Ordering number : ENN6940

N-Channel Silicon MOSFET

MCH3405

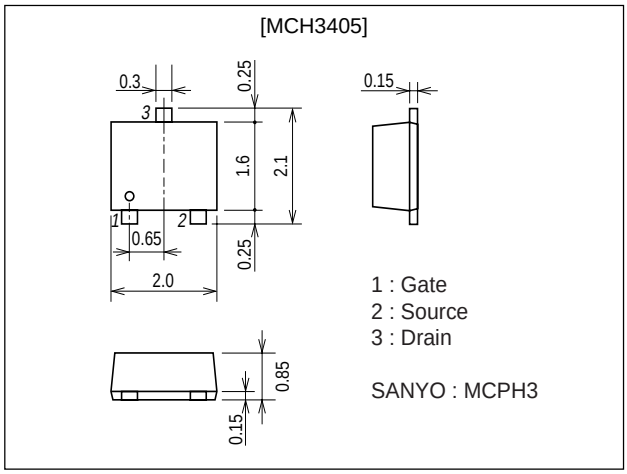
Ultrahigh-Speed Switching Applications

Features

- Low ON-resistance.
- Ultrahigh-speed switching.
- 1.8V drive.

Package Dimensions

unit : mm
2167



Specifications

Absolute Maximum Ratings at Ta=25°C

Parameter	Symbol	Conditions	Ratings	Unit
Drain-to-Source Voltage	V_{DSS}		20	V
Gate-to-Source Voltage	V_{GSS}		±10	V
Drain Current (DC)	I_D		1.8	A
Drain Current (Pulse)	I_{DP}	PW≤10μs, duty cycle≤1%	7.2	A
Allowable Power Dissipation	P_D	Mounted on a ceramic board (900mm²×0.8mm)	0.8	W
Channel Temperature	Tch		150	°C
Storage Temperature	Tstg		-55 to +125	°C

Electrical Characteristics at Ta=25°C

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	I_D=1mA, V_{GS}=0	20			V
Zero-Gate Voltage Drain Current	I_{DSS}	V_{DS}=20V, V_{GS}=0			1	μA
Gate-to-Source Leakage Current	I_{GSS}	V_{GS}=±8V, V_{DS}=0			±10	μA
Gate-to-Source Cutoff Voltage	$V_{GS(off)}$	V_{DS}=10V, I_D=1mA	0.4		1.3	V
Forward Transfer Admittance	$\|yfs\|$	V_{DS}=10V, I_D=1A	1.9	2.8		S

Marking : KE

Continued on next page.

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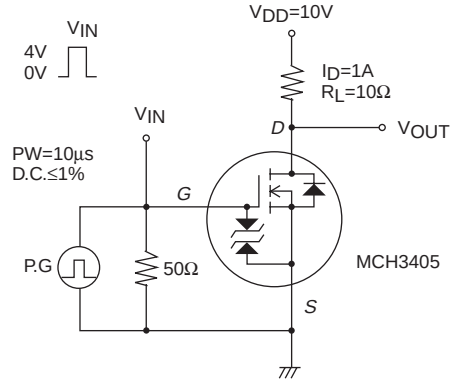
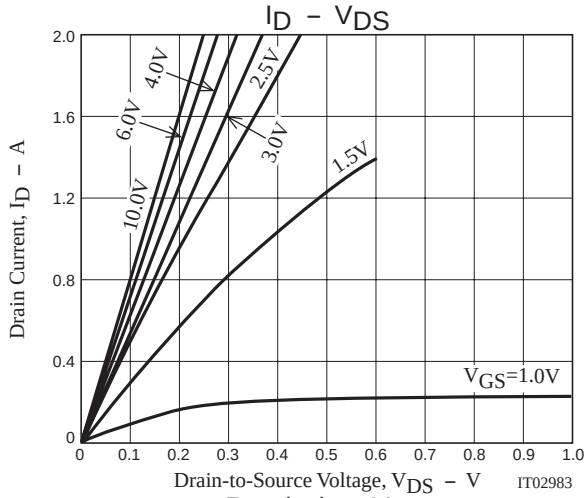
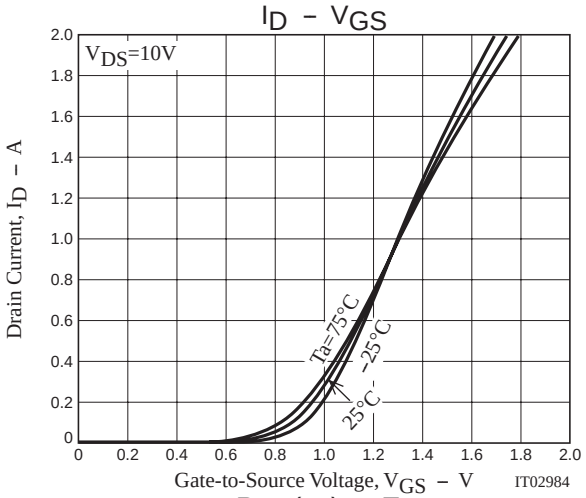
Continued from preceding page.

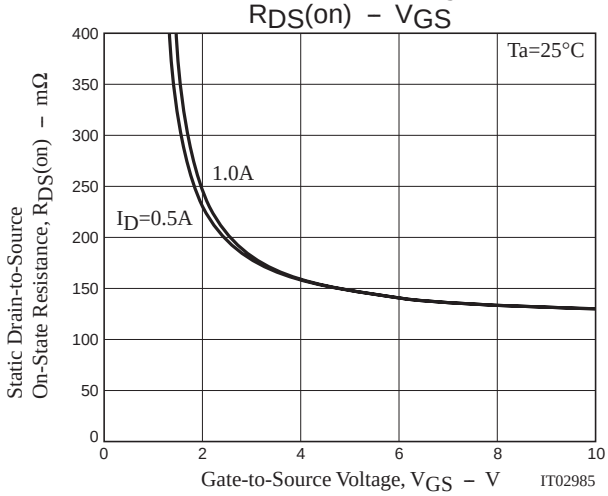
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Static Drain-to-Source On-State Resistance	$R_{DS}(on)1$	I_D=1A, V_{GS}=4V		160	210	mΩ
	$R_{DS}(on)2$	I_D=0.5A, V_{GS}=2.5V		200	280	mΩ
	$R_{DS}(on)3$	I_D=0.1A, V_{GS}=1.8V		280	390	mΩ
Input Capacitance	Ciss	V_{DS}=10V, f=1MHz		100		pF
Output Capacitance	Coss	V_{DS}=10V, f=1MHz		22		pF
Reverse Transfer Capacitance	Crss	V_{DS}=10V, f=1MHz		15		pF
Turn-ON Delay Time	$t_d(on)$	See specified Test Circuit		5.5		ns
Rise Time	t_r	See specified Test Circuit		18		ns
Turn-OFF Delay Time	$t_d(off)$	See specified Test Circuit		17		ns
Fall Time	t_f	See specified Test Circuit		8		ns
Total Gate Charge	Qg	V_{DS}=10V, V_{GS}=10V, I_D=1.8A		4.5		nC
Gate-to-Source Charge	Qgs	V_{DS}=10V, V_{GS}=10V, I_D=1.8A		0.4		nC
Gate-to-Drain “Miller” Charge	Qgd	V_{DS}=10V, V_{GS}=10V, I_D=1.8A		0.4		nC
Diode Forward Voltage	V_{SD}	I_S=1.8A, V_{GS}=0		0.91	1.2	V

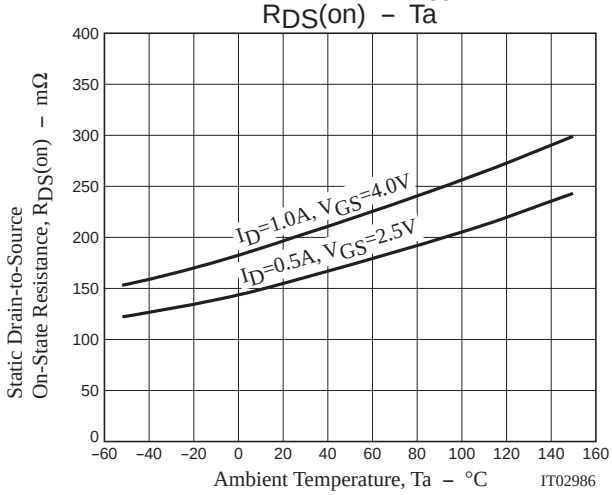
Switching Time Test Circuit

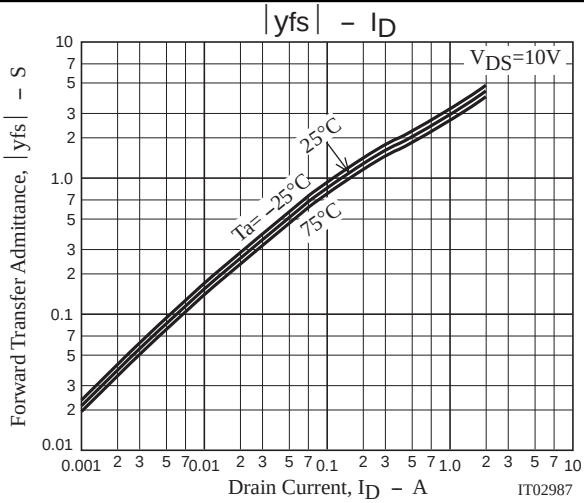


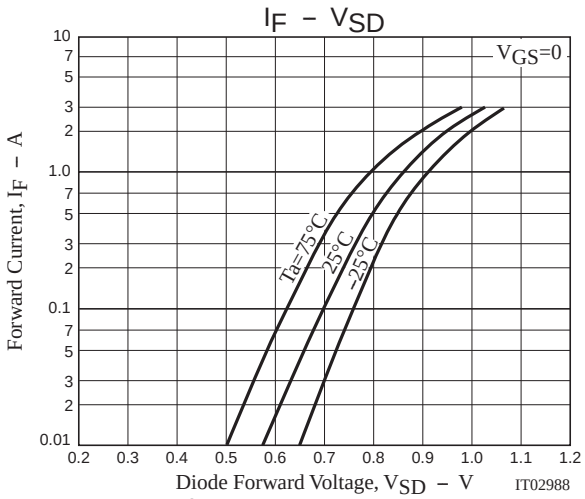


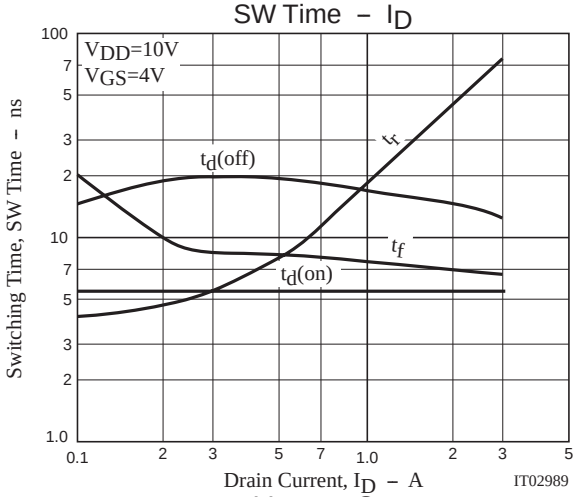


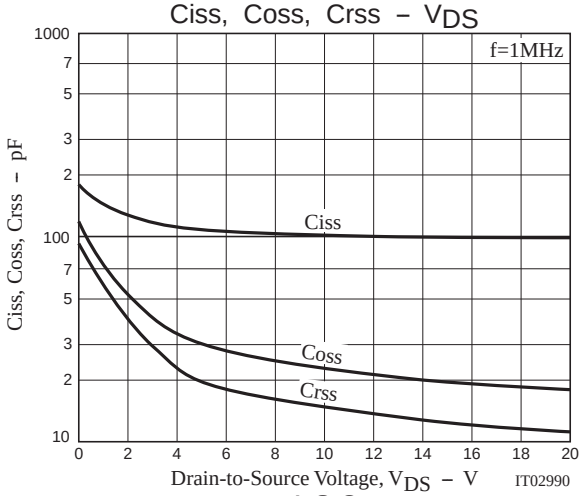


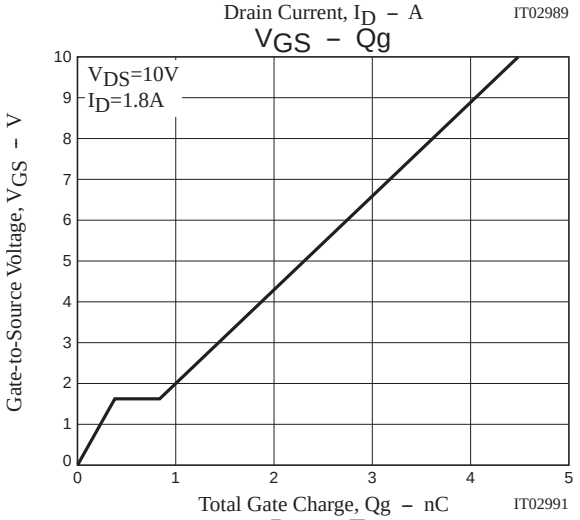


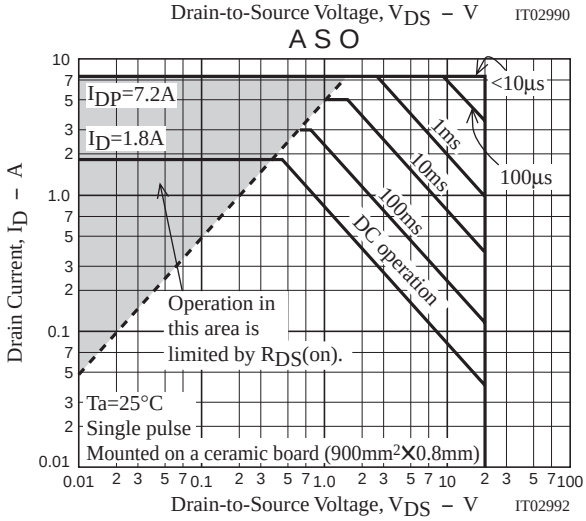

|yfs| – ID
VDS=10V
Ta= –25°C
25°C
75°C
Forward Transfer Admittance, |yfs| – S
Drain Current, ID – A
IT02987

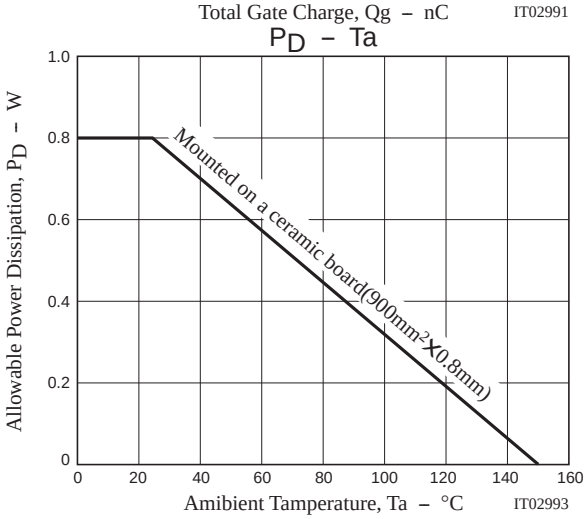

IF – VSD
VGS=0
Ta=75°C
25°C
–25°C
Forward Current, IF – A
Diode Forward Voltage, VSD – V
IT02988


SW Time – ID
VDD=10V
VGS=4V
tr
td(off)
tf
td(on)
Switching Time, SW Time – ns
Drain Current, ID – A
IT02989


Ciss, Coss, Crss – VDS
f=1MHz
Ciss
Coss
Crss
Ciss, Coss, Crss – pF
Drain-to-Source Voltage, VDS – V
IT02990


VGS – Qg
VDS=10V
ID=1.8A
Gate-to-Source Voltage, VGS – V
Total Gate Charge, Qg – nC
IT02991


A S O
IDP=7.2A
ID=1.8A
<10µs
1ms
10ms
100ms
100µs
DC operation
Operation in
this area is
limited by RDS(on).
Ta=25°C
Single pulse
Mounted on a ceramic board (900mm²×0.8mm)
Drain Current, ID – A
Drain-to-Source Voltage, VDS – V
IT02992


PD – Ta
Mounted on a ceramic board(900mm²×0.8mm)
Allowable Power Dissipation, PD – W
Amibient Tamperature, Ta – °C
IT02993