Ordering number : ENA1993A

SANYO Semiconductors

DATA SHEET

An ON Semiconductor Company

N-Channel and P-Channel Silicon MOSFET

MCH6660 — General-Purpose Switching Device Applications

Features

- ON-resistance Nch : $R_{DS}(on)1$=105mΩ(typ.)
  Pch : $R_{DS}(on)1$=205mΩ(typ.)
- 1.8V drive
- Halogen free compliance
- Protection diode in

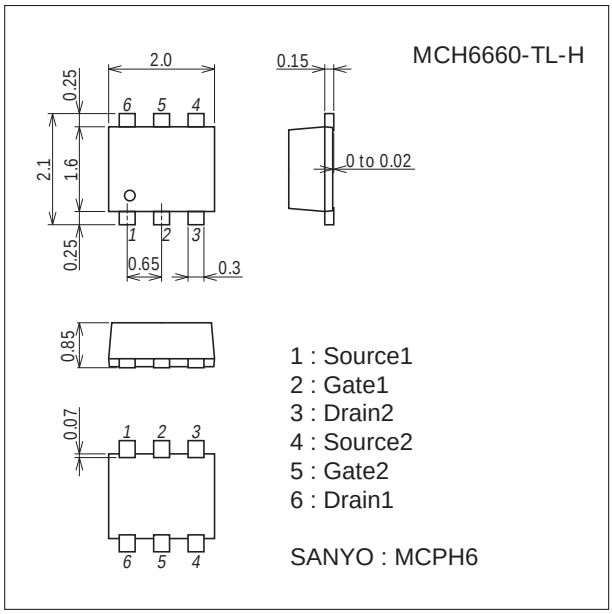
Specifications

Absolute Maximum Ratings at Ta=25°C

Parameter	Symbol	Conditions	N-channel	P-channel	Unit
Drain-to-Source Voltage	V_{DSS}		20	−20	V
Gate-to-Source Voltage	V_{GSS}		±10	±10	V
Drain Current (DC)	I_D		2	−1.5	A
Drain Current (Pulse)	I_{DP}	PW≤10μs, duty cycle≤1%	8	−6	A
Allowable Power Dissipation	P_D	When mounted on ceramic substrate (900mm²×0.8mm) 1unit	0.8		W
Channel Temperature	Tch		150		℃
Storage Temperature	Tstg		−55 to +150		℃

Package Dimensions

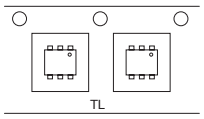
unit : mm (typ)
7022A-006



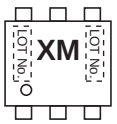
Product & Package Information

- Package : MCPH6
- JEITA, JEDEC : SC-88, SC-70-6, SOT-363
- Minimum Packing Quantity : 3,000 pcs./reel

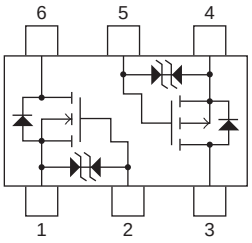
Packing Type : TL



Marking



Electrical Connection

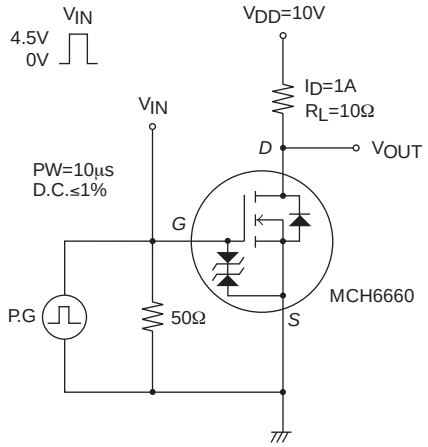


Electrical Characteristics at Ta=25°C

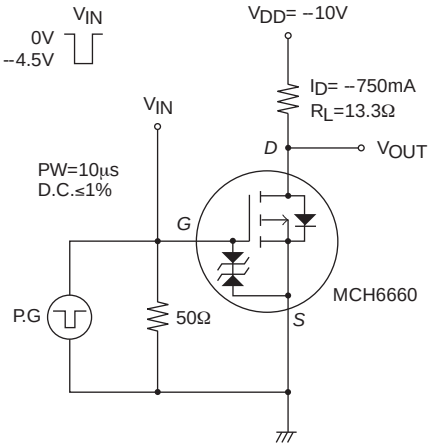
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
[N-channel]						
Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	I_D=1mA, V_{GS}=0V	20			V
Zero-Gate Voltage Drain Current	I_{DSS}	V_{DS}=20V, V_{GS}=0V			1	μA
Gate-to-Source Leakage Current	I_{GSS}	V_{GS}=±8V, V_{DS}=0V			±10	μA
Cutoff Voltage	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		S
Static Drain-to-Source On-State Resistance	R_{DS}(on)1	I_D=1A, V_{GS}=4.5V		105	136	mΩ
	R_{DS}(on)2	I_D=0.5A, V_{GS}=2.5V		147	205	mΩ
	R_{DS}(on)3	I_D=0.3A, V_{GS}=1.8V		212	318	mΩ
Input Capacitance	Ciss	V_{DS}=10V, f=1MHz		128		pF
Output Capacitance	Coss			28		pF
Reverse Transfer Capacitance	Crss			21		pF
Turn-ON Delay Time	t_d(on)	See specified Test Circuit.		5.1		ns
Rise Time	t_r			11		ns
Turn-OFF Delay Time	t_d(off)			14.5		ns
Fall Time	t_f			12		ns
Total Gate Charge	Qg	V_{DS}=10V, V_{GS}=4.5V, I_D=2A		1.8		nC
Gate-to-Source Charge	Qgs			0.3		nC
Gate-to-Drain “Miller” Charge	Qgd			0.55		nC
Diode Forward Voltage	V_{SD}	I_S=2A, V_{GS}=0V		0.85	1.2	V
[P-channel]						
Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	I_D=−1mA, V_{GS}=0V	−20			V
Zero-Gate Voltage Drain Current	I_{DSS}	V_{DS}=−20V, V_{GS}=0V			−1	μA
Gate-to-Source Leakage Current	I_{GSS}	V_{GS}=±8V, V_{DS}=0V			±10	μA
Cutoff Voltage	V_{GS}(off)	V_{DS}=−10V, I_D=−1mA	−0.4		−1.4	V
Forward Transfer Admittance	| yfs |	V_{DS}=−10V, I_D=−750mA		1.9		S
Static Drain-to-Source On-State Resistance	R_{DS}(on)1	I_D=−750mA, V_{GS}=−4.5V		205	266	mΩ
	R_{DS}(on)2	I_D=−300mA, V_{GS}=−2.5V		295	413	mΩ
	R_{DS}(on)3	I_D=−100mA, V_{GS}=−1.8V		430	645	mΩ
Input Capacitance	Ciss	V_{DS}=−10V, f=1MHz		120		pF
Output Capacitance	Coss			26		pF
Reverse Transfer Capacitance	Crss			20		pF
Turn-ON Delay Time	t_d(on)	See specified Test Circuit.		5.3		ns
Rise Time	t_r			9.7		ns
Turn-OFF Delay Time	t_d(off)			16		ns
Fall Time	t_f			14		ns
Total Gate Charge	Qg	V_{DS}=−10V, V_{GS}=−4.5V, I_D=−1.5A		1.7		nC
Gate-to-Source Charge	Qgs			0.28		nC
Gate-to-Drain “Miller” Charge	Qgd			0.47		nC
Diode Forward Voltage	V_{SD}	I_S=−1.5A, V_{GS}=0V		−0.89	−1.2	V

Switching Time Test Circuit

[N-channel]

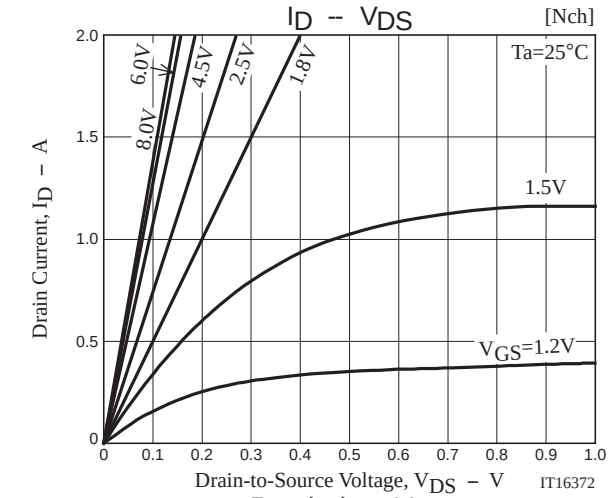


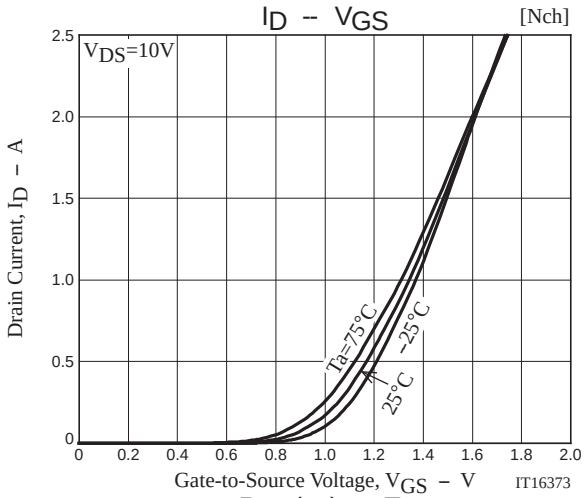
[P-channel]

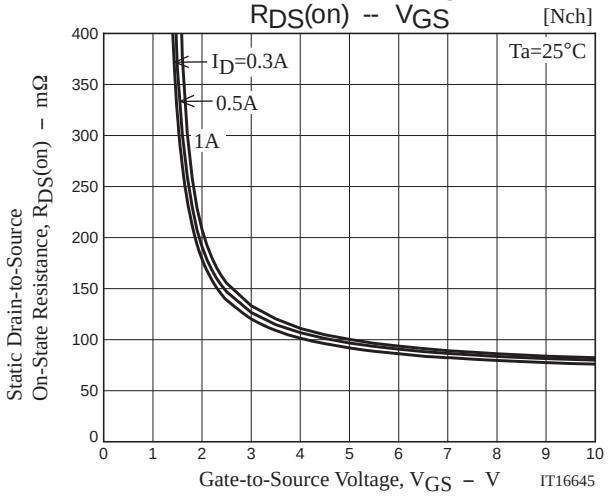


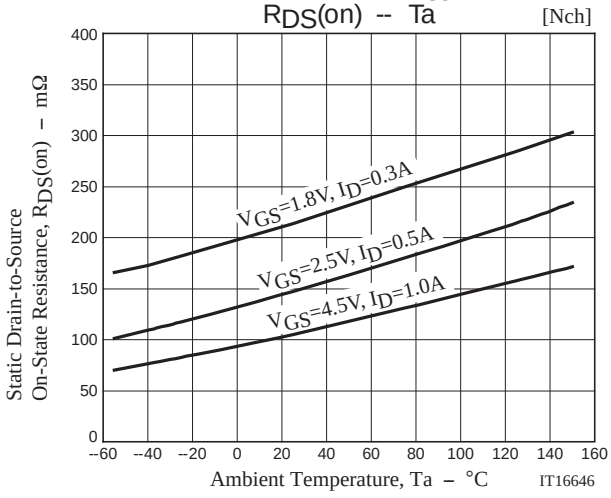
Ordering Information

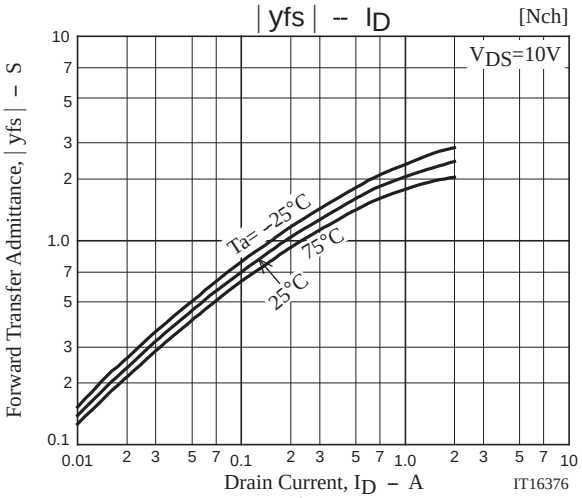
Device	Package	Shipping	memo
MCH6660-TL-H	MCPH6	3,000pcs./reel	Pb Free and Halogen Free

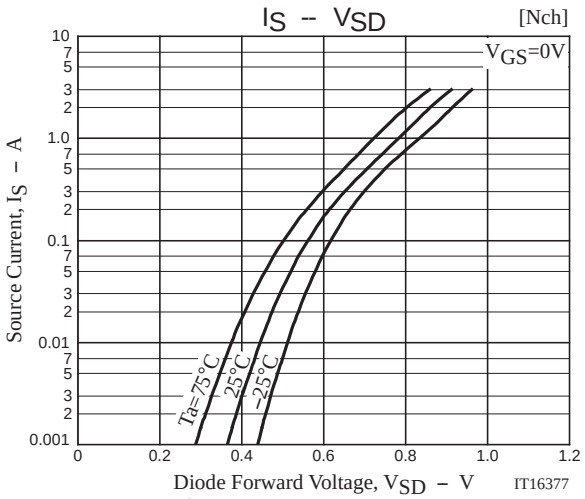


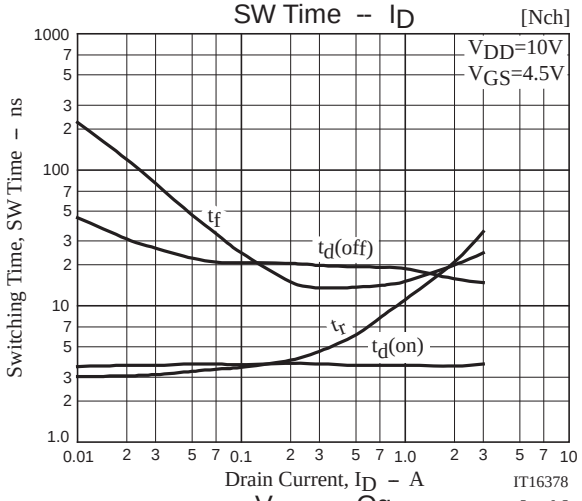


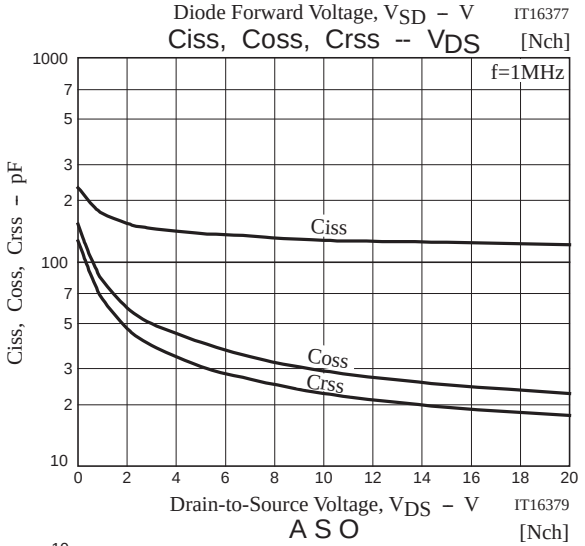


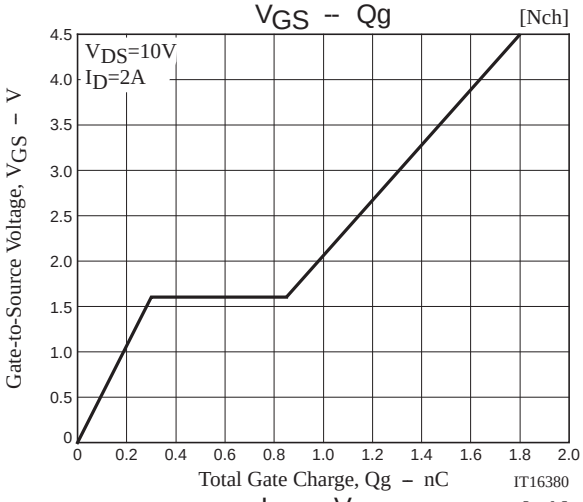


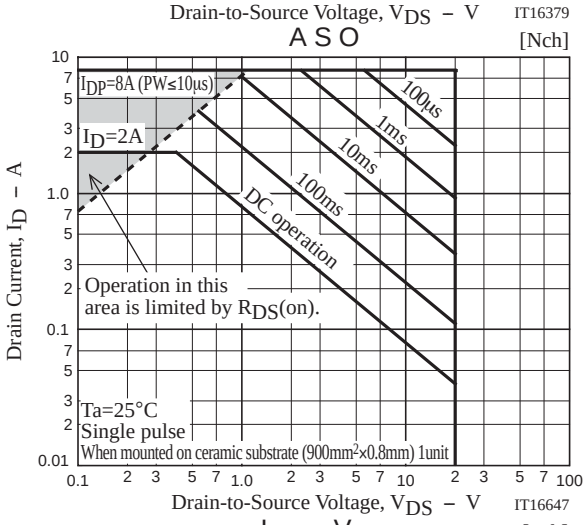

| yfs | -- ID
[Nch]
VDS=10V
Ta= –25°C
75°C
25°C
Forward Transfer Admittance, | yfs | – S
Drain Current, ID – A
IT16376

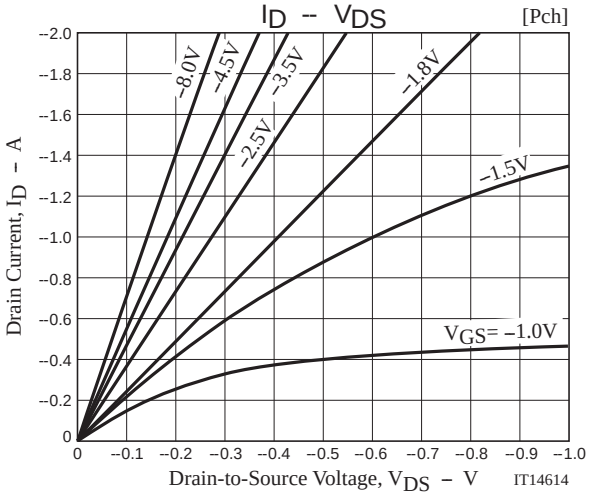

IS -- VSD
[Nch]
VGS=0V
Ta=75°C
25°C
–25°C
Source Current, IS – A
Diode Forward Voltage, VSD – V
IT16377

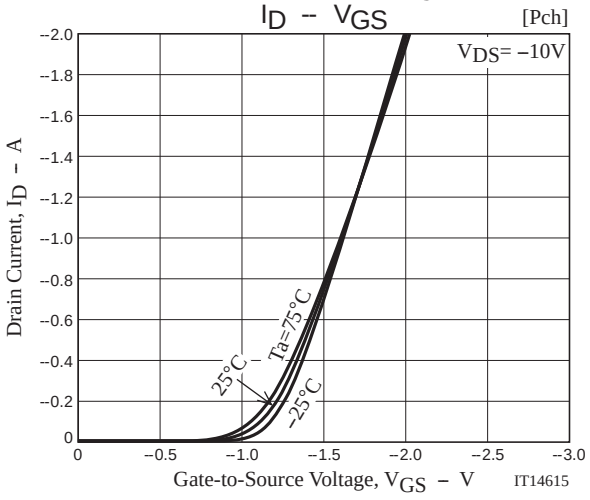

SW Time -- ID
[Nch]
VDD=10V
VGS=4.5V
tf
td(off)
tr
td(on)
Switching Time, SW Time – ns
Drain Current, ID – A
IT16378

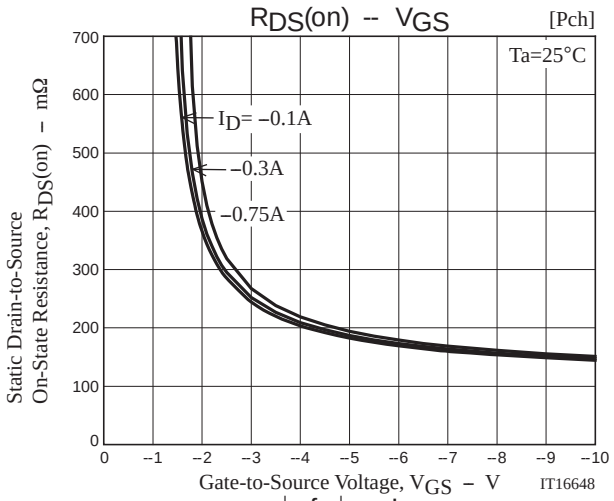

Ciss, Coss, Crss -- VDS
[Nch]
f=1MHz
Ciss
Coss
Crss
Ciss, Coss, Crss – pF
Drain-to-Source Voltage, VDS – V
IT16379

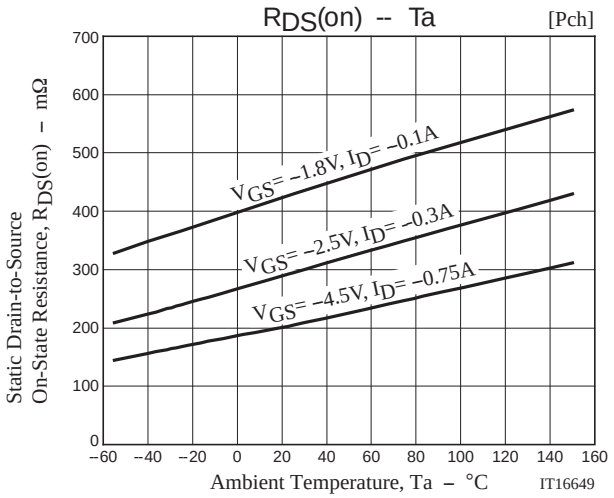

VGS -- Qg
[Nch]
VDS=10V
ID=2A
Gate-to-Source Voltage, VGS – V
Total Gate Charge, Qg – nC
IT16380

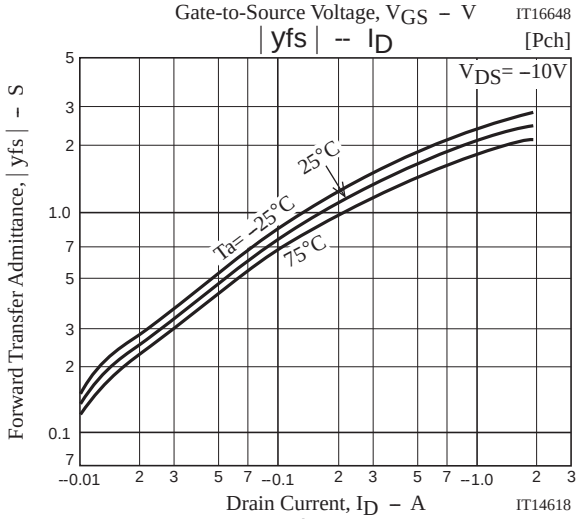

A S O
[Nch]
IDP=8A (PW≤10μs)
ID=2A
100μs
1ms
10ms
100ms
DC operation
Operation in this
area is limited by RDS(on).
Ta=25°C
Single pulse
When mounted on ceramic substrate (900mm²×0.8mm) 1unit
Drain Current, ID – A
Drain-to-Source Voltage, VDS – V
IT16647

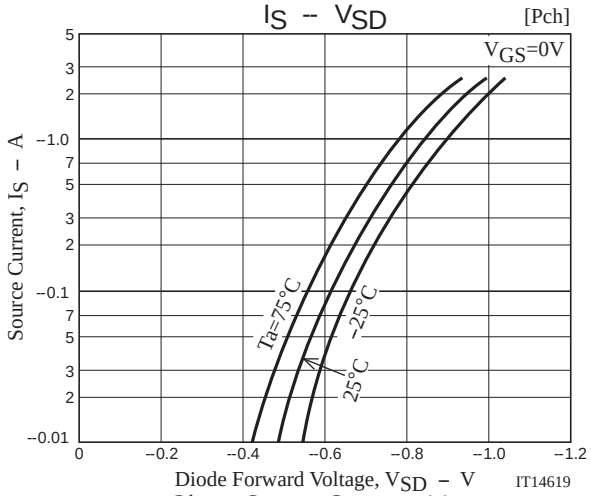

ID -- VDS
[Pch]
–8.0V
–4.5V
–3.5V
–2.5V
–1.8V
–1.5V
VGS= –1.0V
Drain Current, ID – A
Drain-to-Source Voltage, VDS – V
IT14614

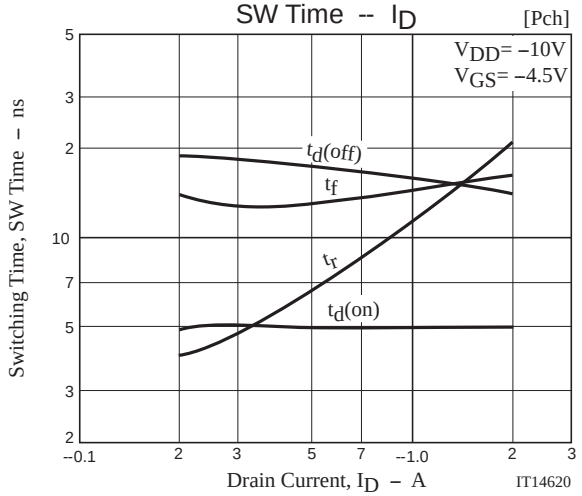

ID -- VGS
[Pch]
VDS= –10V
25°C
Ta=75°C
–25°C
Drain Current, ID – A
Gate-to-Source Voltage, VGS – V
IT14615

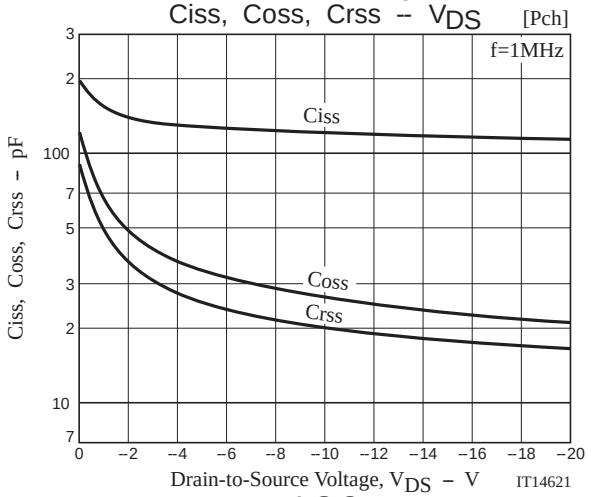

RDS(on) -- VGS
[Pch]
Ta=25°C
ID= –0.1A
–0.3A
–0.75A
Static Drain-to-Source On-State Resistance, RDS(on) – mΩ
Gate-to-Source Voltage, VGS – V
IT16648

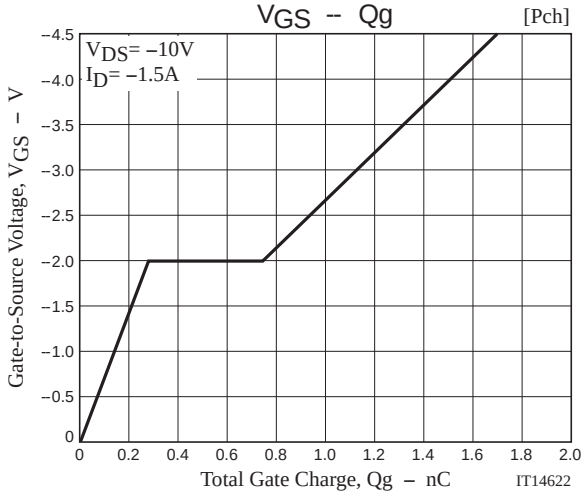

RDS(on) -- Ta
[Pch]
VGS= –1.8V, ID= –0.1A
VGS= –2.5V, ID= –0.3A
VGS= –4.5V, ID= –0.75A
Static Drain-to-Source On-State Resistance, RDS(on) – mΩ
Ambient Temperature, Ta – °C
IT16649

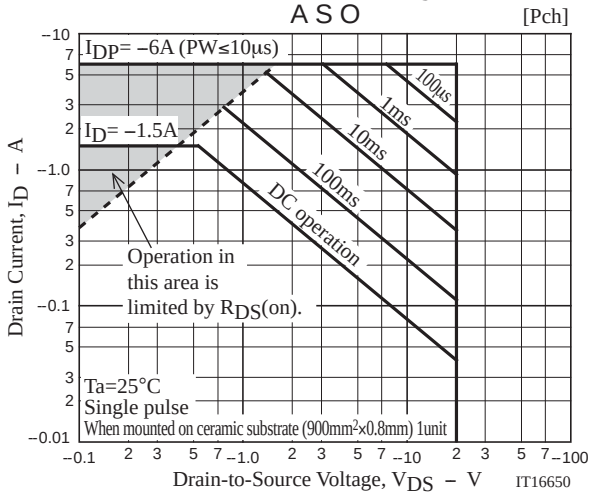

| yfs | -- ID
[Pch]
VDS= –10V
25°C
Ta= –25°C
75°C
Forward Transfer Admittance, | yfs | – S
Drain Current, ID – A
IT14618

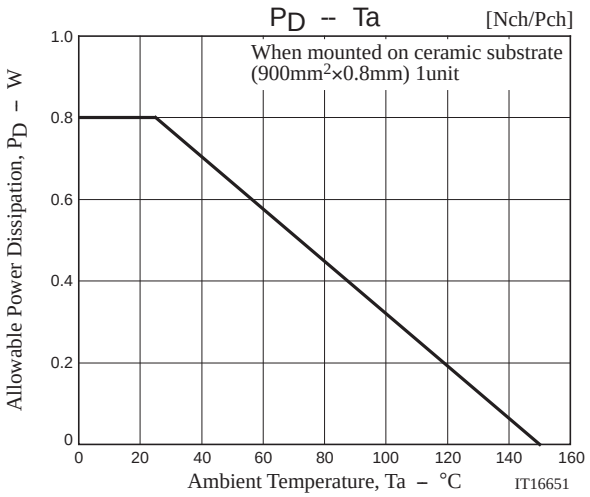

IS -- VSD
[Pch]
VGS=0V
Ta=75°C
–25°C
25°C
Source Current, IS – A
Diode Forward Voltage, VSD – V
IT14619


SW Time -- ID
[Pch]
VDD= –10V
VGS= –4.5V
td(off)
tf
tr
td(on)
Switching Time, SW Time – ns
Drain Current, ID – A
IT14620


Ciss, Coss, Crss -- VDS
[Pch]
f=1MHz
Ciss
Coss
Crss
Ciss, Coss, Crss – pF
Drain-to-Source Voltage, VDS – V
IT14621


VGS -- Qg
[Pch]
VDS= –10V
ID= –1.5A
Gate-to-Source Voltage, VGS – V
Total Gate Charge, Qg – nC
IT14622


A S O
[Pch]
IDP= –6A (PW≤10μs)
ID= –1.5A
100μs
1ms
10ms
100ms
DC operation
Operation in this area is limited by RDS(on).
Ta=25°C
Single pulse
When mounted on ceramic substrate (900mm²×0.8mm) 1unit
Drain Current, ID – A
Drain-to-Source Voltage, VDS – V
IT16650


PD -- Ta
[Nch/Pch]
When mounted on ceramic substrate
(900mm2×0.8mm) 1unit
Allowable Power Dissipation, PD – W
1.0
0.8
0.6
0.4
0.2
0
0
20
40
60
80
100
120
140
160
Ambient Temperature, Ta – °C
IT16651

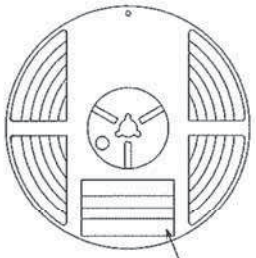
Embossed Taping Specification

MCH6660-TL-H

1. Packing Format

Package Name	Carrier Tape Type	Maximun Number of devices contained (pcs)			Packing format	
		Reel	Inner box	Outer box	Inner BOX (C-1)	Outer BOX (A-7)
MCPH6	MCP4	3,000	15,000	90,000	5 reels contained Dimensions:mm (external) 183×72×185	6 inner boxes contained Dimensions:mm (external) 440×195×210

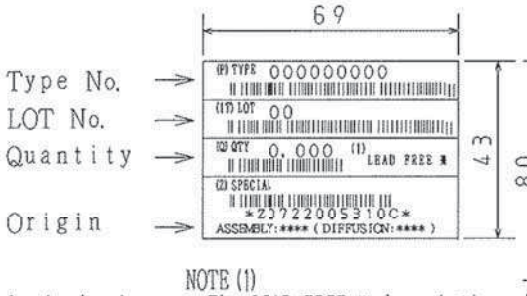
Packing method



Reel label

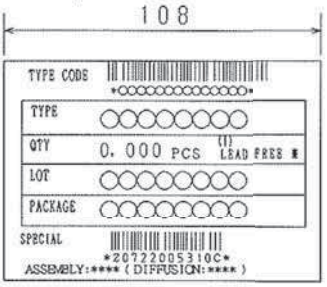
Reel label, Inner box label

(unit:mm)



Outer box label

It is a label at the time of factory shipments. The form of a label may change in physical distribution process.

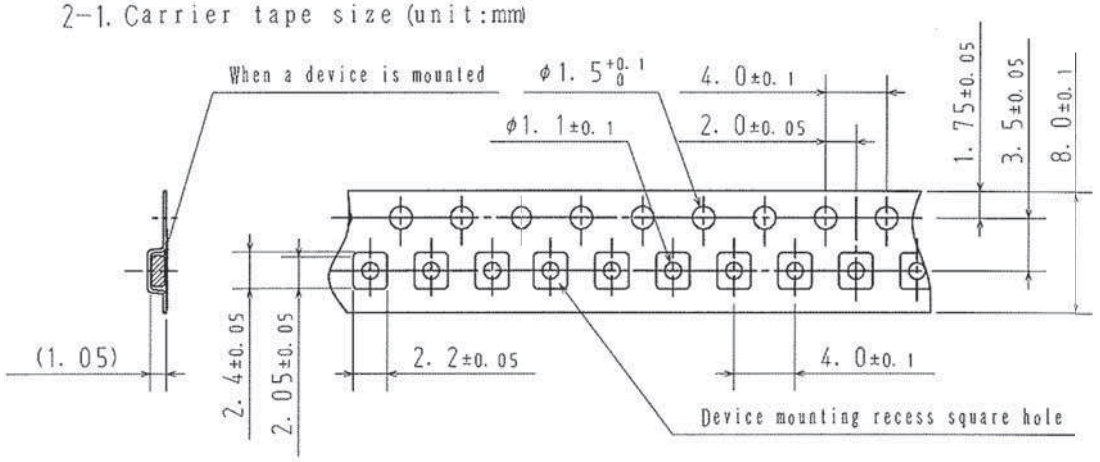


NOTE (1)
The LEAD FREE ※ description shows that the surface treatment of the terminal is lead free.

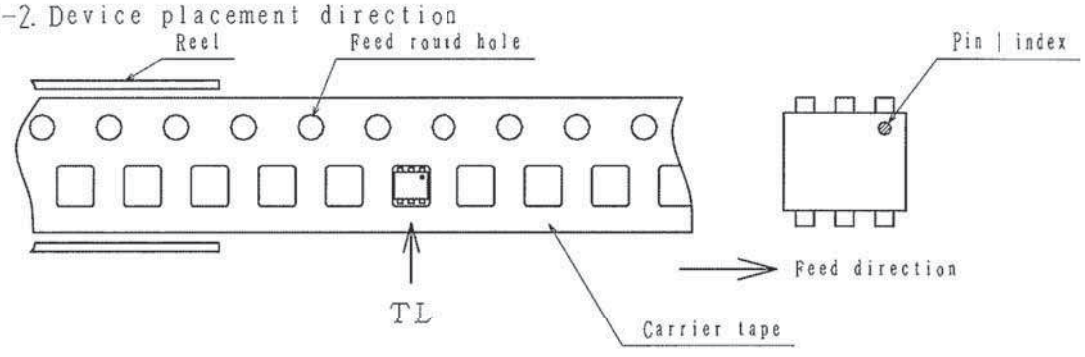
Label	JEITA Phase
LEAD FREE 3	JEITA Phase 3A
LEAD FREE 4	JEITA Phase 3

2. Taping configuration

2-1. Carrier tape size (unit:mm)



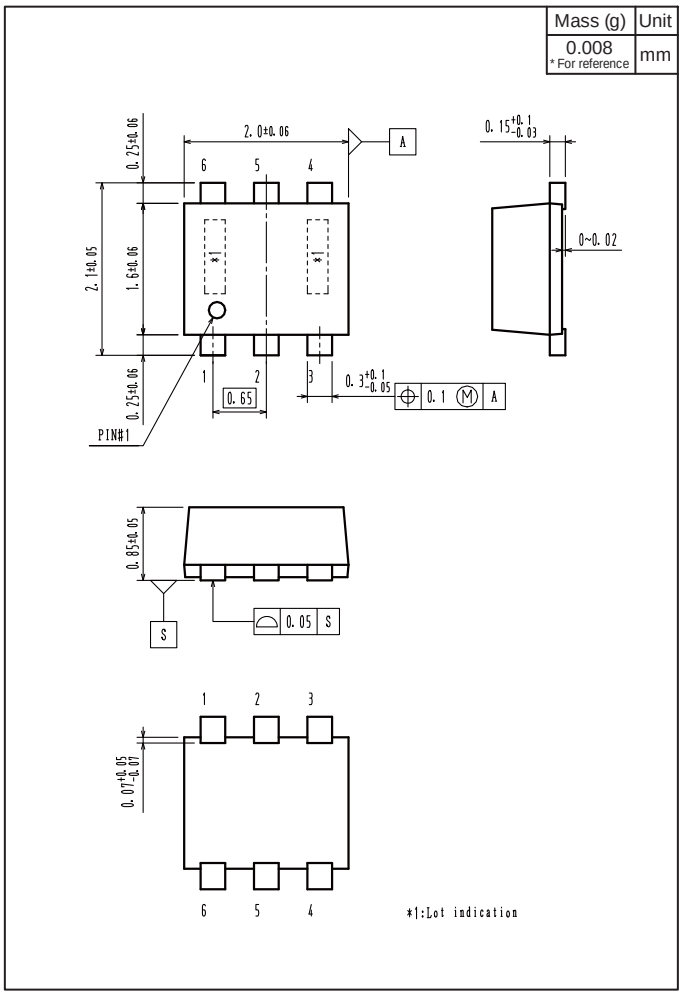
2-2. Device placement direction



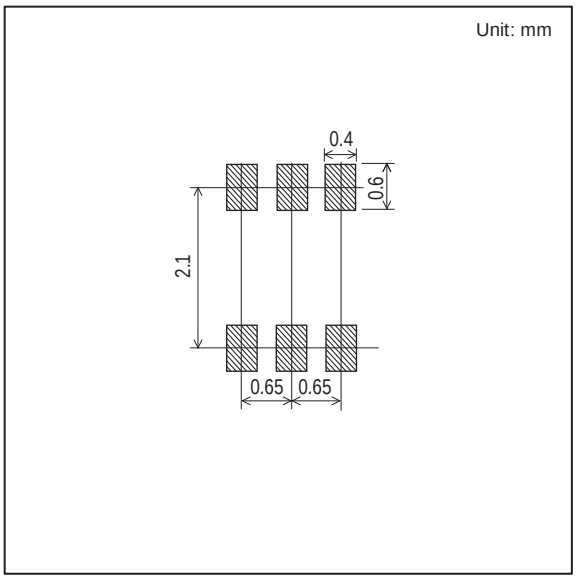
Those with pin 1 index on the feed hole side·····TL

Outline Drawing

MCH6660-TL-H



Land Pattern Example



Note on usage : Since the MCH6660 is a MOSFET product, please avoid using this device in the vicinity of highly charged objects.

This catalog provides information as of July, 2012. Specifications and information herein are subject to change without notice.