Ordering number : ENN8198

SANYO Semiconductors
DATA SHEET

VEC2901

TR : NPN Epitaxial Planar Silicon Transistor
FET : N-Channel Silicon MOSFET

Switching, Flash Applications

Features

- Composite type with an NPN transistor and N-ch MOS-FET contained in one package facilitating high-density mounting.
- Ultrasmall package permitting applied sets to be made small and slim.

Specifications

Absolute Maximum Ratings at Ta=25°C

Parameter	Symbol	Conditions	Ratings	Unit
[TR]				
Collector-to-Base Voltage	V_{CBO}		100	V
Collector-to-Emitter Voltage	V_{CEO}		50	V
Emitter-to-Base Voltage	V_{EBO}		6	V
Collector Current	I_C		5	A
Collector Current (Pulse)	I_{CP}		8	A
Collector Dissipation	P_C	Mounted on a ceramic board (900mm²×0.8mm) 1unit	1.1	W
Junction Temperature	Tj		150	°C
Storage Temperature	Tstg		−55 to +150	°C
[FET]				
Drain-to-Source Voltage	V_{DSS}		30	V
Gate-to-Source Voltage	V_{GSS}		±10	V
Drain Current	I_D		150	mA
Drain Current (Pulse)	I_{DP}	PW≤10μs, duty cycle≤1%	600	mA
Allowable Power Dissipation	P_D		0.25	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	
[TR]						
Collector Cutoff Current	I_{CBO}	V_{CB}=40V, I_E=0			100	nA
Emitter Cutoff Current	I_{EBO}	V_{EB}=4V, I_C=0			100	nA
DC Current Gain	h_{FE}	V_{CE}=2V, I_C=500mA	250		400	
Gain-Bandwidth Product	f_T	V_{CE}=10V, I_C=500mA		330		MHz
Output Capacitance	Cob	V_{CB}=10V, f=1MHz		26		pF
Collector-to-Emitter Saturation Voltage	V_{CE}(sat)1	I_C=1.6A, I_B=53mA		55	110	mV
	V_{CE}(sat)2	I_C=2A, I_B=40mA		75	150	mV

Marking : AA

Continued on next page.

SANYO Electric Co.,Ltd. Semiconductor Company
TOKYO OFFICE Tokyo Bldg., 1-10, 1 Chome, Ueno, Taito-ku, TOKYO, 110-8534 JAPAN

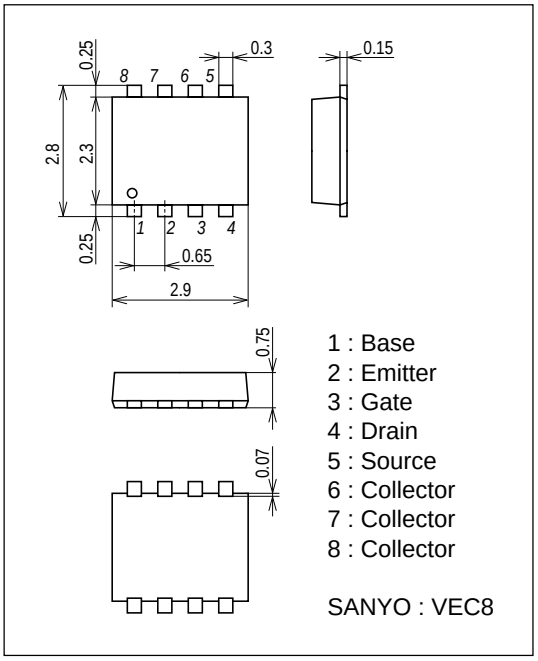
Continued from preceding page.

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Base-to-Emitter Saturation Voltage	$V_{BE}(sat)$	I_C=2A, I_B=40mA		0.9	1.2	V
Collector-to-Base Breakdown Voltage	$V_{(BR)CBO}$	I_C=10μA, I_E=0	100			V
Collector-to-Emitter Breakdown Voltage	$V_{(BR)CEO}$	I_C=1mA, R_{BE}=∞	50			V
Emitter-to-Base Breakdown Voltage	$V_{(BR)EBO}$	I_E=10μA, I_C=0	6			V
Turn-ON Time	t_{on}	See specified Test Circuit.		30		ns
Storage Time	t_{stg}	See specified Test Circuit.		360		ns
Fall Time	t_f	See specified Test Circuit.		22		ns
[FET]						
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}=±8V, V_{DS}=0			±10	μA
Cutoff Voltage	$V_{GS}(off)$	V_{DS}=10V, I_D=100μA	0.4		1.3	V
Forward Transfer Admittance	$\|yfs\|$	V_{DS}=10V, I_D=80mA	0.15	0.22		S
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
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

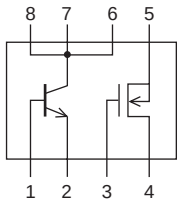
Package Dimensions

unit : mm

2240



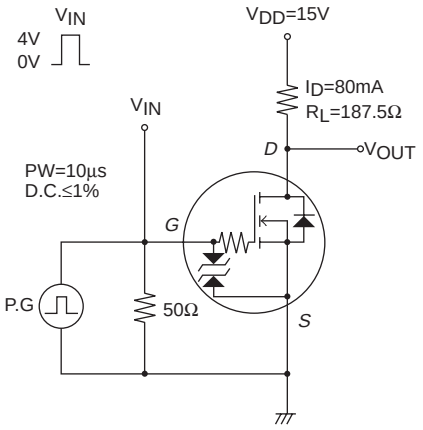
Electrical Connection



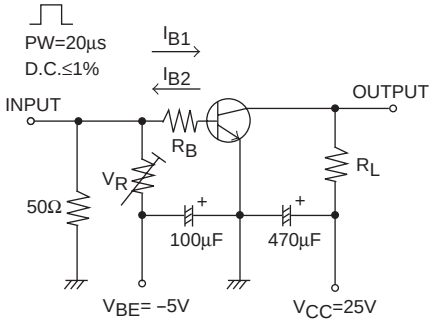
1 : Base
2 : Emitter
3 : Gate
4 : Drain
5 : Source
6 : Collector
7 : Collector
8 : Collector

Top view

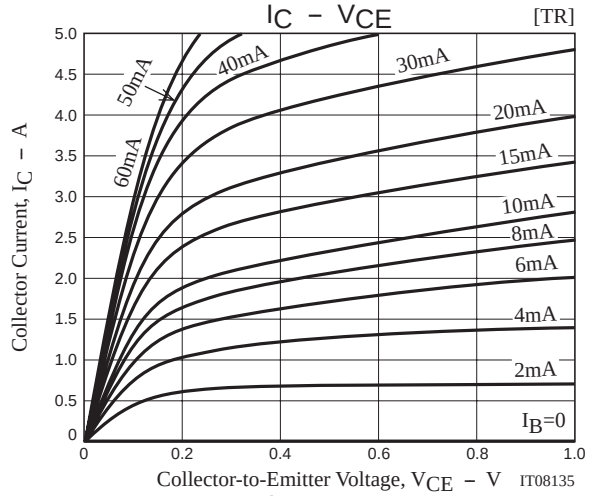
Switching Time Test Circuit

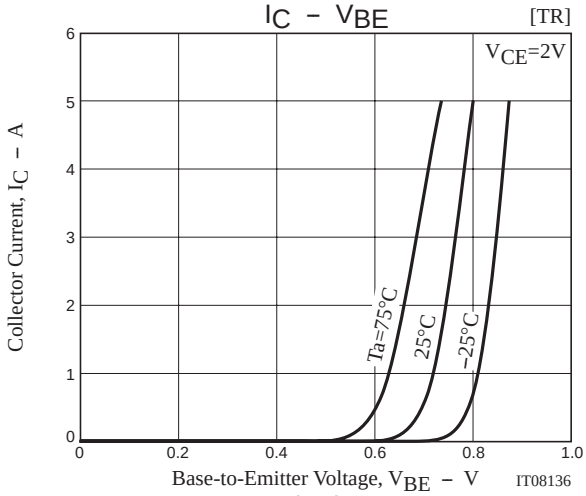


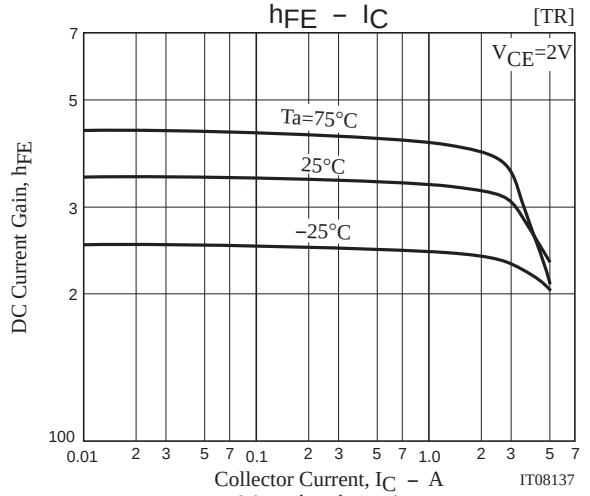
Switching TimeII Test Circuit

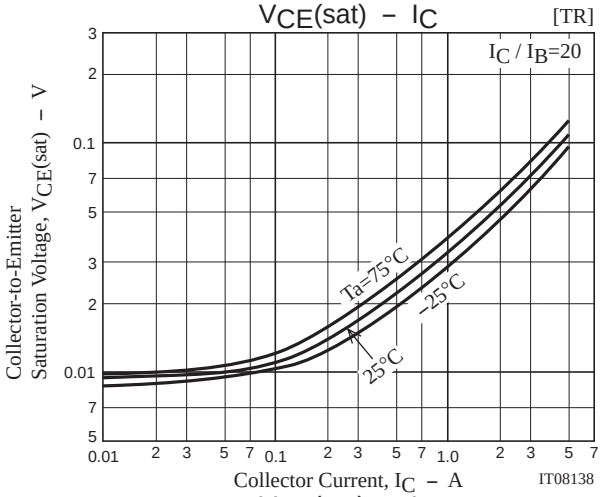


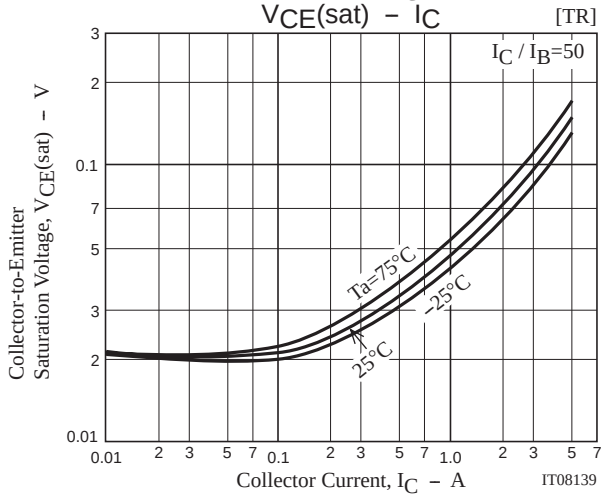
$I_C = -20I_{B1} = 20I_{B2} = 2.5A$

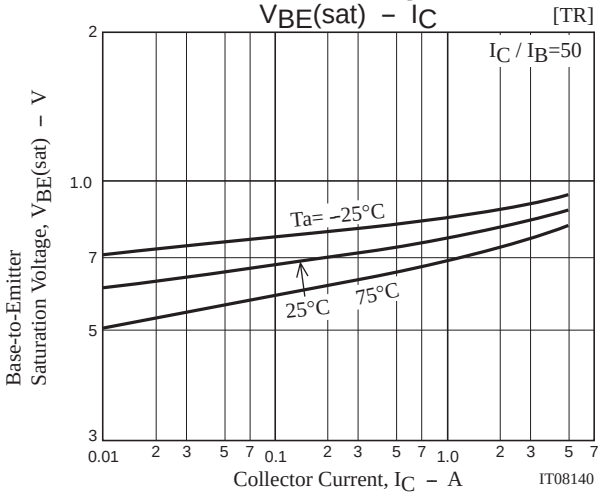


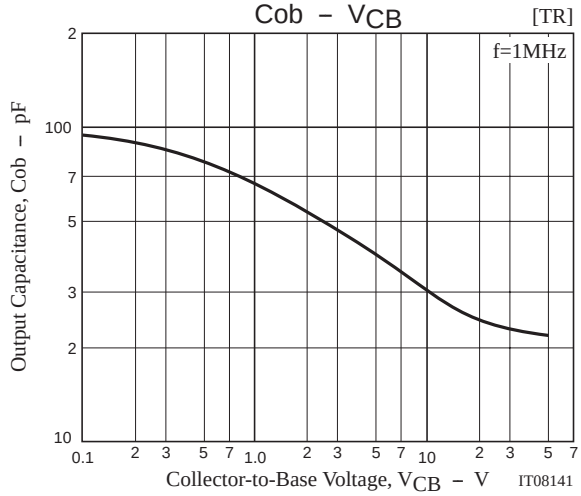


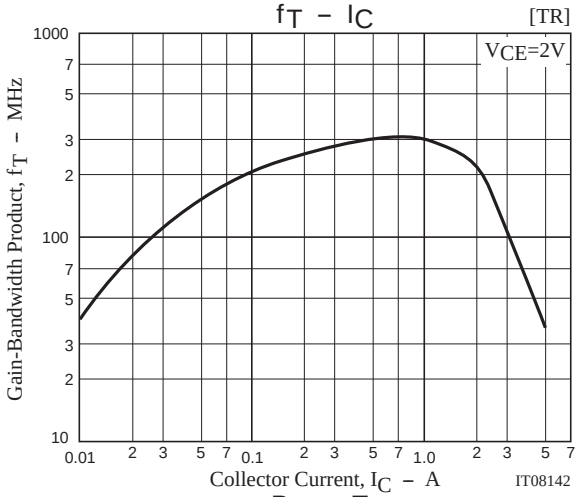


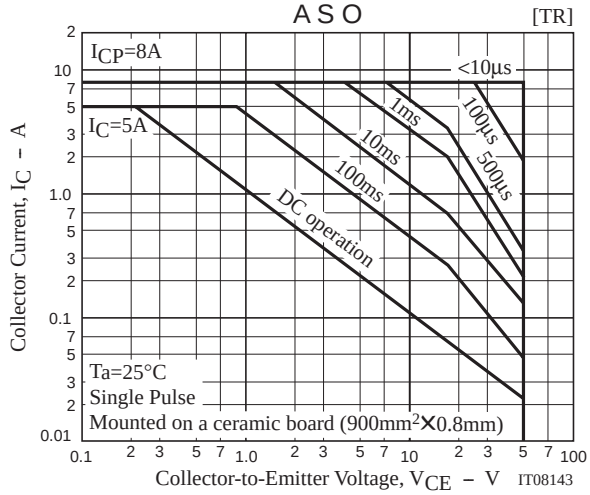


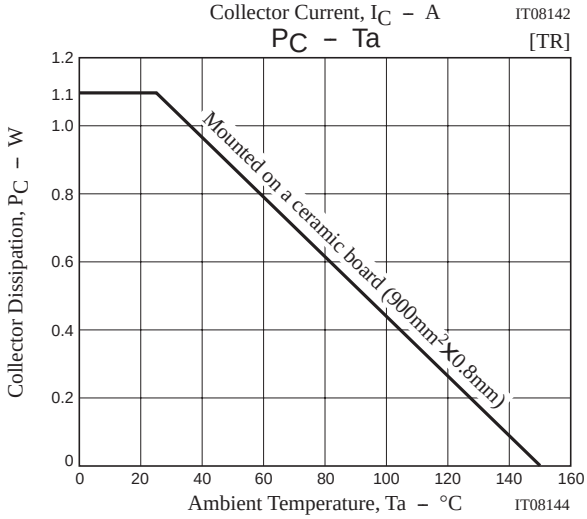


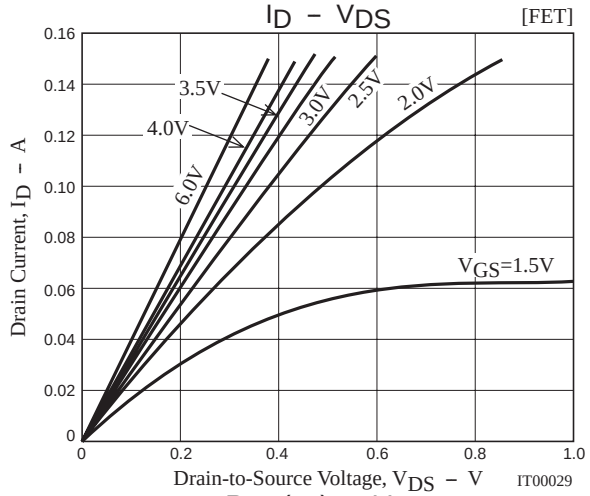


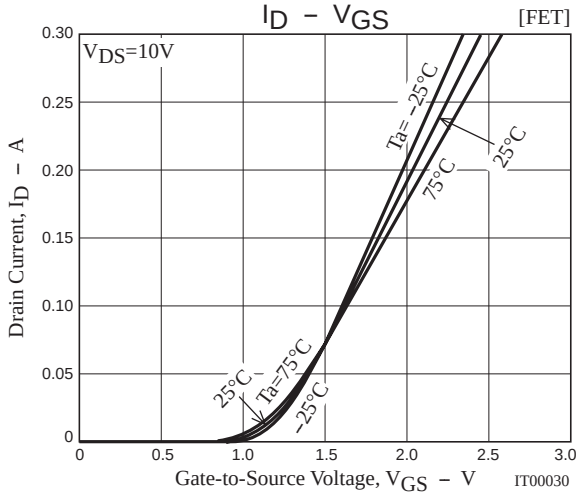

Cob – VCB
[TR]
f=1MHz
Output Capacitance, Cob – pF
Collector-to-Base Voltage, VCB – V
IT08141

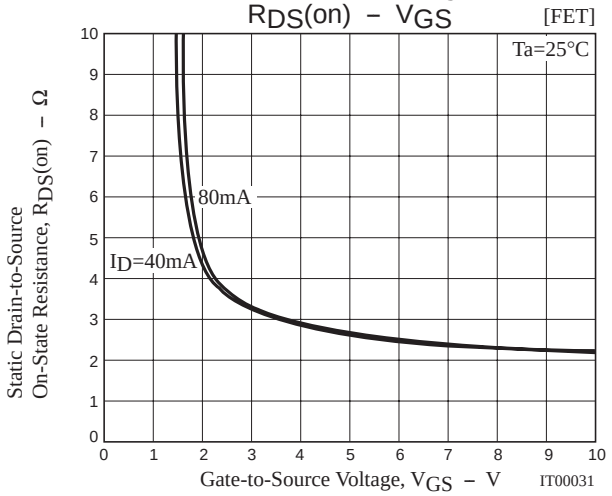

fT – IC
[TR]
VCE=2V
Gain-Bandwidth Product, fT – MHz
Collector Current, IC – A
IT08142

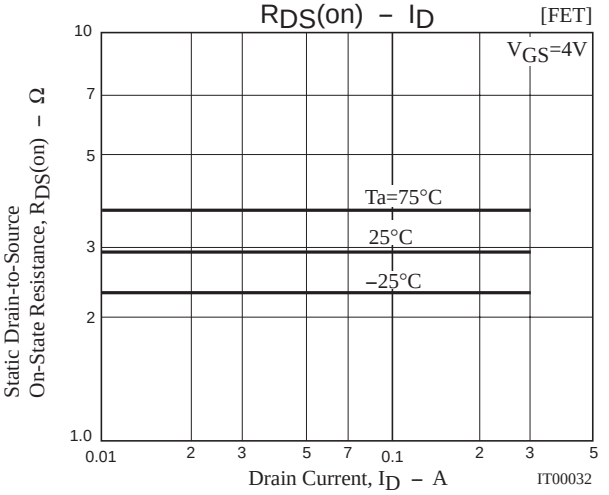

A S O
[TR]
ICP=8A
IC=5A
<10μs
1ms
100μs
10ms
500μs
100ms
DC operation
Ta=25°C
Single Pulse
Mounted on a ceramic board (900mm2×0.8mm)
Collector Current, IC – A
Collector-to-Emitter Voltage, VCE – V
IT08143


PC – Ta
[TR]
Mounted on a ceramic board (900mm2×0.8mm)
Collector Dissipation, PC – W
Ambient Temperature, Ta – °C
IT08144

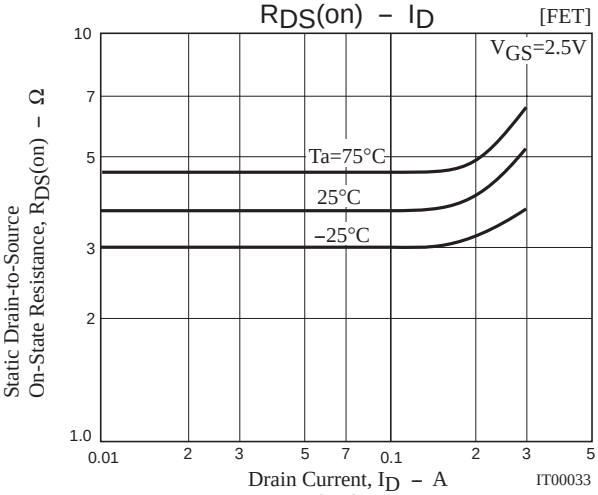

ID – VDS
[FET]
3.5V
4.0V
6.0V
3.0V
2.5V
2.0V
VGS=1.5V
Drain Current, ID – A
Drain-to-Source Voltage, VDS – V
IT00029


ID – VGS
[FET]
VDS=10V
Ta=–25°C
25°C
75°C
25°C
Ta=75°C
–25°C
Drain Current, ID – A
Gate-to-Source Voltage, VGS – V
IT00030

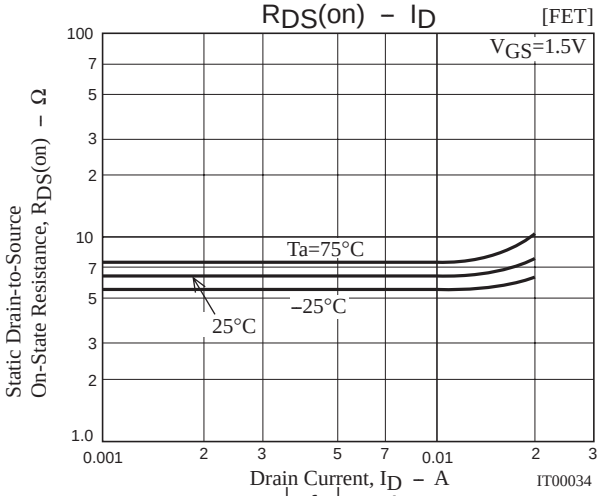

RDS(on) – VGS
[FET]
Ta=25°C
80mA
ID=40mA
Static Drain-to-Source
On-State Resistance, RDS(on) – Ω
Gate-to-Source Voltage, VGS – V
IT00031


RDS(on) – ID
[FET]
VGS=4V
Ta=75°C
25°C
–25°C
Static Drain-to-Source
On-State Resistance, RDS(on) – Ω
Drain Current, ID – A
IT00032

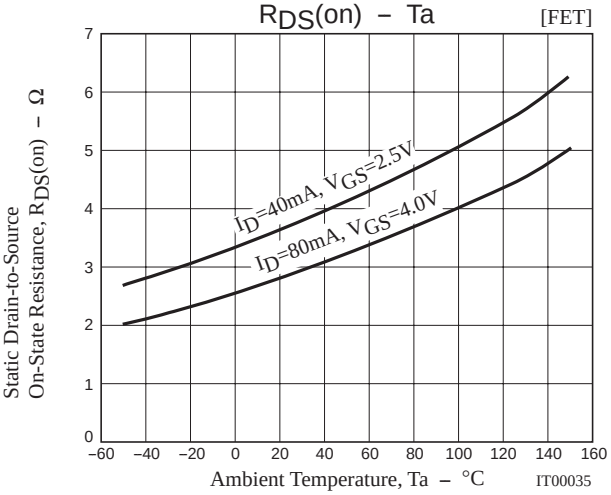
$R_{DS}(on)$ – I_D [FET]



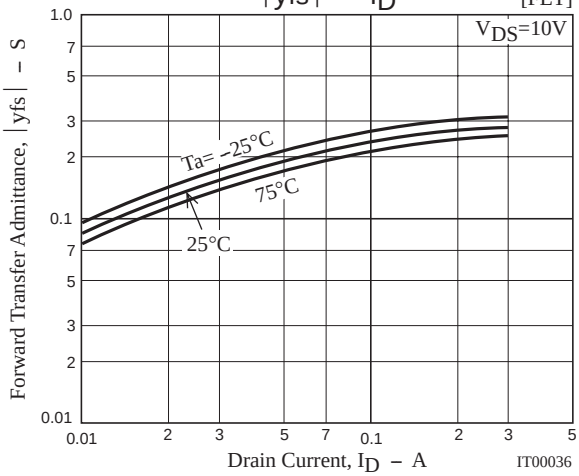
$R_{DS}(on)$ – I_D [FET]



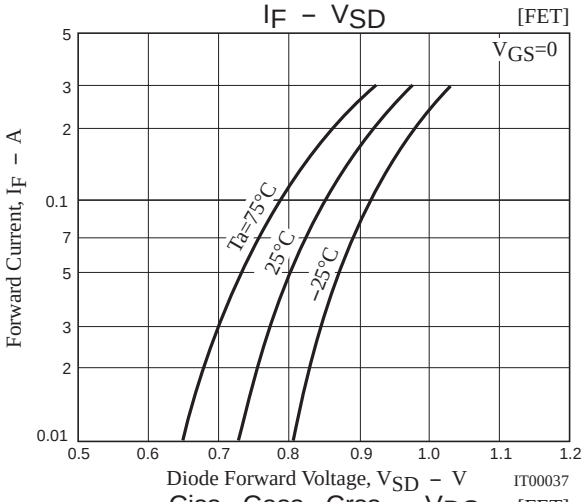
$R_{DS}(on)$ – Ta [FET]



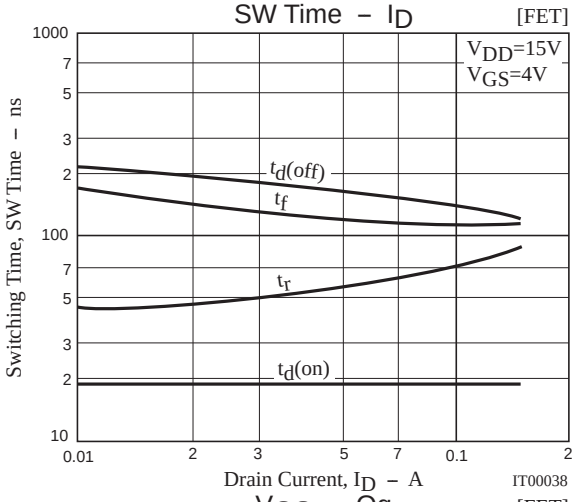
$|yfs|$ – I_D [FET]



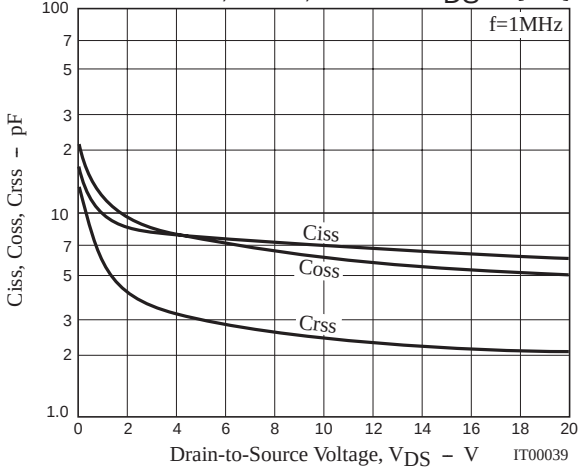
I_F – V_{SD} [FET]



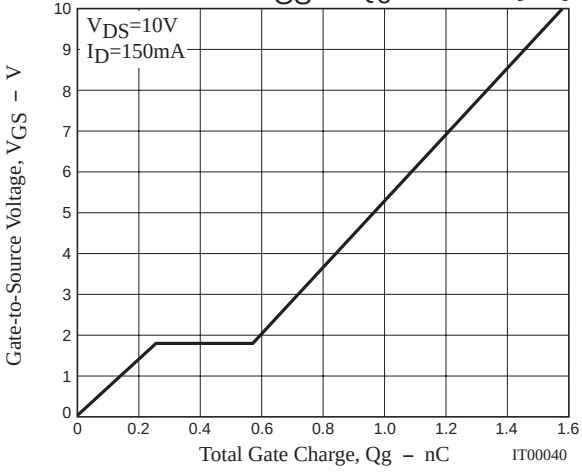
SW Time – I_D [FET]

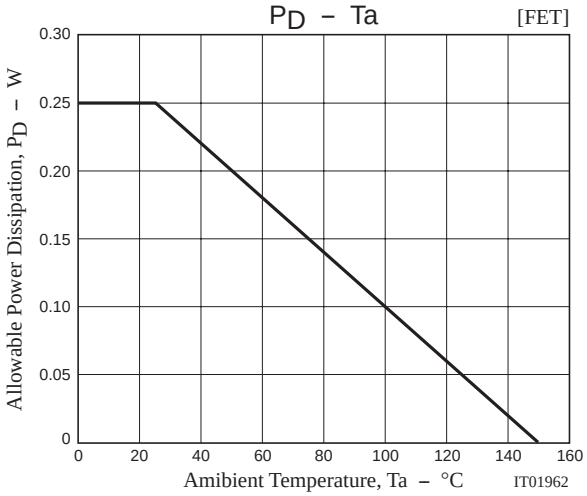


Ciss, Coss, Crss – V_{DS} [FET]



V_{GS} – Qg [FET]





Note on usage : Since the VEC2901 includes MOSFET, please avoid using this device in the vicinity of highly charged objects.