



MCH6933

TR : PNP Epitaxial Planar Silicon Transistor

FET : N-Channel Silicon MOSFET

Power Management Switch Applications

Features

- Composite type with a PNP transistor and a N-ch MOSFET contained in one package facilitating high-density mounting.
- Ultrasmall package permitting applied sets to be small and slim.

Specifications

Absolute Maximum Ratings at Ta=25°C

Parameter	Symbol	Conditions	Ratings	Unit
[TR]				
Collector-to-Base Voltage	V _{CB0}		-15	V
Collector-to-Emitter Voltage	V _{CEO}		-12	V
Emitter-to-Base Voltage	V _{EBO}		-5	V
Collector Current	I _C		-0.5	A
Collector Current (Pulse)	I _{CP}		-1	A
Collector Dissipation	P _C	Mounted on a ceramic board (600mm ² X0.8mm) 1unit	0.5	W
Junction Temperature	T _J		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	Mounted on a ceramic board (600mm ² X0.8mm) 1unit	0.5	W
Channel Temperature	T _{ch}		150	°C
[Common Rating]				
Total Dissipation	P _T	Mounted on a ceramic board (600mm ² X0.8mm)	0.55	W
Storage Temperature	T _{stg}		-55 to +150	°C

Marking : EY

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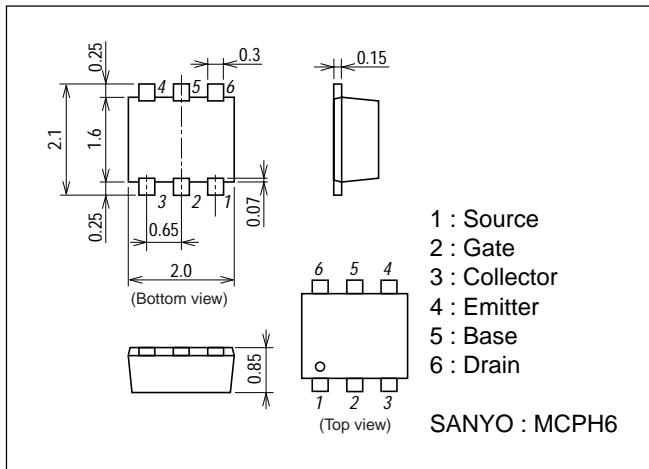
Electrical Characteristics at Ta=25°C

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
[TR]						
Collector Cutoff Current	I_{CBO}	$V_{CB}=-12V, I_E=0$			-100	nA
Emitter Cutoff Current	I_{EBO}	$V_{EB}=-4V, I_C=0$			-100	nA
DC Current Gain	h_{FE}	$V_{CE}=-2V, I_C=-10mA$	300		700	
Gain-Bandwidth Product	f_T	$V_{CE}=-2V, I_C=-50mA$		490		MHz
Output Capacitance	C_{ob}	$V_{CB}=-10V, f=1MHz$		4		pF
Collector-to-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C=-200mA, I_B=-10mA$		-150	-300	mV
Base-to-Emitter Saturation Voltage	$V_{BE(sat)}$	$I_C=-200mA, I_B=-10mA$		-0.9	-1.2	V
Collector-to-Base Breakdown Voltage	$V_{(BR)CBO}$	$I_C=-10\mu A, I_E=0$	-15			V
Collector-to-Emitter Breakdown Voltage	$V_{(BR)CEO}$	$I_C=-1mA, R_{BE}=\infty$	-12			V
Emitter-to-Base Breakdown Voltage	$V_{(BR)EBO}$	$I_E=-10\mu A, I_C=0$	-5			V
Turn-ON Time	t_{on}	See specified Test Circuit.		30		ns
Storage Time	t_{stg}	See specified Test Circuit.		57		ns
Fall Time	t_f	See specified Test Circuit.		30		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}	$V_{GS}=\pm 8V, V_{DS}=0$			± 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} $	$V_{DS}=10V, I_D=80mA$	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	C_{iss}	$V_{DS}=10V, f=1MHz$		7.0		pF
Output Capacitance	C_{oss}	$V_{DS}=10V, f=1MHz$		5.9		pF
Reverse Transfer Capacitance	C_{rss}	$V_{DS}=10V, f=1MHz$		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	Q_g	$V_{DS}=10V, V_{GS}=10V, I_D=150mA$		1.58		nC
Gate-to-Source Charge	Q_{gs}	$V_{DS}=10V, V_{GS}=10V, I_D=150mA$		0.26		nC
Gate-to-Drain "Miller" Charge	Q_{gd}	$V_{DS}=10V, V_{GS}=10V, I_D=150mA$		0.31		nC
Diode Forward Voltage	V_{SD}	$I_S=150mA, V_{GS}=0$		0.87	1.2	V

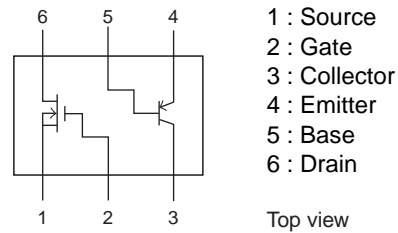
Package Dimensions

unit : mm

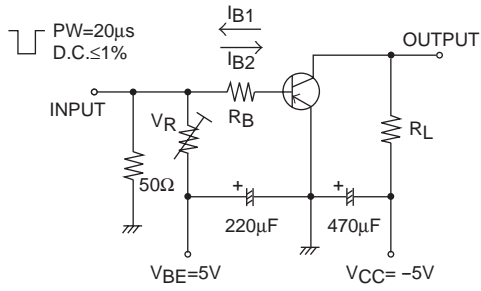
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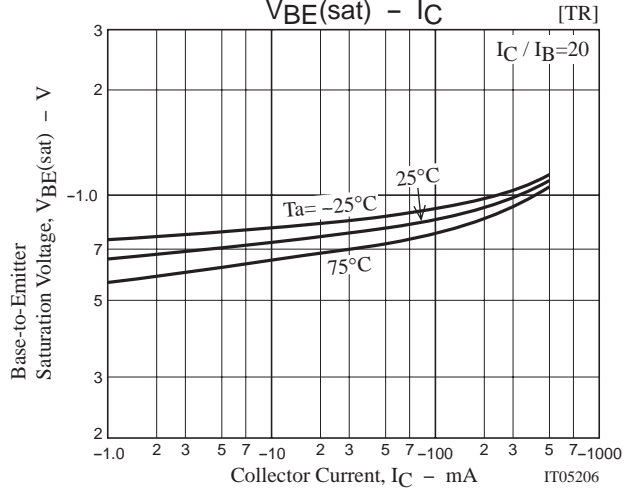
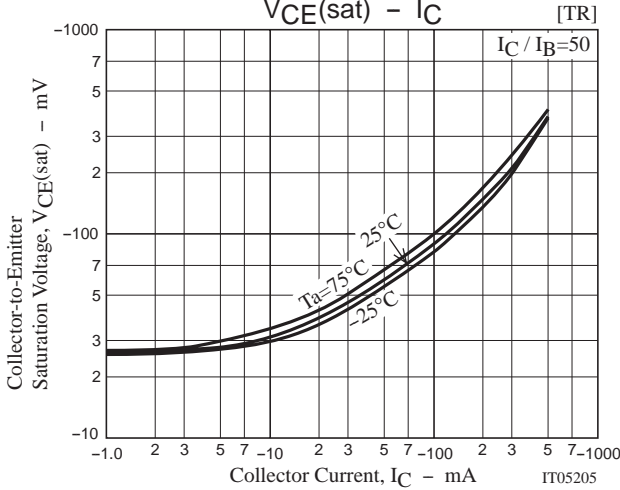
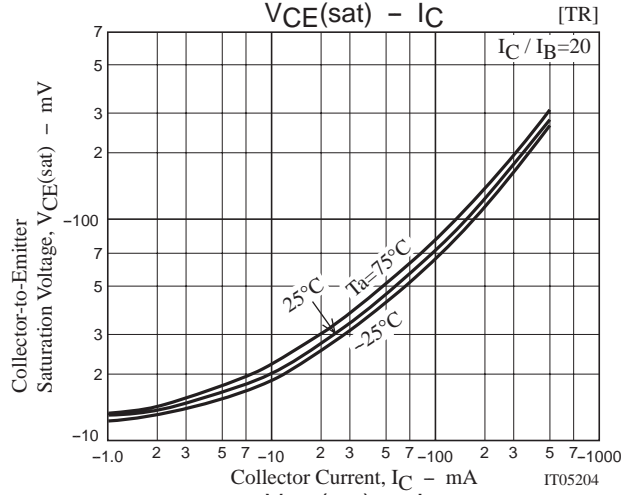
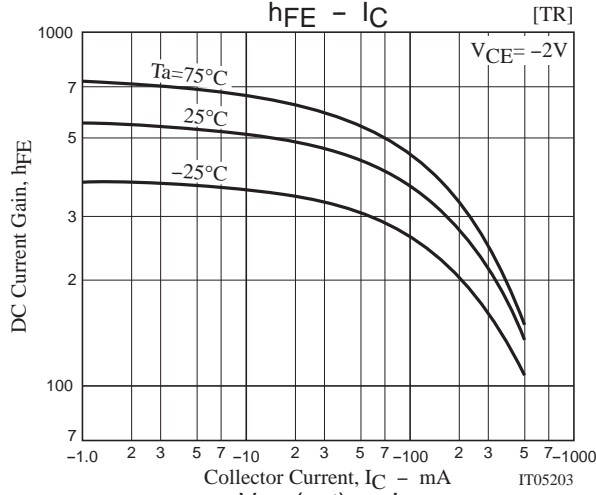
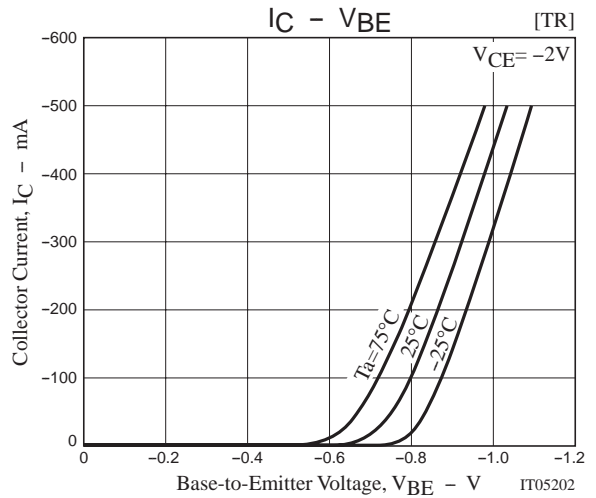
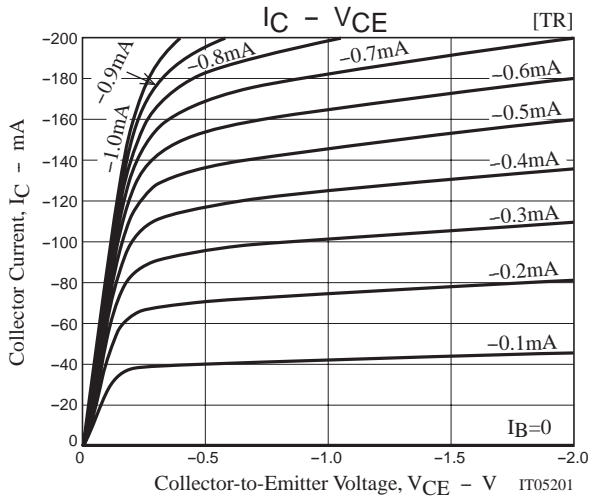
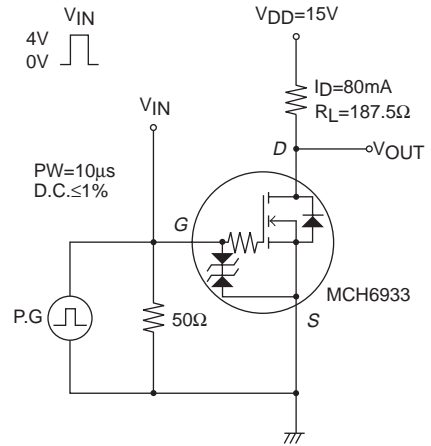
Electrical Connection



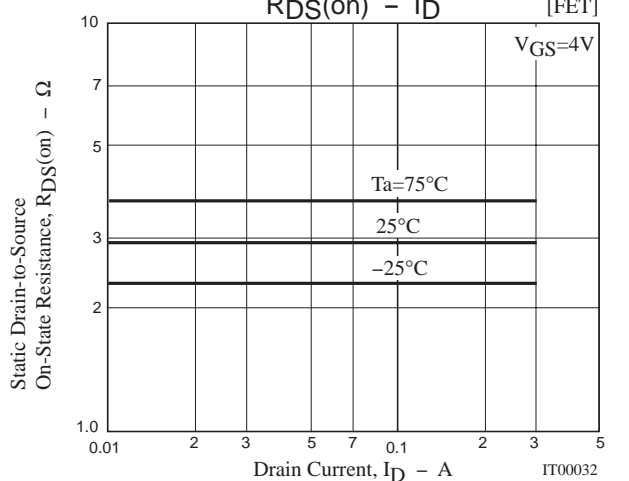
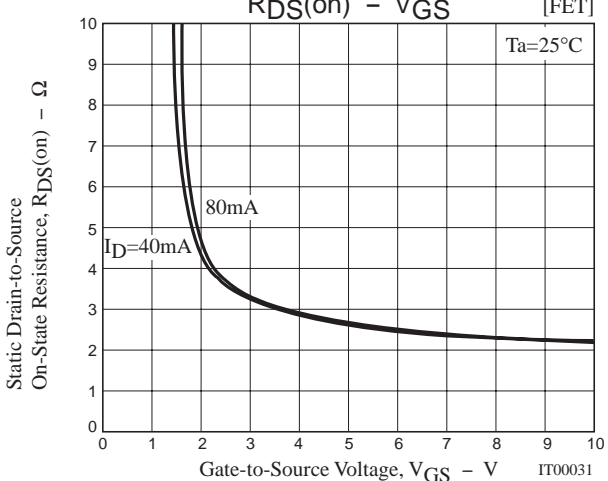
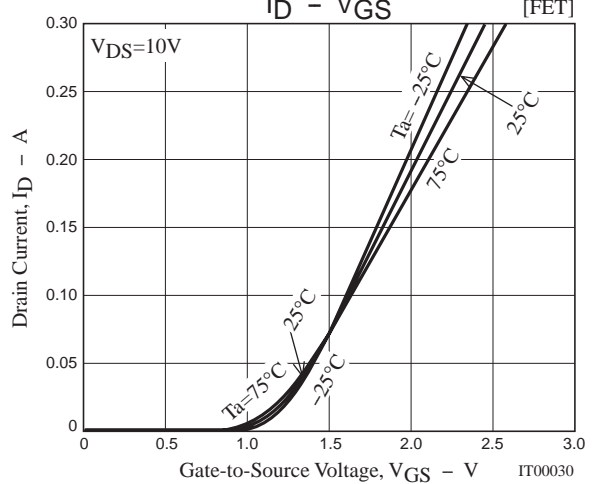
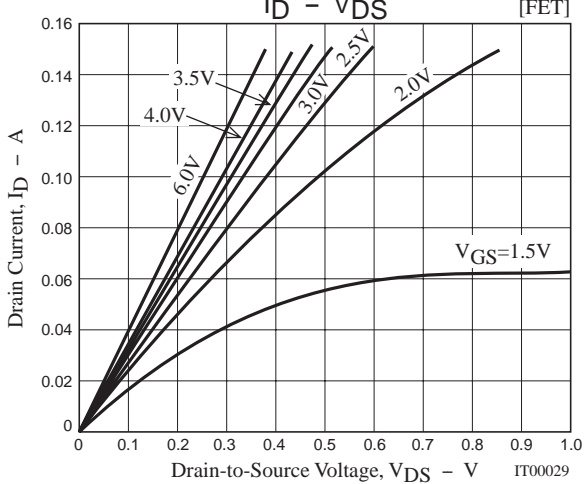
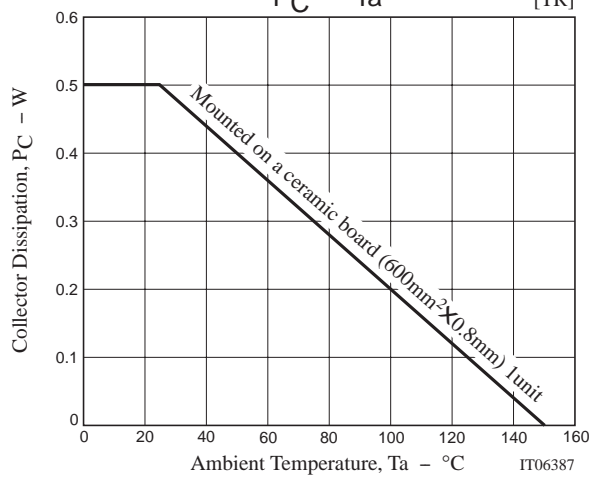
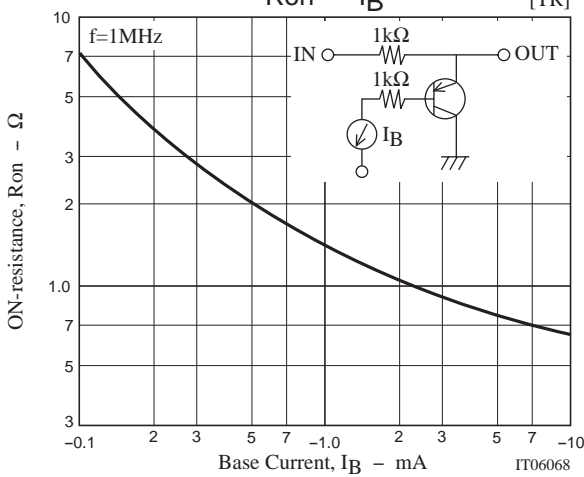
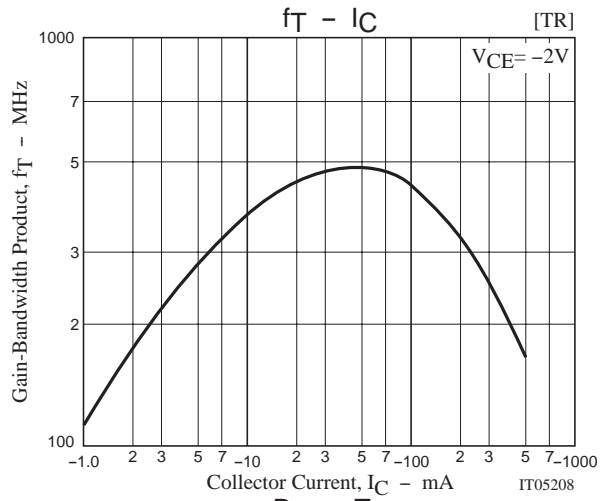
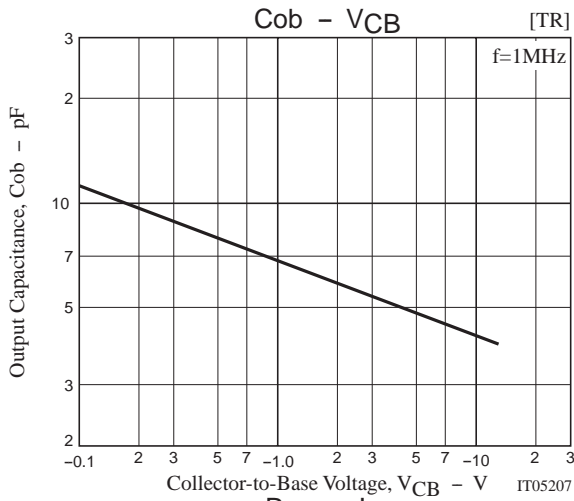
Switching Time Test Circuit



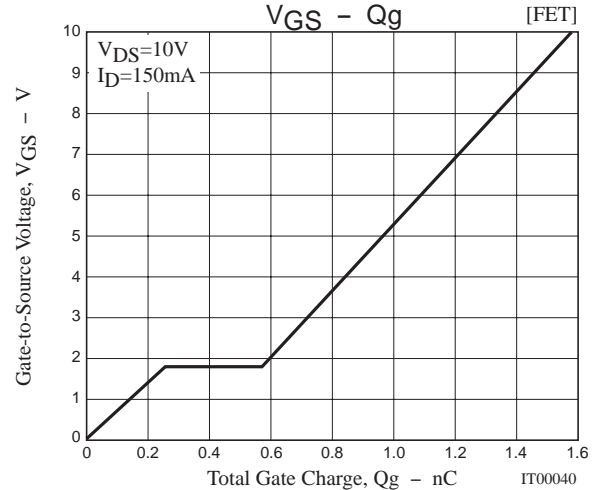
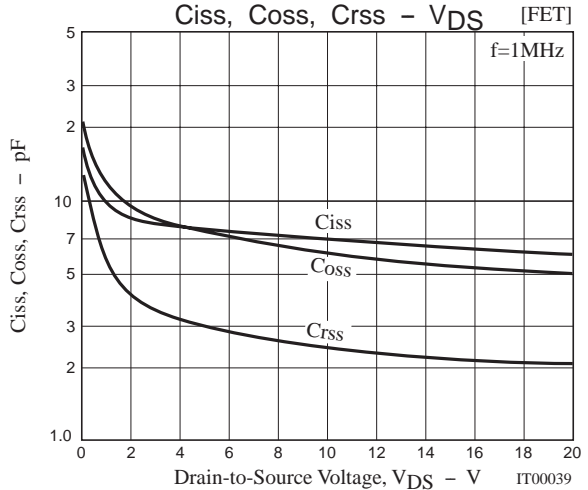
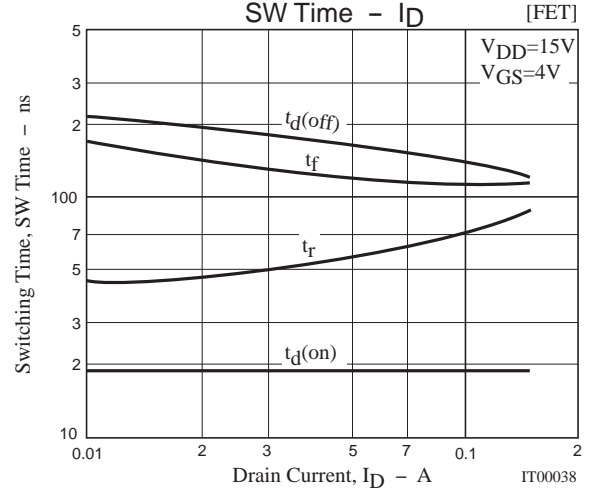
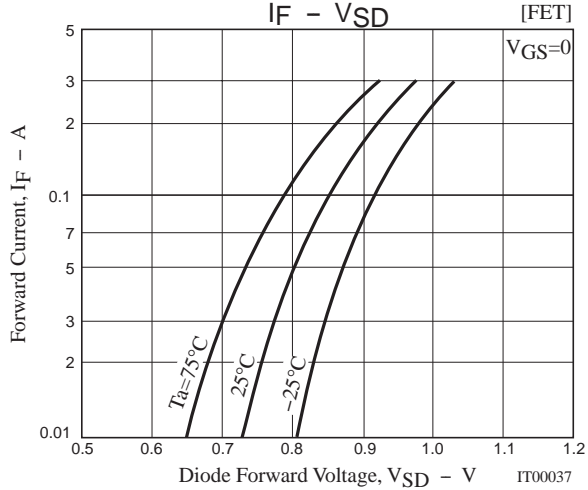
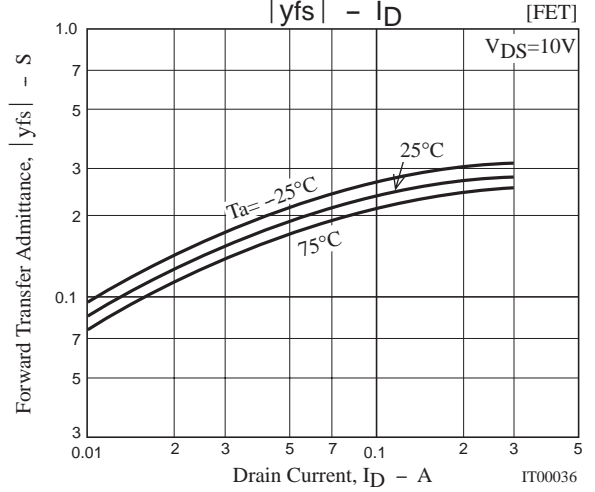
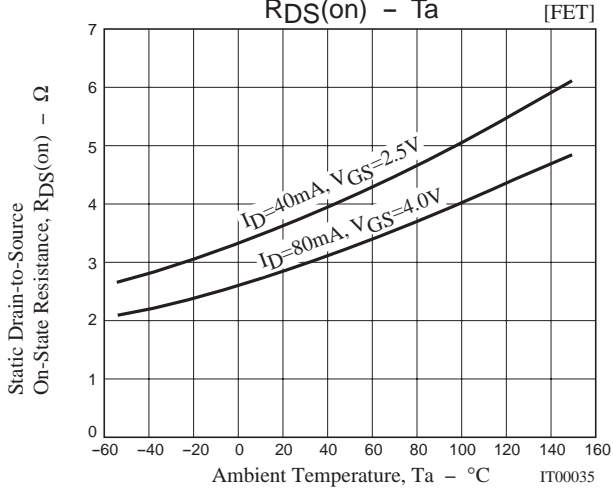
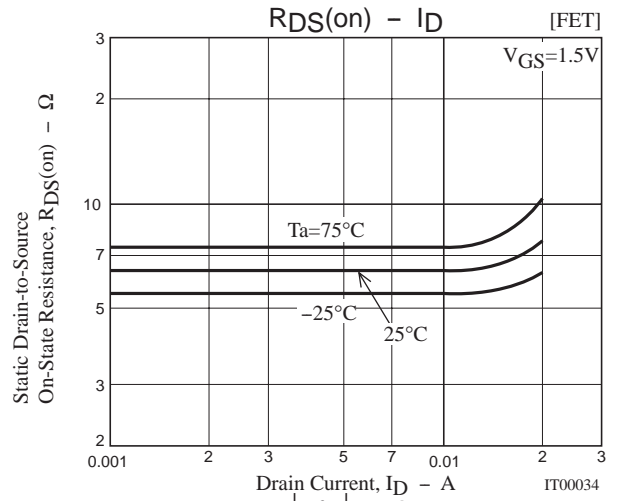
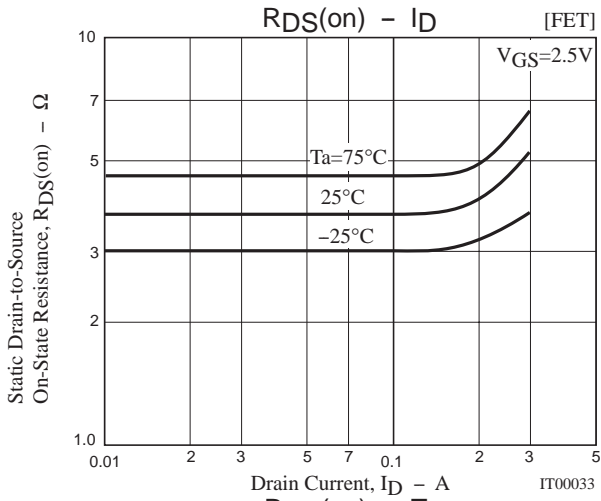
$I_C = 20I_{B1} = -20I_{B2} = -400\text{mA}$



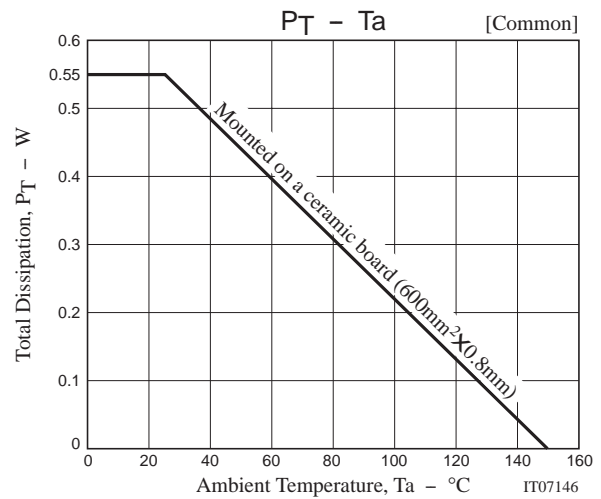
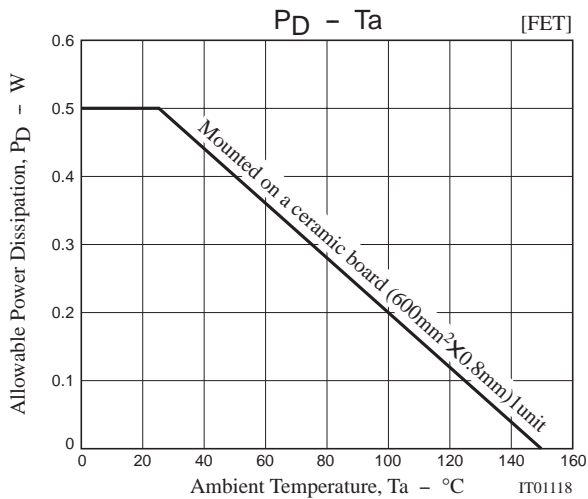
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Note on usage : Since the MCH6933 is a MOSFET product, please avoid using this device in the vicinity of highly charged objects.

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