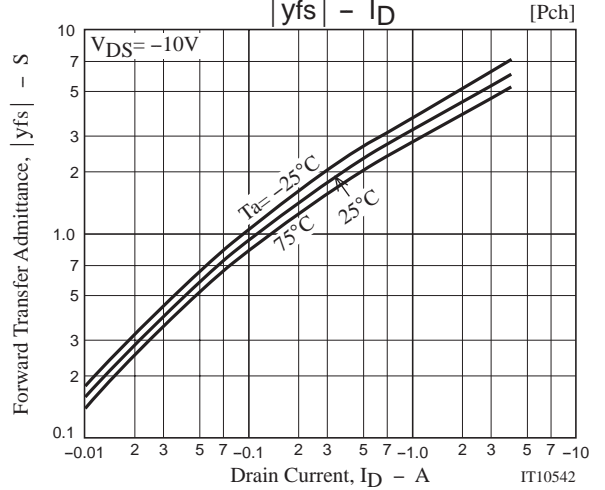
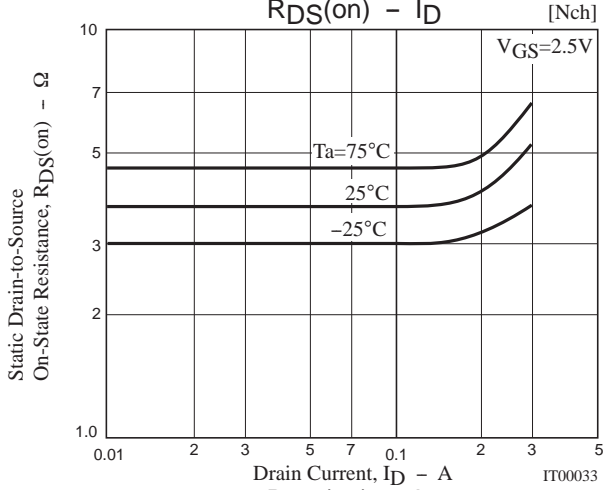
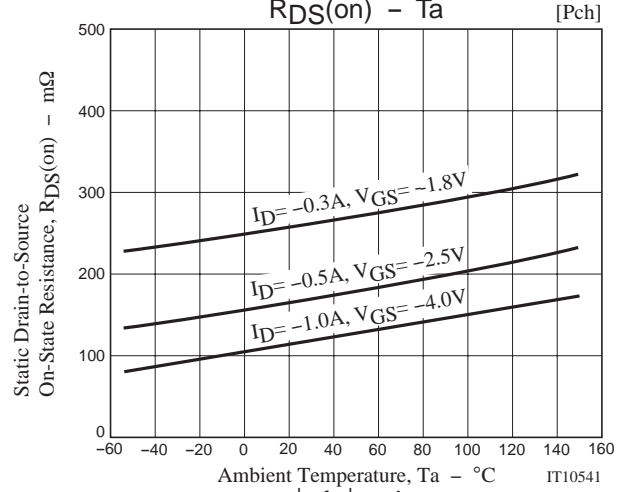
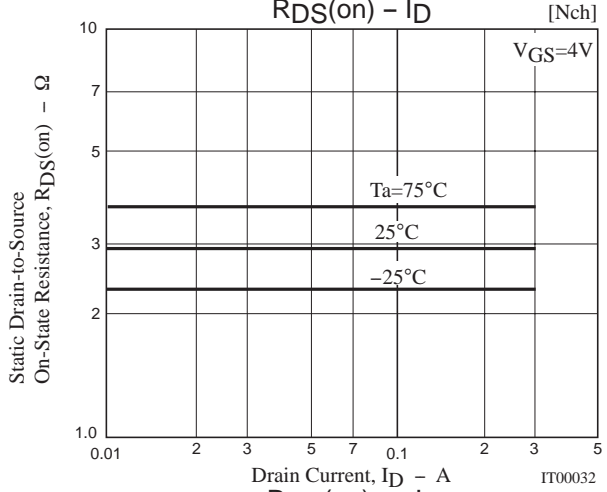
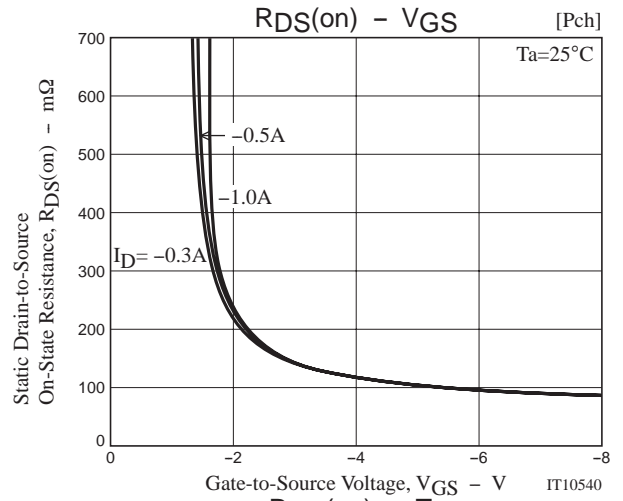
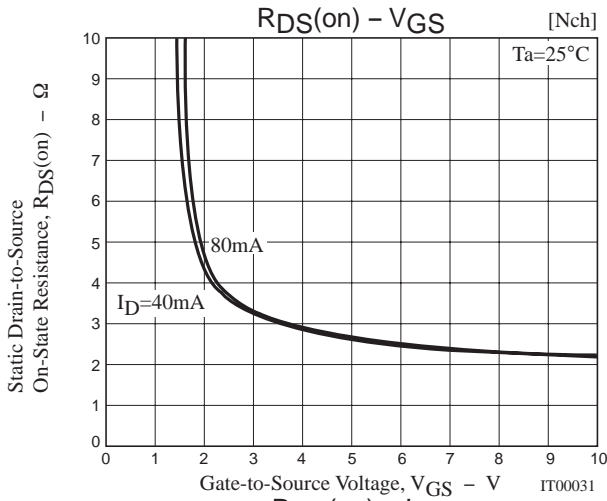
[N-channel]



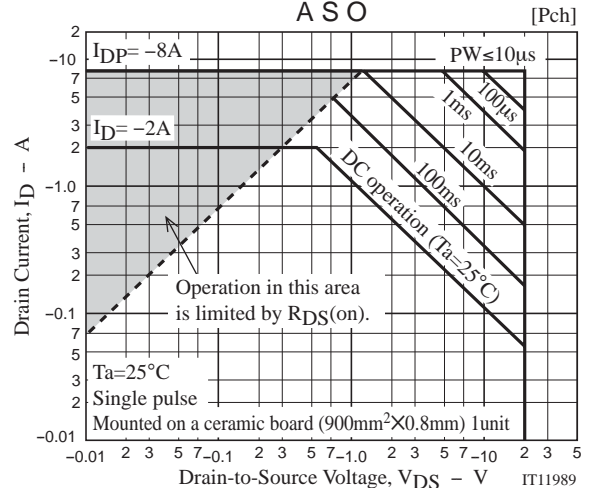
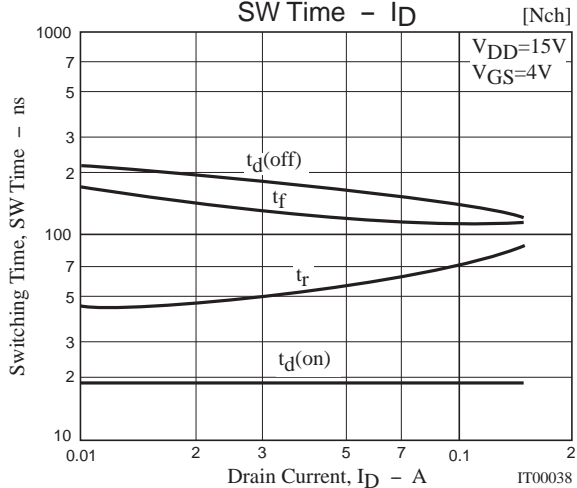
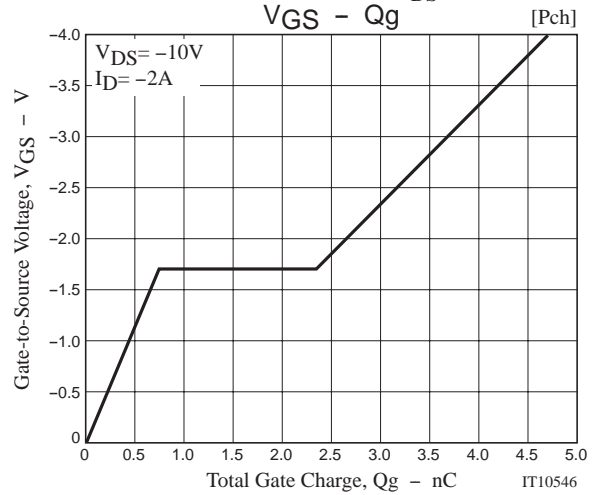
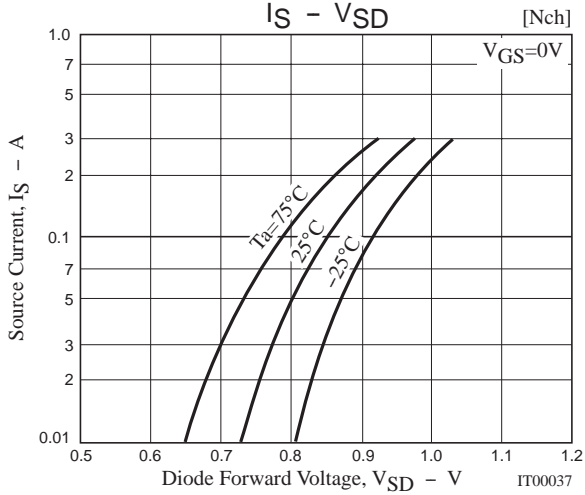
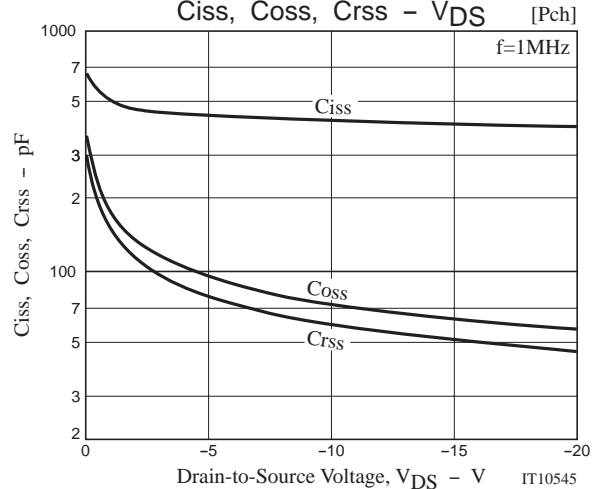
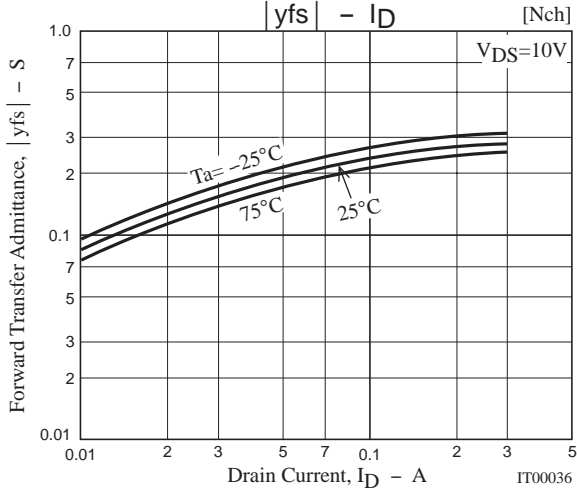
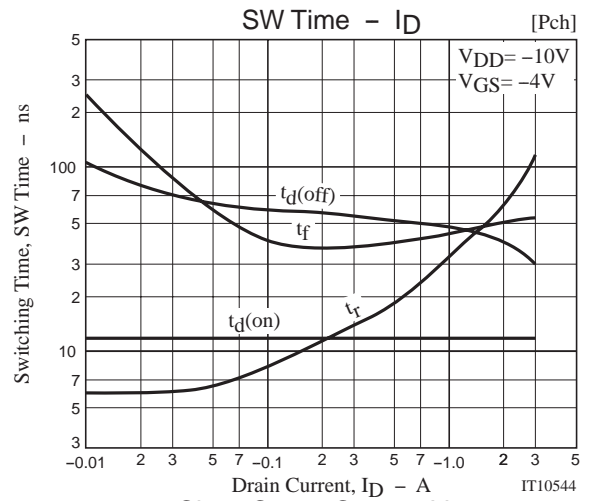
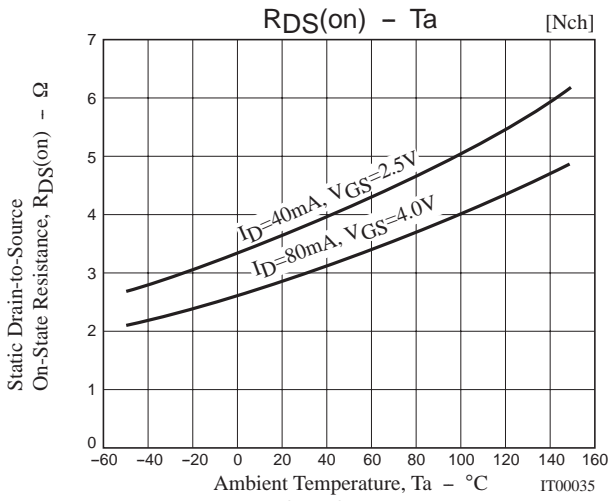
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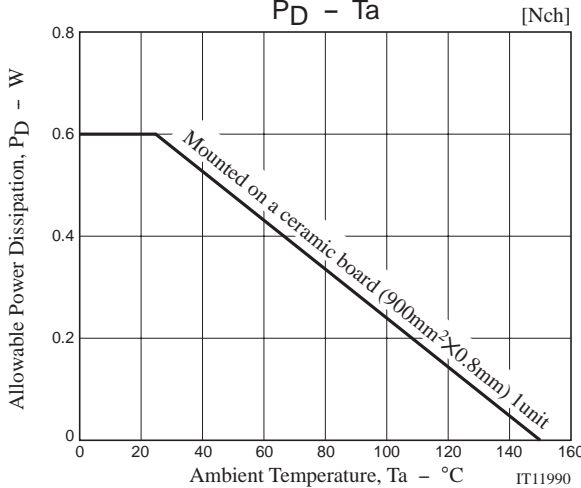
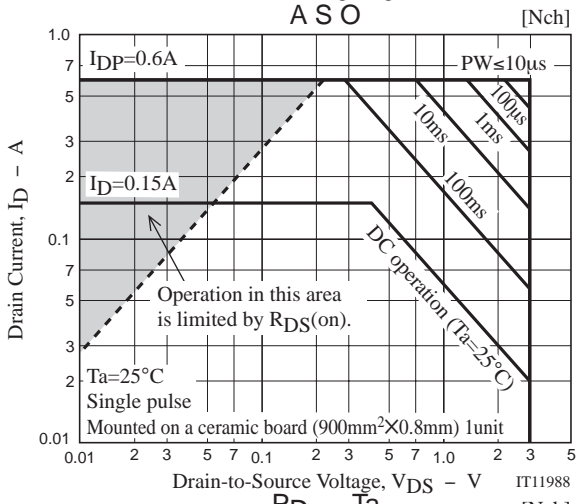
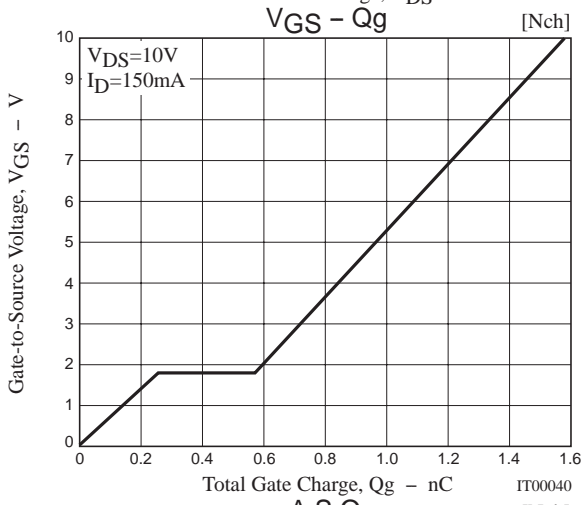
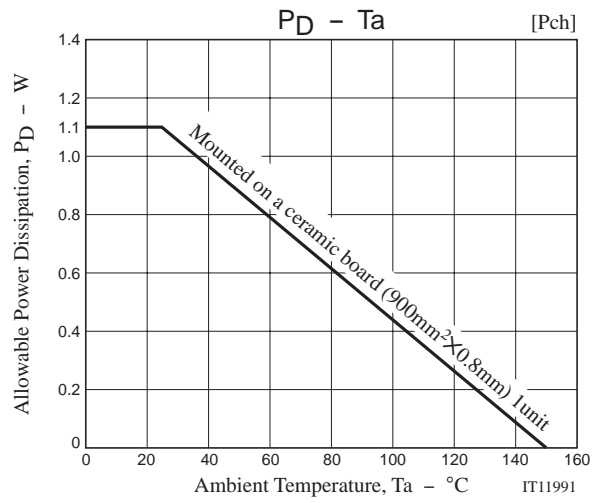
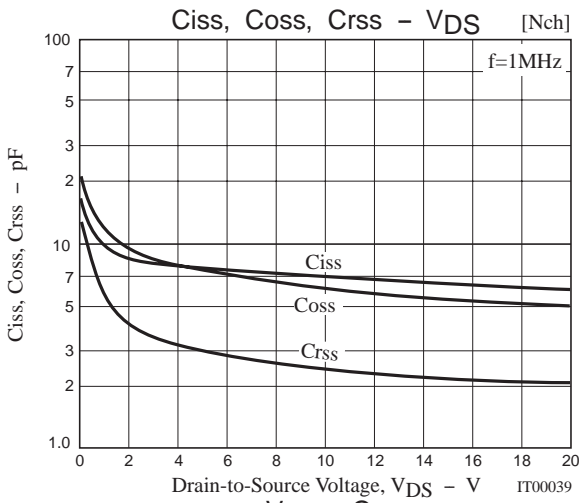
# EMH2603



# EMH2603



# EMH2603



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