Ordering number : ENA1510A

ECH8668

Power MOSFET

20V, 7.5A, 17mΩ, −20V, −5A, 38mΩ, Complementary Dual ECH8

ON Semiconductor®

http://onsemi.com

Features

- The ECH8668 incorporates an N-channel MOSFET and a P-channel MOSFET that feature low ON-resistance and high-speed switching , thereby enablimg high-density mounting
- 1.8V drive
- Halogen free compliance
- Protection diode in

Specifications

Absolute Maximum Ratings at Ta=25°C

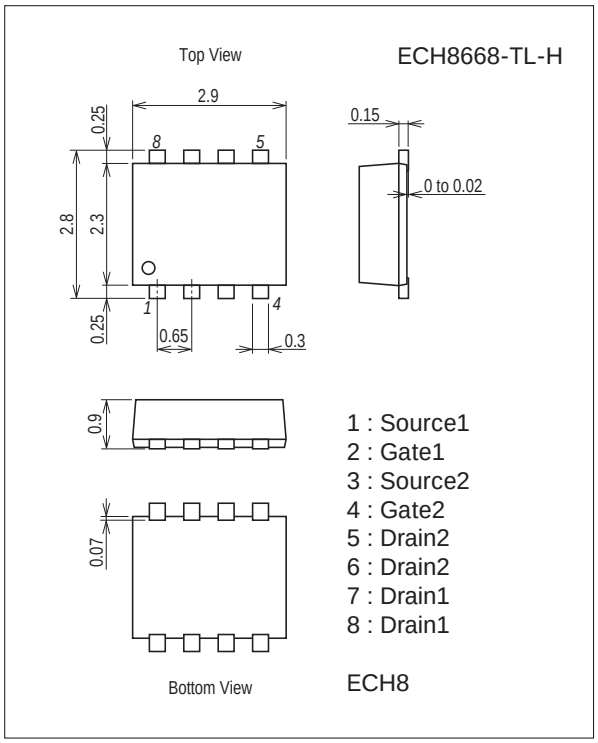
Parameter	Symbol	Conditions	N-channel	P-channel	Unit
Drain-to-Source Voltage	V_{DSS}		20	−20	V
Gate-to-Source Voltage	V_{GSS}		±10	±10	V
Drain Current (DC)	I_D		7.5	−5	A
Drain Current (Pulse)	I_{DP}	PW≤10μs, duty cycle≤1%	40	−40	A
Allowable Power Dissipation	P_D	When mounted on ceramic substrate (900mm^2×0.8mm) 1unit	1.3		W
Total Dissipation	P_T	When mounted on ceramic substrate (900mm^2×0.8mm)	1.5		W
Channel Temperature	Tch		150		°C
Storage Temperature	Tstg		−55 to +150		°C

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

Package Dimensions

unit : mm (typ)

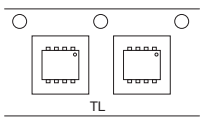
7011A-001



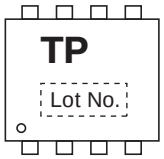
Product & Package Information

- Package : ECH8
- JEITA, JEDEC : -
- Minimum Packing Quantity : 3,000 pcs./reel

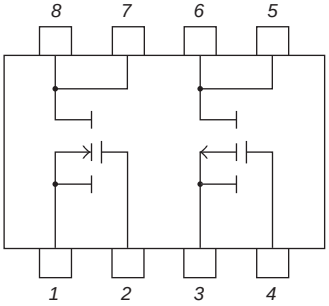
Packing Type : TL



Marking



Electrical Connection

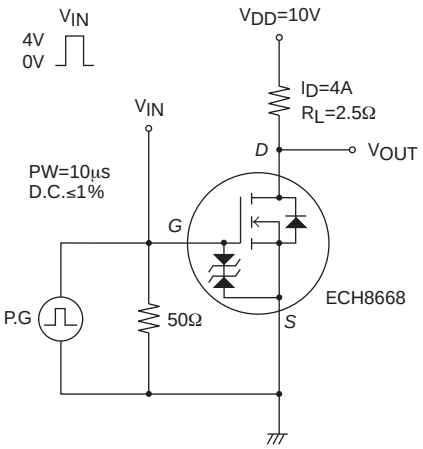


Electrical Characteristics at Ta=25°C

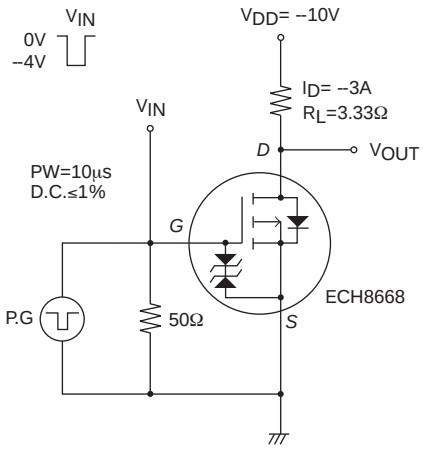
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
[N-channel]						
Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	I_D=1mA, V_{GS}=0V	20			V
Zero-Gate Voltage Drain Current	I_{DSS}	V_{DS}=20V, V_{GS}=0V			1	μA
Gate-to-Source Leakage Current	I_{GSS}	V_{GS}=±8V, V_{DS}=0V			±10	μA
Cutoff Voltage	V_{GS}(off)	V_{DS}=10V, I_D=1mA	0.5		1.3	V
Forward Transfer Admittance	| yfs |	V_{DS}=10V, I_D=4A	4.2	7		S
Static Drain-to-Source On-State Resistance	R_{DS}(on)1	I_D=4A, V_{GS}=4.5V		13	17	mΩ
	R_{DS}(on)2	I_D=2A, V_{GS}=2.5V		18	26	mΩ
	R_{DS}(on)3	I_D=0.5A, V_{GS}=1.8V		30	48	mΩ
Input Capacitance	Ciss	V_{DS}=10V, f=1MHz		1060		pF
Output Capacitance	Coss			180		pF
Reverse Transfer Capacitance	Crss			135		pF
Turn-ON Delay Time	t_d(on)	See specified Test Circuit.		17.5		ns
Rise Time	t_r			120		ns
Turn-OFF Delay Time	t_d(off)			68		ns
Fall Time	t_f			80		ns
Total Gate Charge	Qg	V_{DS}=10V, V_{GS}=4.5V, I_D=7.5A		10.8		nC
Gate-to-Source Charge	Qgs			2.1		nC
Gate-to-Drain “Miller” Charge	Qgd			2.9		nC
Diode Forward Voltage	V_{SD}	I_S=7.5A, V_{GS}=0V		0.74	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		−1.3	V
Forward Transfer Admittance	| yfs |	V_{DS}=−10V, I_D=−3A	4.9	8.3		S
Static Drain-to-Source On-State Resistance	R_{DS}(on)1	I_D=−3A, V_{GS}=−4.5V		29	38	mΩ
	R_{DS}(on)2	I_D=−1.5A, V_{GS}=−2.5V		41	58	mΩ
	R_{DS}(on)3	I_D=−0.5A, V_{GS}=−1.8V		64	98	mΩ
Input Capacitance	Ciss	V_{DS}=−10V, f=1MHz		960		pF
Output Capacitance	Coss			180		pF
Reverse Transfer Capacitance	Crss			140		pF
Turn-ON Delay Time	t_d(on)	See specified Test Circuit.		14		ns
Rise Time	t_r			55		ns
Turn-OFF Delay Time	t_d(off)			92		ns
Fall Time	t_f			68		ns
Total Gate Charge	Qg	V_{DS}=−10V, V_{GS}=−4.5V, I_D=−5A		11		nC
Gate-to-Source Charge	Qgs			2.0		nC
Gate-to-Drain “Miller” Charge	Qgd			2.8		nC
Diode Forward Voltage	V_{SD}	I_S=−5A, V_{GS}=0V		−0.82	−1.2	V

Switching Time Test Circuit

[N-channel]

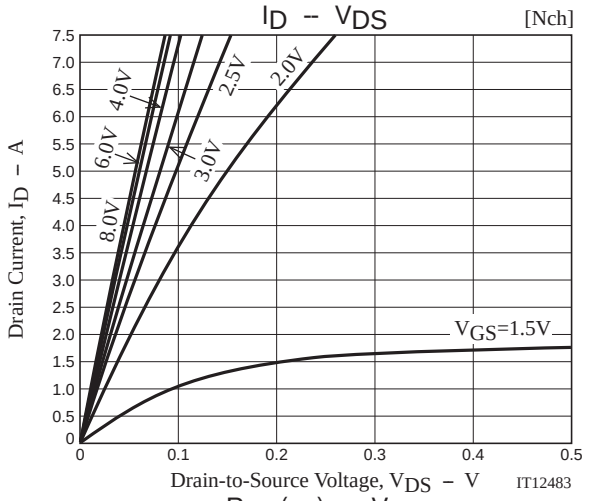


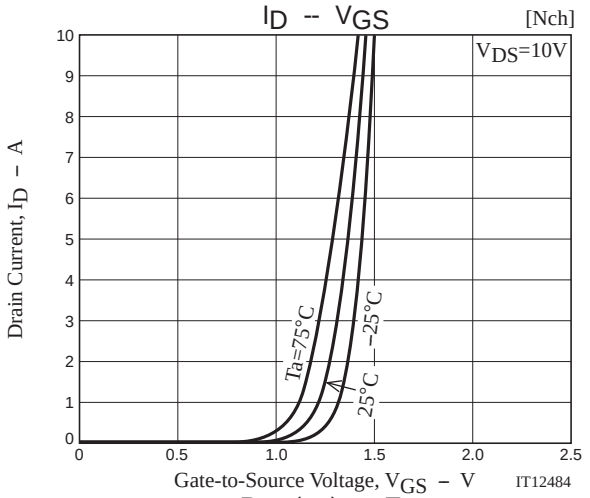
[P-channel]

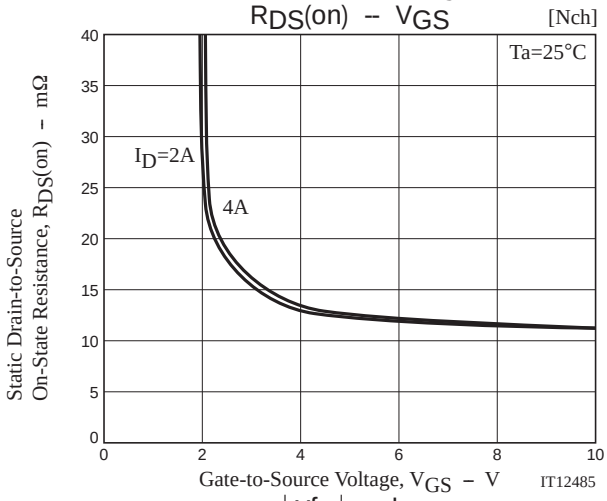


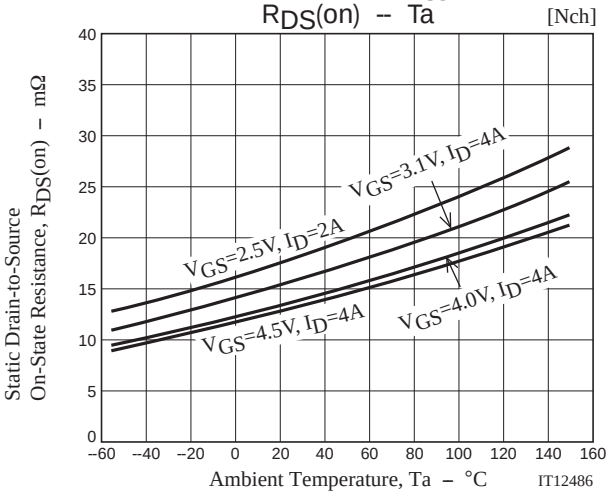
Ordering Information

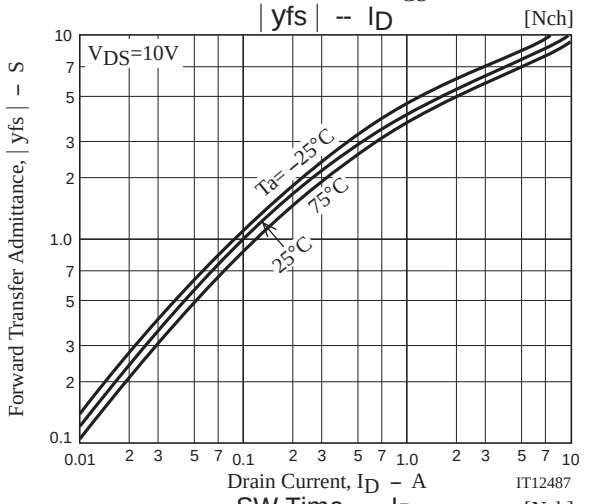
Device	Package	Shipping	memo
ECH8668-TL-H	ECH8	3,000pcs./reel	Pb Free and Halogen Free

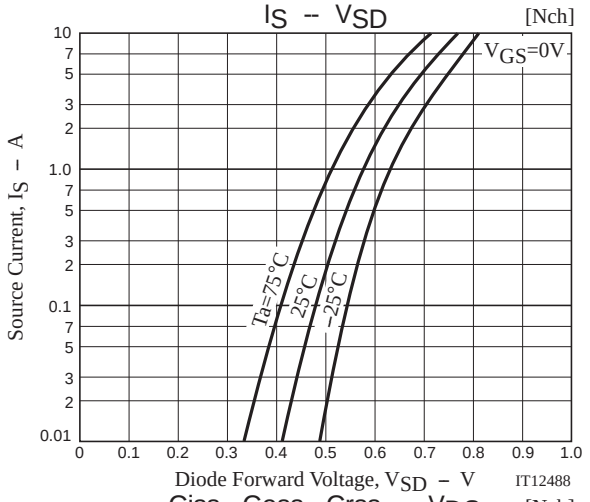

ID -- VDS
[Nch]
Drain Current, ID – A
Drain-to-Source Voltage, VDS – V
IT12483
4.0V
6.0V
8.0V
2.5V
2.0V
3.0V
VGS=1.5V

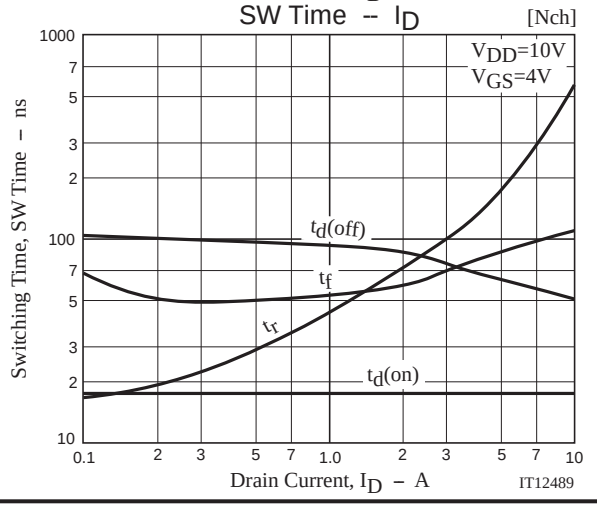

ID -- VGS
[Nch]
VDS=10V
Drain Current, ID – A
Gate-to-Source Voltage, VGS – V
IT12484
Ta=75°C
25°C
–25°C

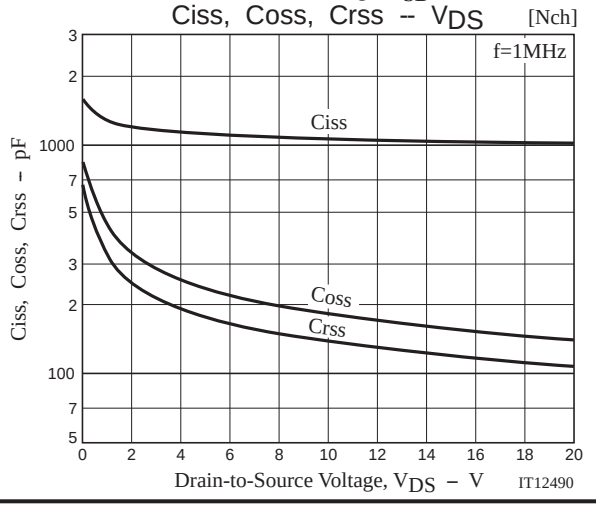

RDS(on) -- VGS
[Nch]
Ta=25°C
Static Drain-to-Source
On-State Resistance, RDS(on) – mΩ
ID=2A
4A
Gate-to-Source Voltage, VGS – V
IT12485

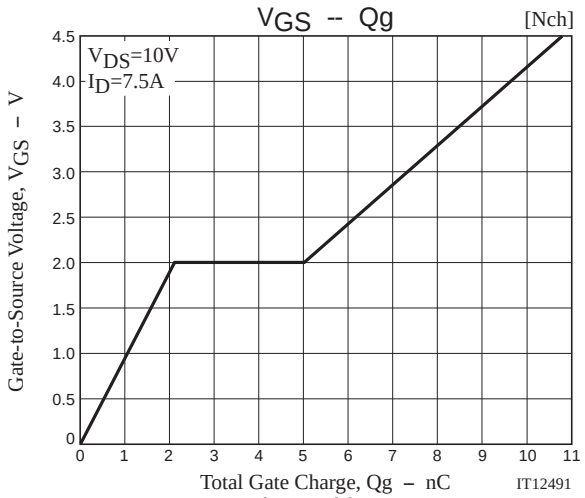

RDS(on) -- Ta
[Nch]
Static Drain-to-Source
On-State Resistance, RDS(on) – mΩ
VGS=3.1V, ID=4A
VGS=2.5V, ID=2A
VGS=4.5V, ID=4A
VGS=4.0V, ID=4A
Ambient Temperature, Ta – °C
IT12486

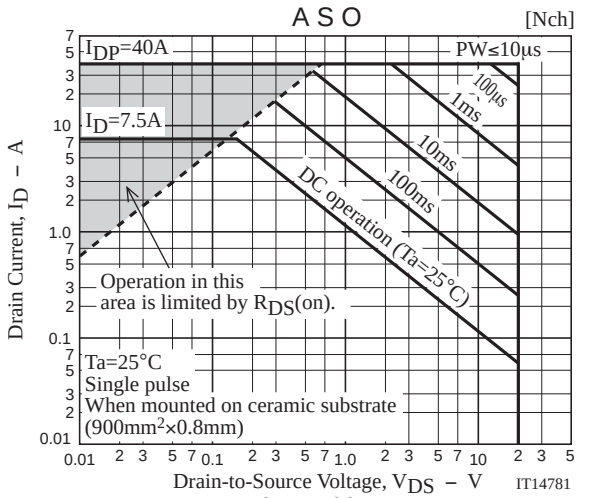

| yfs | -- ID
[Nch]
VDS=10V
Forward Transfer Admittance, | yfs | – S
Ta= –25°C
75°C
25°C
Drain Current, ID – A
IT12487

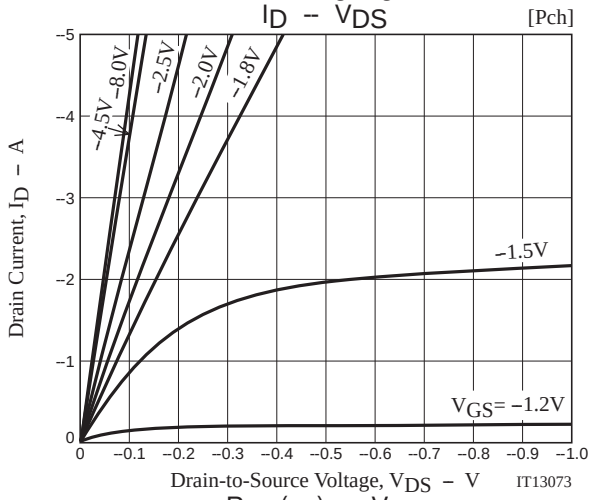

IS -- VSD
[Nch]
VGS=0V
Source Current, IS – A
Ta=75°C
25°C
–25°C
Diode Forward Voltage, VSD – V
IT12488

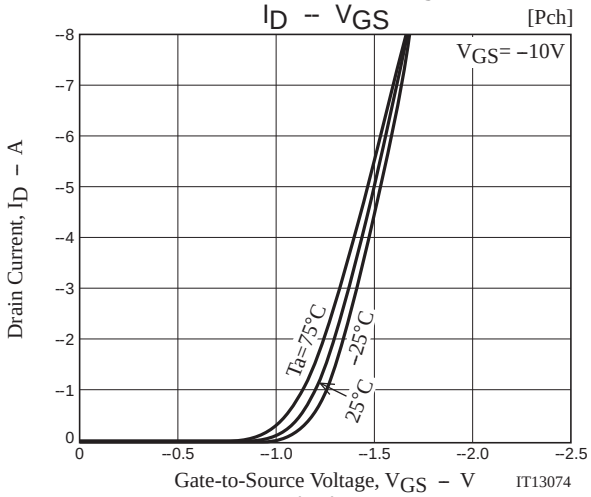

SW Time -- ID
[Nch]
VDD=10V
VGS=4V
Switching Time, SW Time – ns
td(off)
tf
tr
td(on)
Drain Current, ID – A
IT12489

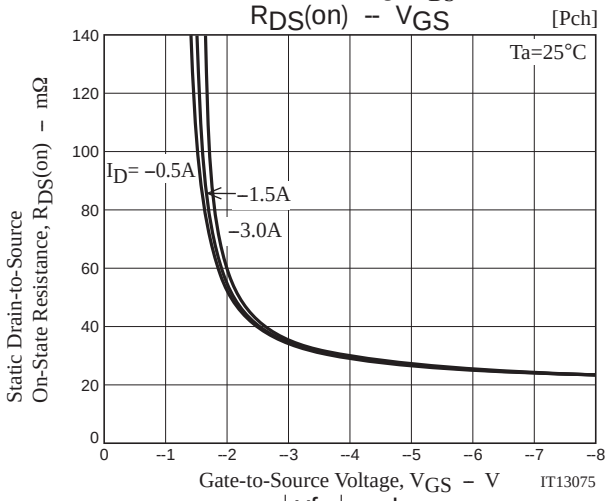

Ciss, Coss, Crss -- VDS
[Nch]
f=1MHz
Ciss, Coss, Crss – pF
Ciss
Coss
Crss
Drain-to-Source Voltage, VDS – V
IT12490

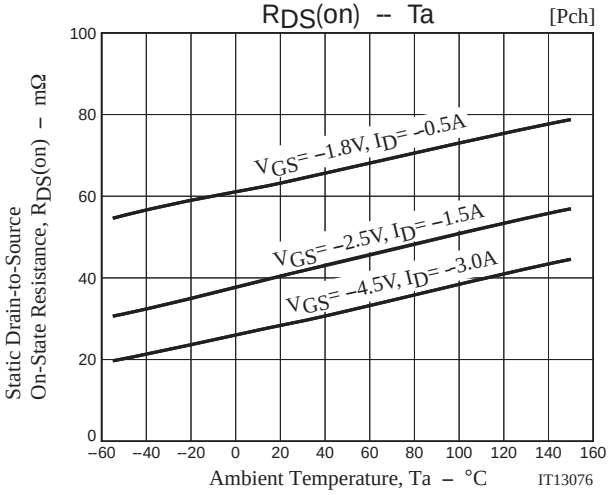

VGS -- Qg
[Nch]
VDS=10V
ID=7.5A
Gate-to-Source Voltage, VGS – V
Total Gate Charge, Qg – nC
IT12491

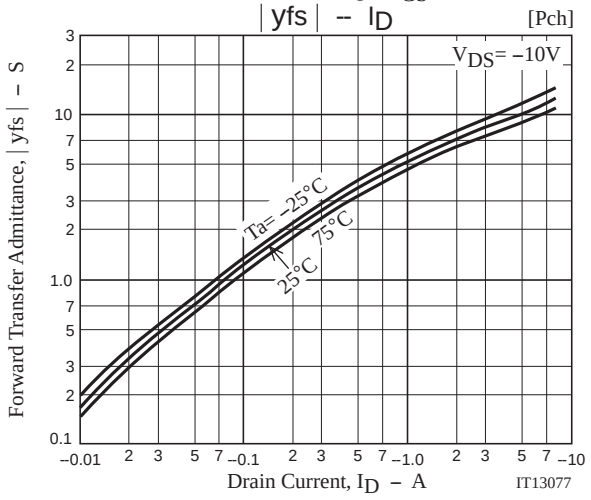

A S O
[Nch]
IDP=40A
PW≤10μs
ID=7.5A
100μs
1ms
10ms
100ms
DC operation (Ta=25°C)
Operation in this
area is limited by RDS(on).
Ta=25°C
Single pulse
When mounted on ceramic substrate
(900mm2×0.8mm)
Drain Current, ID – A
Drain-to-Source Voltage, VDS – V
IT14781

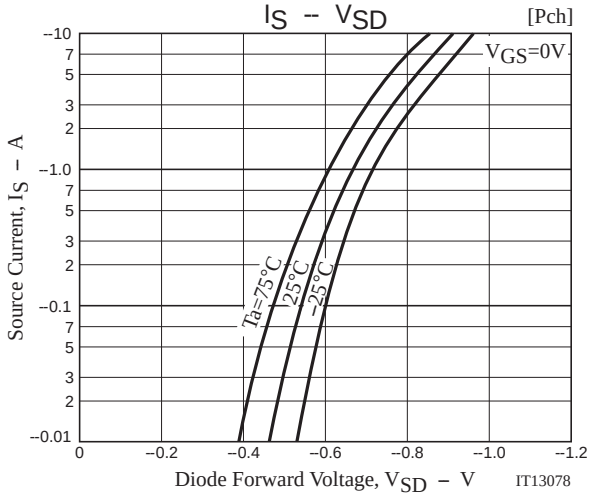

ID -- VDS
[Pch]
–8.0V
–4.5V
–2.5V
–2.0V
–1.8V
–1.5V
VGS= –1.2V
Drain Current, ID – A
Drain-to-Source Voltage, VDS – V
IT13073

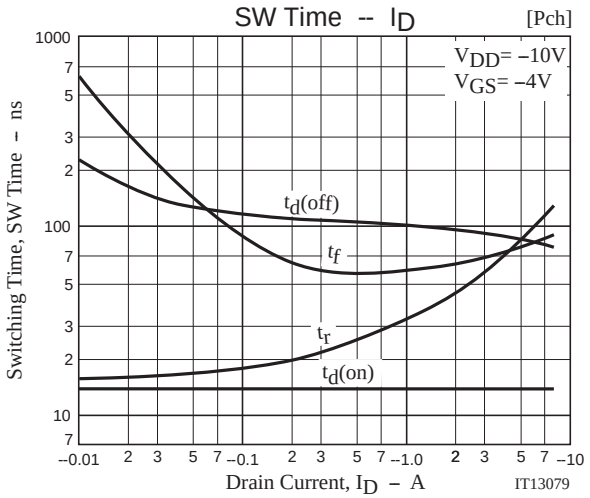

ID -- VGS
[Pch]
VGS= –10V
Ta=75°C
–25°C
25°C
Drain Current, ID – A
Gate-to-Source Voltage, VGS – V
IT13074

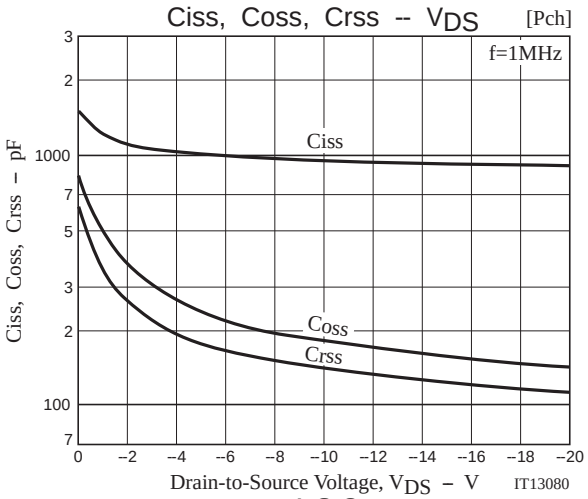

RDS(on) -- VGS
[Pch]
Ta=25°C
ID= –0.5A
–1.5A
–3.0A
Static Drain-to-Source
On-State Resistance, RDS(on) – mΩ
Gate-to-Source Voltage, VGS – V
IT13075

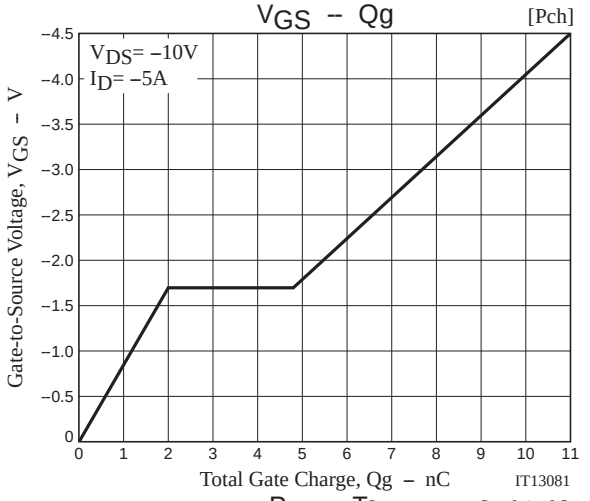

RDS(on) -- Ta
[Pch]
VGS= –1.8V, ID= –0.5A
VGS= –2.5V, ID= –1.5A
VGS= –4.5V, ID= –3.0A
Static Drain-to-Source
On-State Resistance, RDS(on) – mΩ
Ambient Temperature, Ta – °C
IT13076

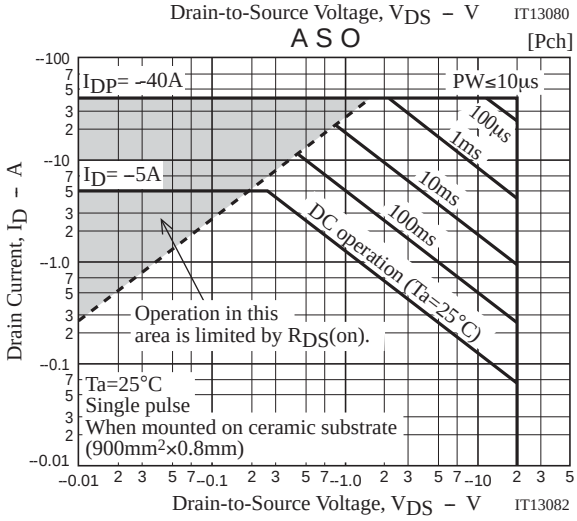

| yfs | -- ID
[Pch]
VDS= –10V
Ta= –25°C
25°C
75°C
Forward Transfer Admittance, | yfs | – S
Drain Current, ID – A
IT13077

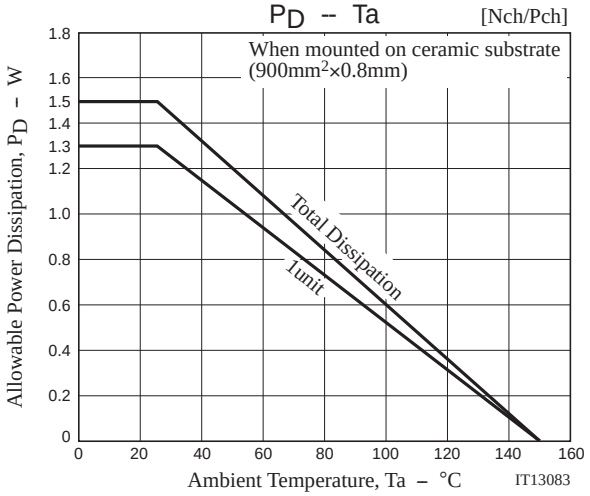

IS -- VSD
[Pch]
VGS=0V
Ta=75°C
25°C
–25°C
Source Current, IS – A
Diode Forward Voltage, VSD – V
IT13078


SW Time -- ID
[Pch]
VDD= −10V
VGS= −4V
td(off)
tf
tr
td(on)
Switching Time, SW Time – ns
Drain Current, ID – A
IT13079


Ciss, Coss, Crss -- VDS
[Pch]
f=1MHz
Ciss
Coss
Crss
Ciss, Coss, Crss – pF
Drain-to-Source Voltage, VDS – V
IT13080


VGS -- Qg
[Pch]
VDS= −10V
ID= −5A
Gate-to-Source Voltage, VGS – V
Total Gate Charge, Qg – nC
IT13081


A S O
[Pch]
IDP= −40A
PW≤10μs
ID= −5A
100μs
1ms
10ms
100ms
DC operation (Ta=25°C)
Operation in this
area is limited by RDS(on).
Ta=25°C
Single pulse
When mounted on ceramic substrate
(900mm2×0.8mm)
Drain Current, ID – A
Drain-to-Source Voltage, VDS – V
IT13082


PD -- Ta
[Nch/Pch]
When mounted on ceramic substrate
(900mm2×0.8mm)
Total Dissipation
1unit
Allowable Power Dissipation, PD – W
Ambient Temperature, Ta – °C
IT13083

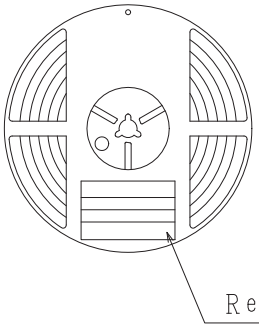
Embossed Taping Specification

ECH8668-TL-H

1. Packing Format

Package Name	Carrier Tape Type	Maximum Number of devices contained (pcs)			Packing format	
		Reel	Inner box	Outer box	Inner BOX (C-1)	Outer BOX (A-7)
ECH8	CPH6	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

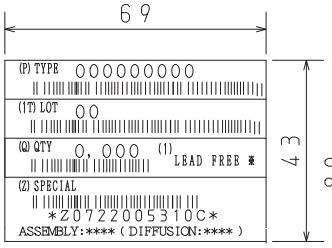
Packing method



Type No.
LOT No.
Quantity
Origin

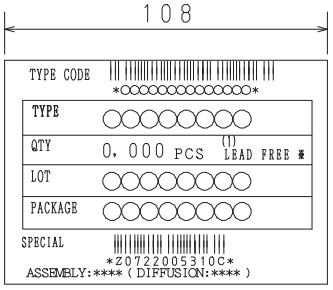
Reel label

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.

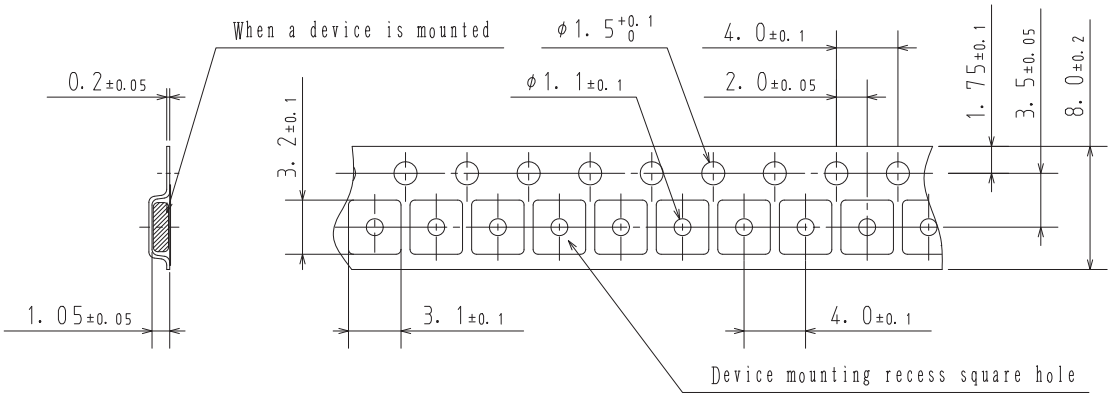


NOTE (1)
The LEAD FREE ※ description shows that the surface treatment of the terminal is lead free.

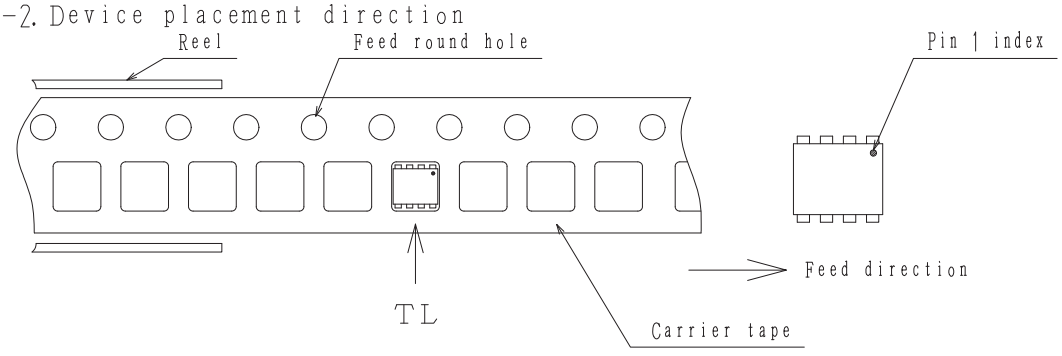
Label	JEITA Phase
LEAD FREE 3	JEITA Phase 3A
LEAD FREE 4	JEITA Phase 3

2. Taping configuration

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



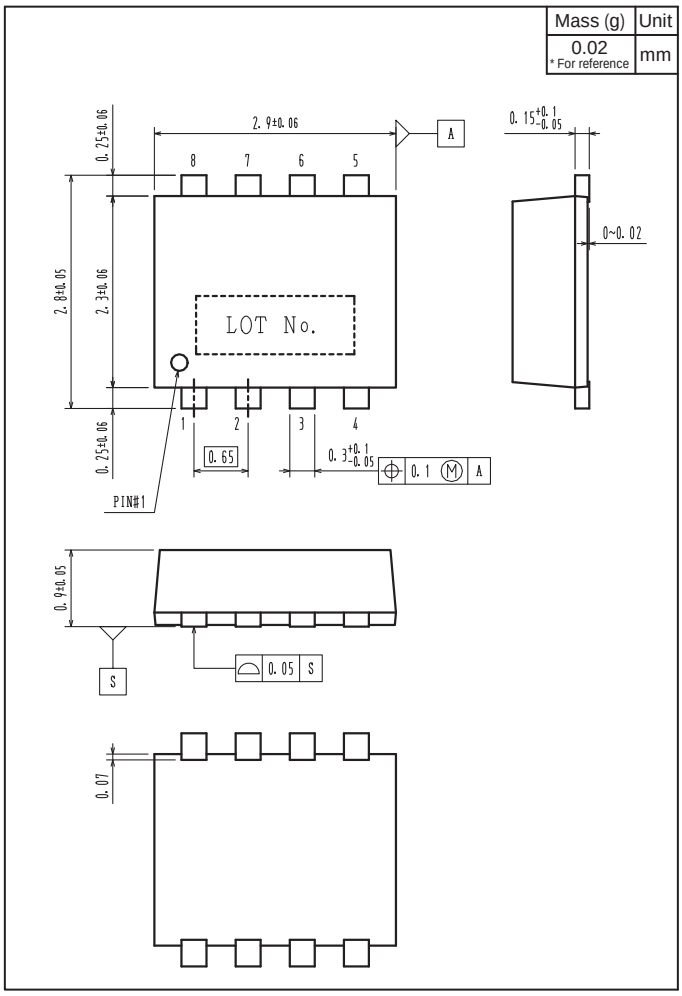
2-2. Device placement direction



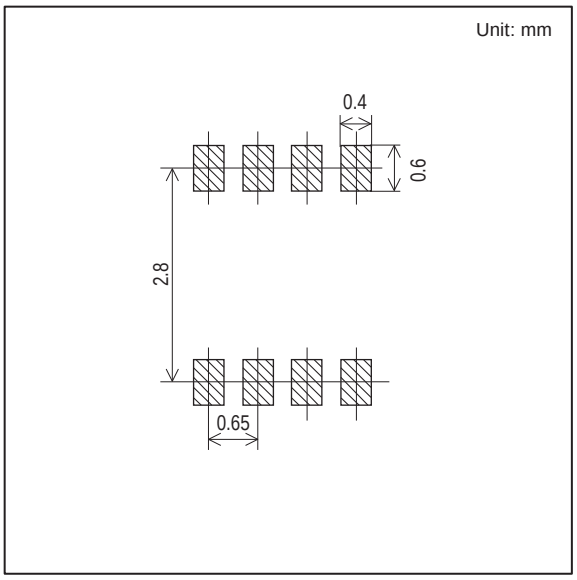
Those with pin 1 index on the feed hole side·····TL

Outline Drawing

ECH8668-TL-H



Land Pattern Example



Note on usage : Since the ECH8668 is a MOSFET product, please avoid using this device in the vicinity of highly charged objects.