



# VEC2603 — N-Channel and P-Channel Silicon MOSFETs

## General-Purpose Switching Device Applications

### Features

- A composite type of a low on-resistance P-channel MOSFET and a small signal N-channel MOSFET for driving P-channel MOSFET enables high-density mounting.
- Best suited for load switches.
- 1.8V drive.
- 0.75mm mount high.

### 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	-12	V
Gate-to-Source Voltage	V <sub>GSS</sub>		±10	±8	V
Drain Current (DC)	I <sub>D</sub>		0.15	-4	A
Drain Current (Pulse)	I <sub>DP</sub>	PW≤10μs, duty cycle≤1%	0.6	-16	A
Allowable Power Dissipation	P <sub>D</sub>	Mounted on a ceramic board (900mm <sup>2</sup> X0.8mm)1unit	0.9		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	0.15	0.22		S

Marking : BF

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# VEC2603

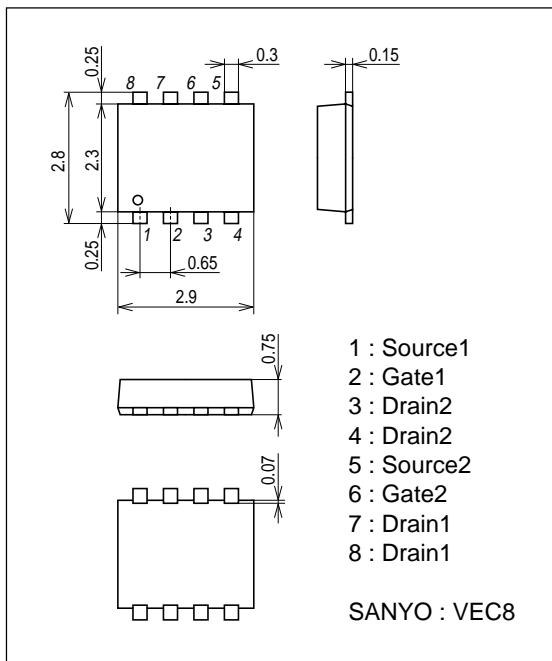
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Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Static Drain-to-Source On-State Resistance	R <sub>DS(on)1</sub>	I <sub>D</sub> =80mA, V <sub>GS</sub> =4V		2.9	3.7	Ω
	R <sub>DS(on)2</sub>	I <sub>D</sub> =40mA, V <sub>GS</sub> =2.5V		3.7	5.2	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	-12			V
Zero-Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =-12V, V <sub>GS</sub> =0V			-10	μA
Gate-to-Source Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> =±6.4V, V <sub>DS</sub> =0V			±10	μA
Cutoff Voltage	V <sub>GS(off)</sub>	V <sub>DS</sub> =-6V, I <sub>D</sub> =-1mA	-0.3		-1.0	V
Forward Transfer Admittance	y <sub>fs</sub>	V <sub>DS</sub> =-6V, I <sub>D</sub> =-2A	4.5	7.6		S
Static Drain-to-Source On-State Resistance	R <sub>DS(on)1</sub>	I <sub>D</sub> =-2A, V <sub>GS</sub> =-4.5V		40	53	mΩ
	R <sub>DS(on)2</sub>	I <sub>D</sub> =-1A, V <sub>GS</sub> =-2.5V		57	80	mΩ
	R <sub>DS(on)3</sub>	I <sub>D</sub> =-0.3A, V <sub>GS</sub> =-1.8V		78	112	mΩ
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =-6V, f=1MHz		940		pF
Output Capacitance	C <sub>oss</sub>	V <sub>DS</sub> =-6V, f=1MHz		230		pF
Reverse Transfer Capacitance	C <sub>rss</sub>	V <sub>DS</sub> =-6V, f=1MHz		180		pF
Turn-ON Delay Time	t <sub>d(on)</sub>	See specified Test Circuit.		14		ns
Rise Time	t <sub>r</sub>	See specified Test Circuit.		120		ns
Turn-OFF Delay Time	t <sub>d(off)</sub>	See specified Test Circuit.		97		ns
Fall Time	t <sub>f</sub>	See specified Test Circuit.		110		ns
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =-6V, V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-4A		11		nC
Gate-to-Source Charge	Q <sub>gs</sub>	V <sub>DS</sub> =-6V, V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-4A		1.6		nC
Gate-to-Drain "Miller" Charge	Q <sub>gd</sub>	V <sub>DS</sub> =-6V, V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-4A		2.8		nC
Diode Forward Voltage	V <sub>SD</sub>	I <sub>S</sub> =-4A, V <sub>GS</sub> =0V		-0.85	-1.5	V

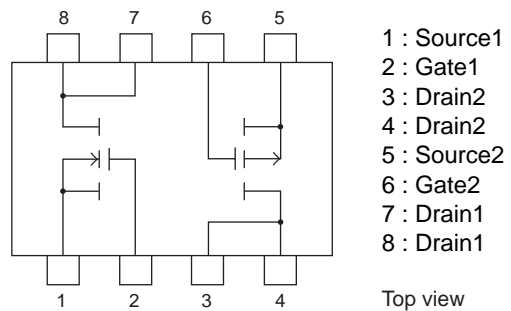
## Package Dimensions

unit : mm (typ)

7012-009



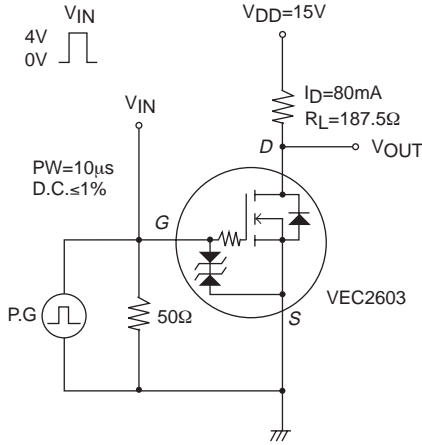
## Electrical Connection



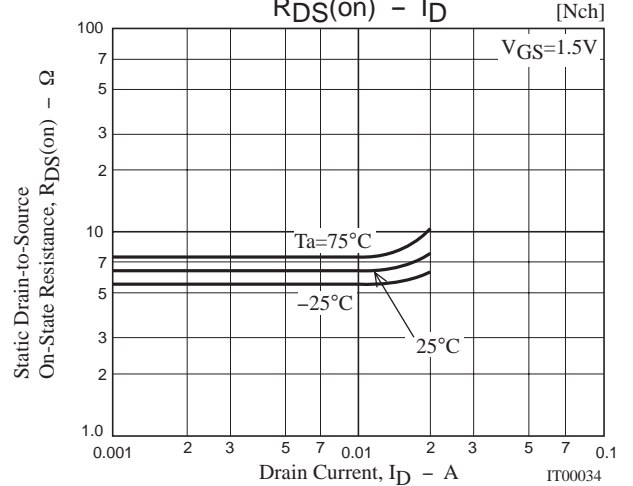
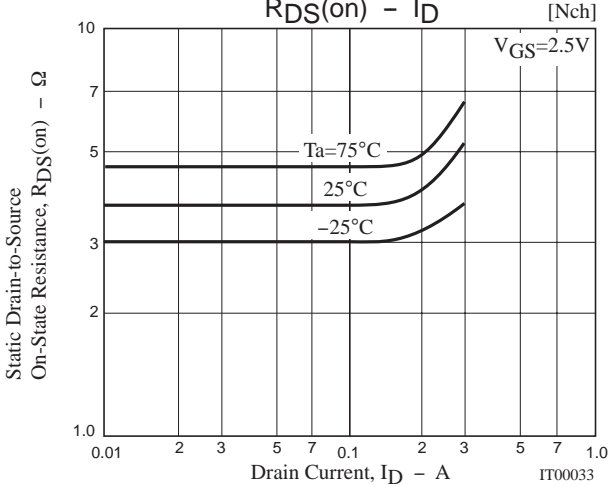
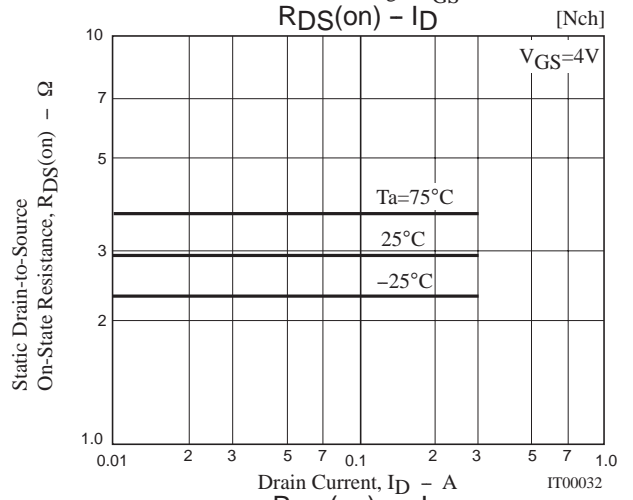
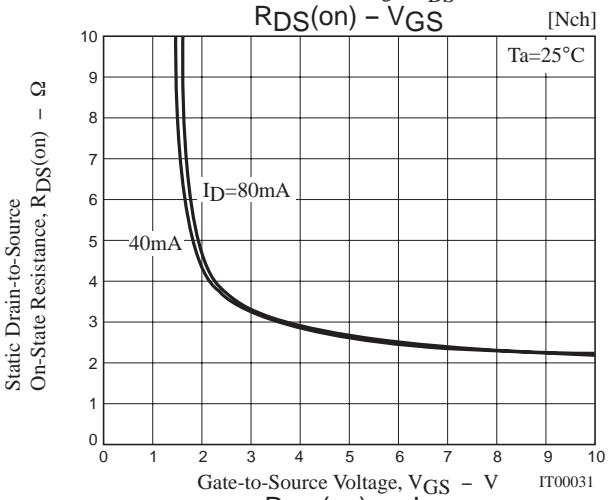
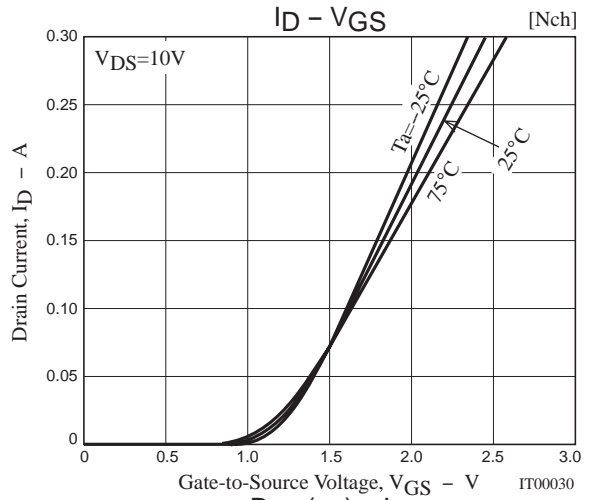
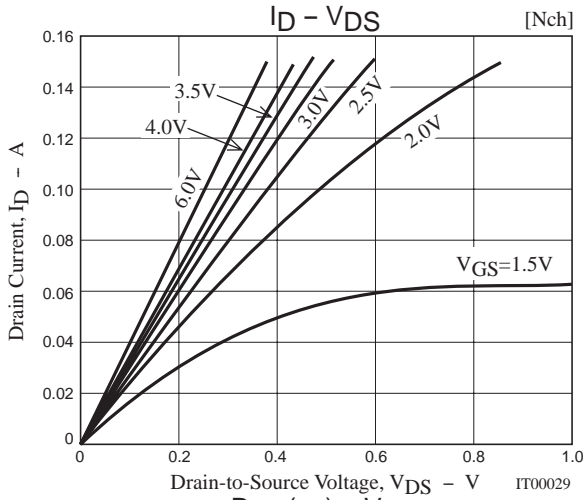
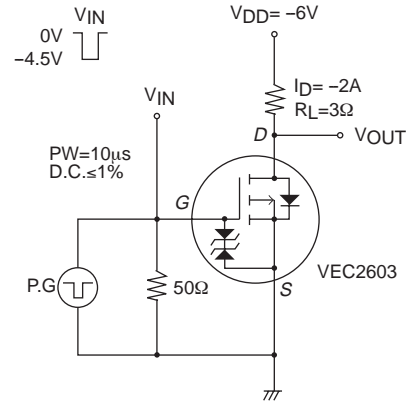
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## Switching Time Test Circuit

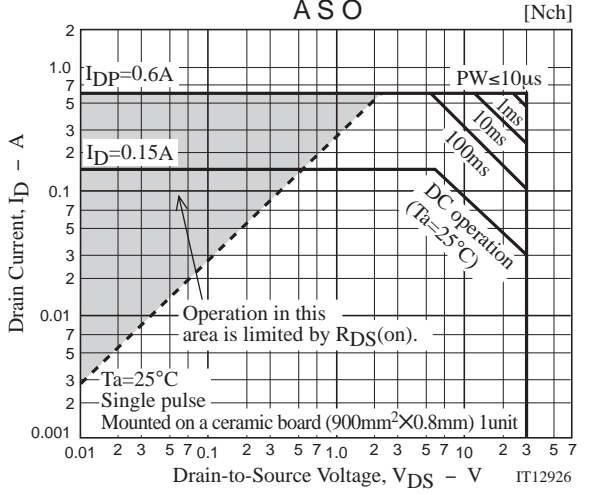
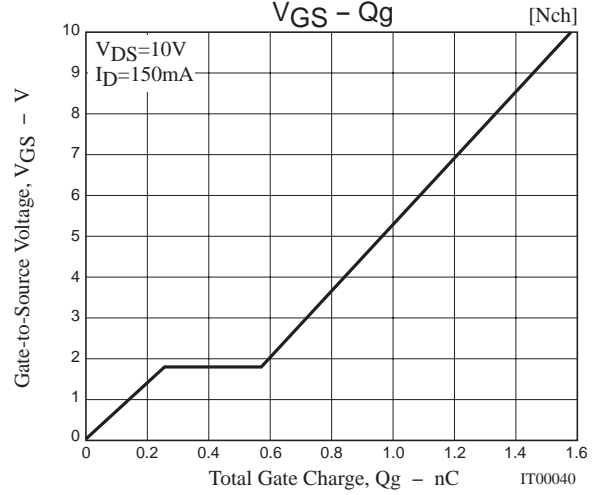
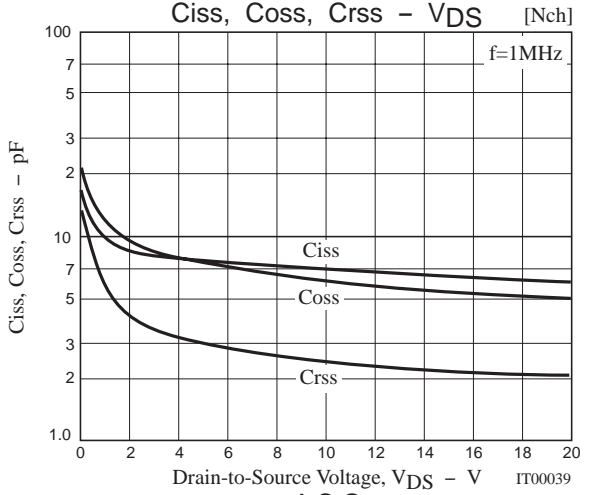
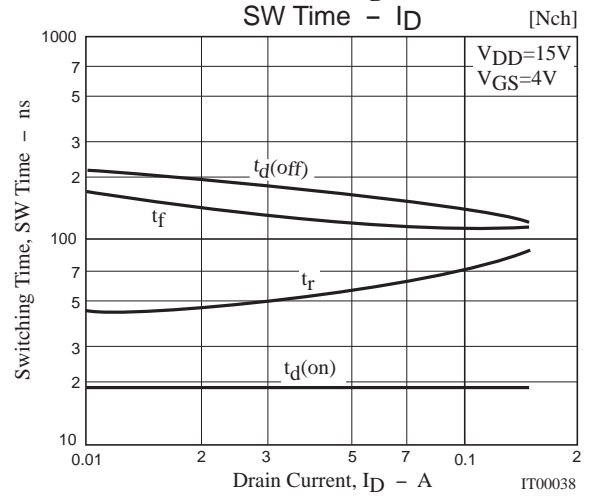
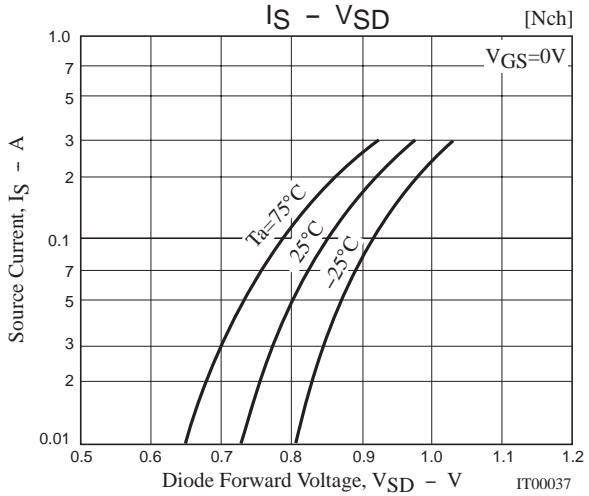
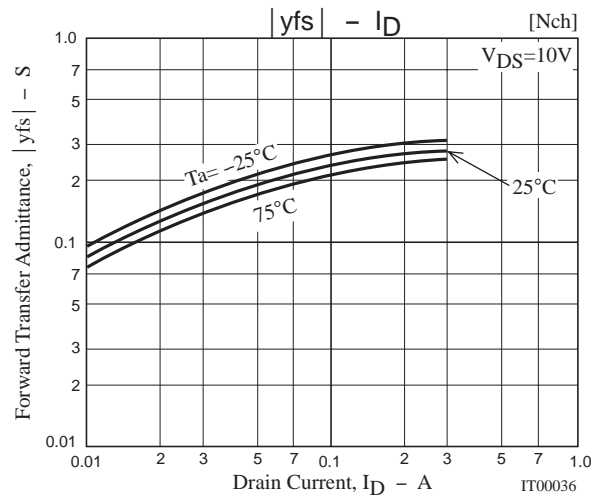
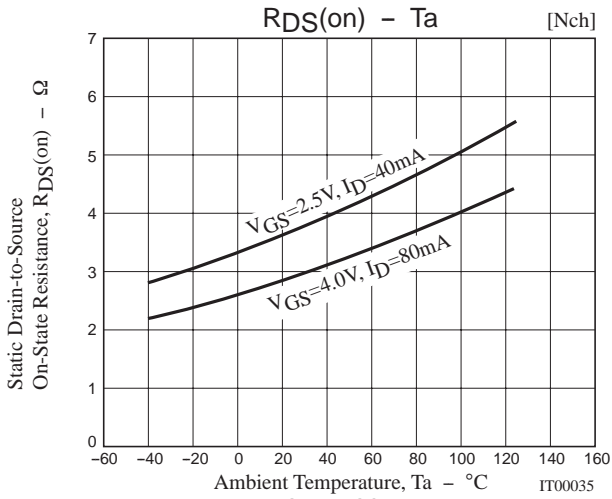
[N-channel]



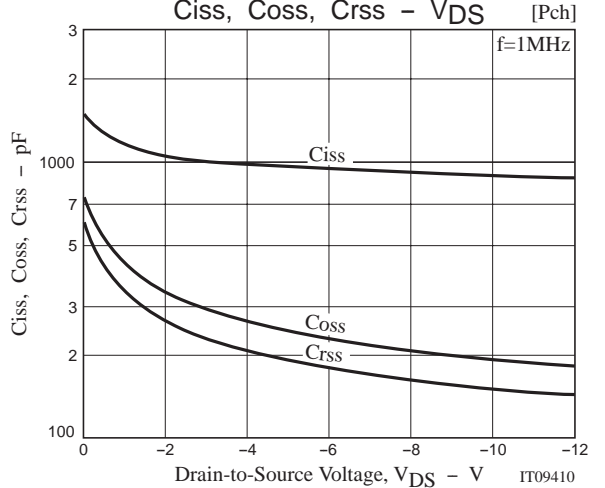
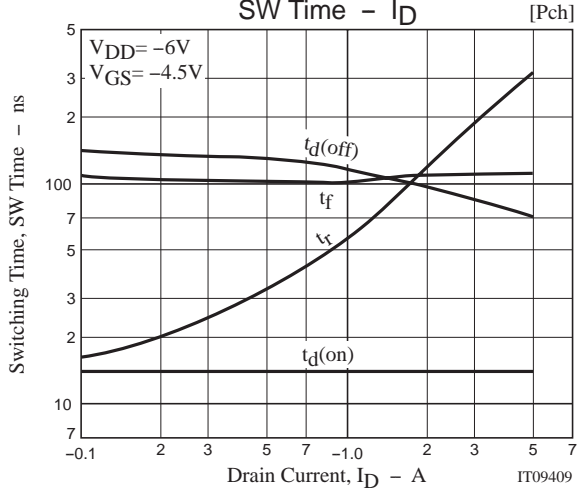
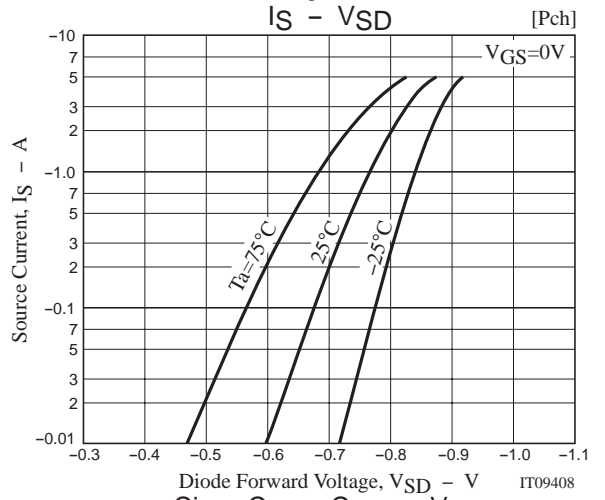
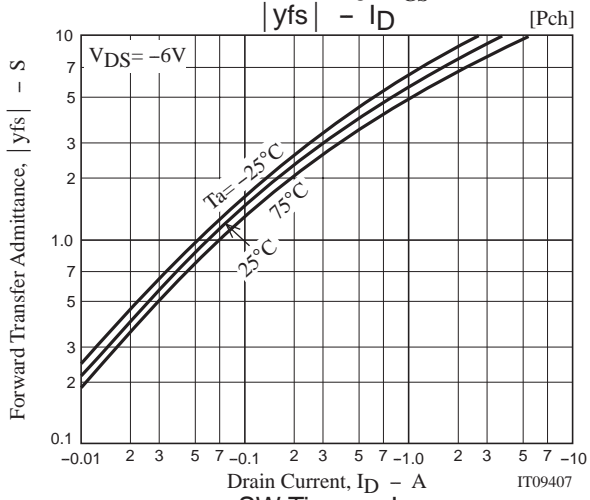
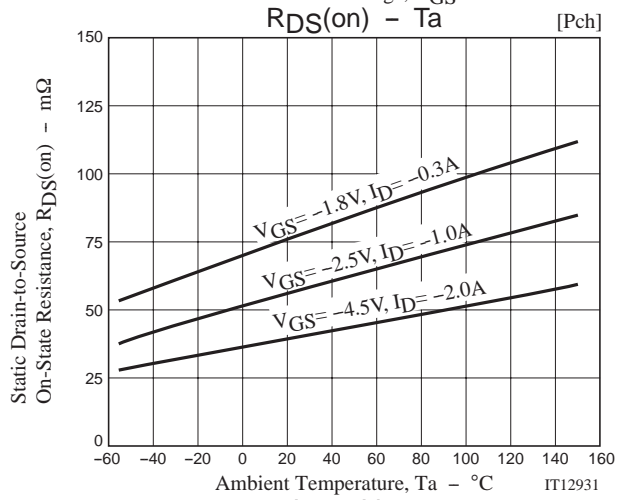
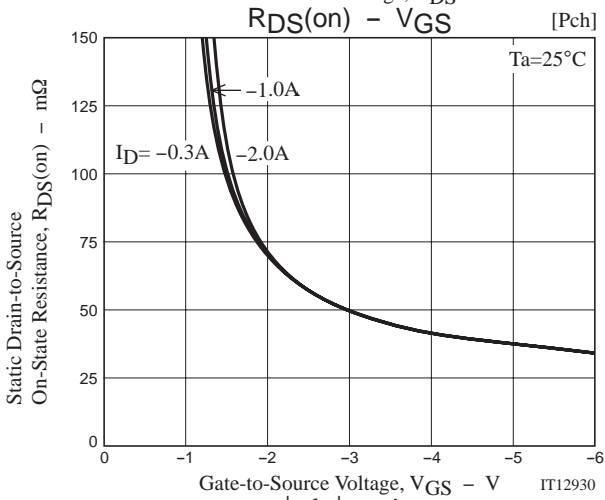
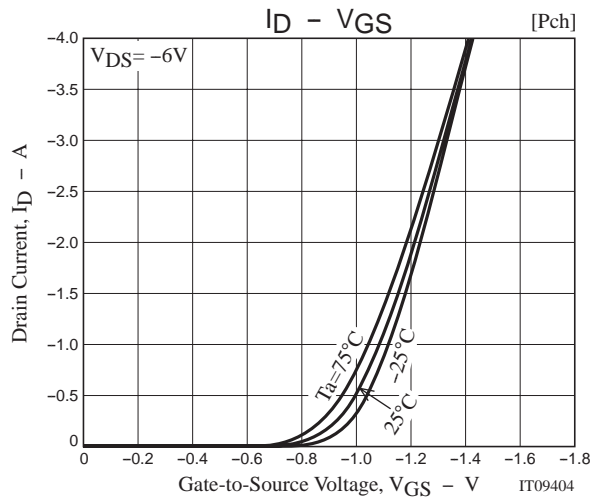
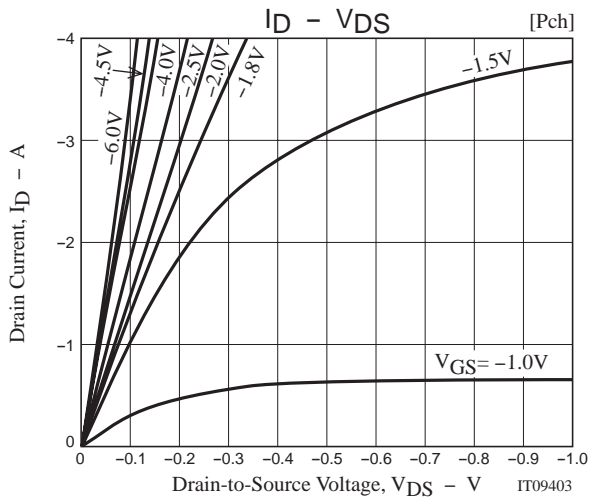
[P-channel]

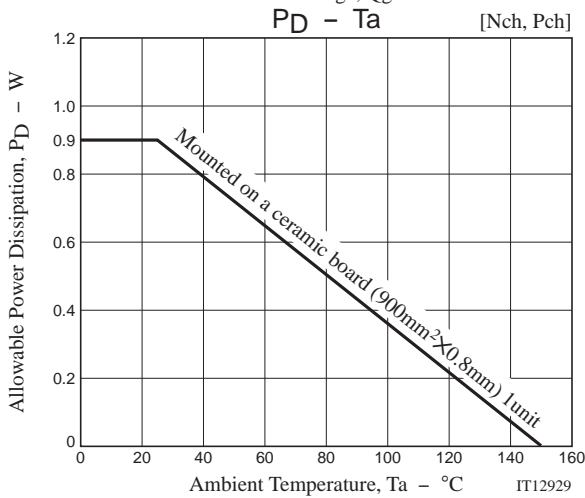
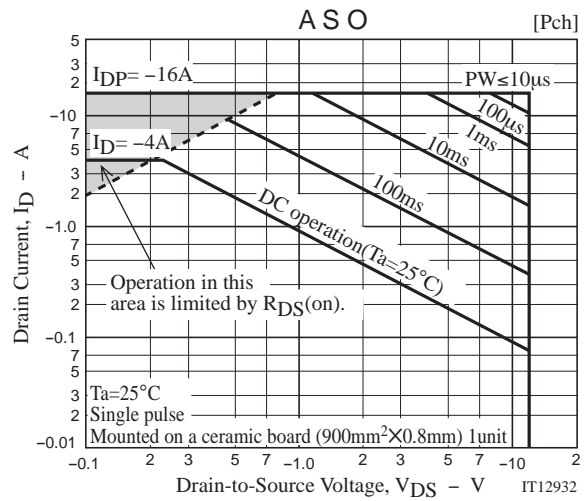
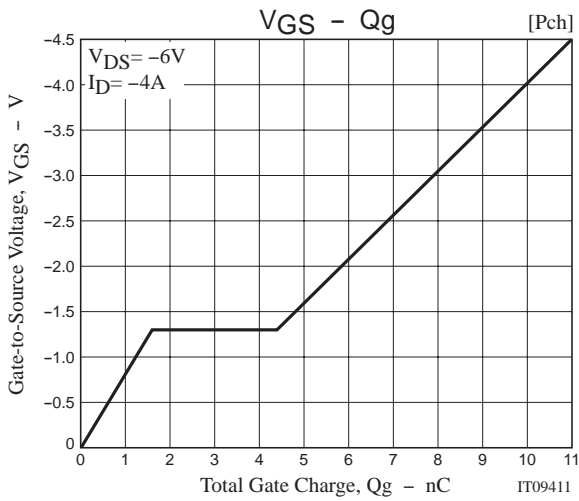


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