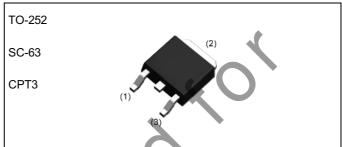
Pch -100V -13A Power MOSFET

V _{DSS}	-100V
R _{DS(on)} (Max.)	200mΩ
I _D	±13A
P _D	20W

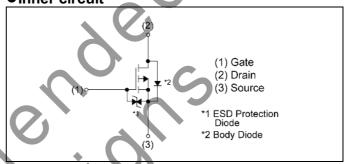
● Outline



Features

- 1) Low on resistance
- 2) Fast switching speed
- 3) Drive circuits can be simple
- 4) Parallel use is easy
- 5) Pb-free lead plating; RoHS compliant

•Inner circuit



Packaging specifications

Packing	Embossed Tape
Reel size (mm)	330
Tape width (mm)	16
Basic ordering unit (pcs)	2500
Taping code	TL
Marking	131P10
	Reel size (mm) Tape width (mm) Basic ordering unit (pcs) Taping code

Application

Switching

● **Absolute maximum ratings** (T_a = 25°C ,unless otherwise specified)

• ,	• ,		
Parameter	Symbol	Value	Unit
Drain - Source voltage	V _{DSS}	-100	V
Continuous drain current	I _D *1	±13	Α
Pulsed drain current	I _{DP} *2	±52	А
Gate - Source voltage	V_{GSS}	±20	V
Power dissipation	P _D *1	20	W
Junction temperature	T _j	150	°C
Operating junction and storage temperature range	T _{stg}	-55 to +150	°C

●Thermal resistance

Parameter	Symbol	Values			Lloit
		Min.	Тур.	Max.	Unit
Thermal resistance, junction - case	R _{thJC} *1	-	1	6.25	°C/W

● Electrical characteristics (T_a = 25°C)

Parameter	Symbol	Conditions	Values			Unit
	Gyrribor	Conditions	Min,	Тур.	Max.	Offic
Drain - Source breakdown voltage	V _{(BR)DSS}	$V_{GS} = 0V$, $I_D = -1mA$	-100	-	-	V
Breakdown voltage	$\Delta V_{(BR)DSS}$	I _D = -1mA	Ö	-91.3	-	mV/°C
temperature coefficient	ΔT_{j}	referenced to 25°C		01.0		
Zero gate voltage drain current	I _{DSS}	$V_{DS} = -100V, V_{GS} = 0V$		S	-1	μA
Gate - Source leakage current	I _{GSS}	$V_{GS} = \pm 20V, V_{DS} = 0V$	-	-	±10	μA
Gate threshold voltage	$V_{GS(th)}$	$V_{DS} = -10V, I_{D} = -1mA$	-1.0	1	-2.5	V
Gate threshold voltage temperature coefficient	$\frac{\Delta V_{GS(th)}}{\Delta T_{j}}$	I _D = -1mA referenced to 25°C	- (3.0	-	mV/°C
		$V_{GS} = -10V, I_D = -6.5A$	-	135	200	
Static drain - source on - state resistance	R _{DS(on)} *3	$V_{GS} = -4.5V, I_D = -6.5A$	-	150	220	mΩ
on state resistance)	V _{GS} = -4.0V, I _D = -6.5A	-	155	230	
Gate resistance	R _G	f = 1MHz, open drain	-	6.0	-	Ω
Forward Transfer Admittance	Yfs *3	V _{DS} = -10V, I _D = -13A	10	-	-	S

^{*1} Tc=25°C, Limited only by maximum temperature allowed.

^{*2} Pw \leq 10 μ s, Duty cycle \leq 1%

³ Pulsed

● Electrical characteristics (T_a = 25°C)

Darameter	Cymahal	Conditions	Values			l leit
Parameter	Symbol	Symbol Conditions Min. Typ.		Тур.	Max.	Unit
Input capacitance	C _{iss}	V _{GS} = 0V	-	2400	-	
Output capacitance	C_{oss}	V _{DS} = -25V	-	100	- \	pF
Reverse transfer capacitance	C_{rss}	f = 1MHz	-	65	(-)	
Turn - on delay time	t _{d(on)} *3	$V_{DD} \simeq -50V, V_{GS} = -10V$	-	20	-	
Rise time	t _r *3	I _D = -6.5A	-	25	-	
Turn - off delay time	t _{d(off)} *3	R _L ~ 7.68Ω	0	70	-	ns
Fall time	t _f *3	$R_G = 10\Omega$		60	-	

● Gate charge characteristics (T_a = 25°C)

	\			_		
Parameter	Symbol	Conditions	5	Values		Unit
	Gymbol	Odriditions	Min.	Тур.	Max.	Offic
Total gate charge	Q _g *3	V _{DD} ≈ -50V,	-	40	-	
Gate - Source charge	Q _{gs} *3	$I_D = -13A$,	-	6	-	nC
Gate - Drain charge	Q _{gd} *3	$V_{GS} = -10V$	-	6	-	

● Body diode electrical characteristics (Source-Drain) (T_a = 25°C)

Parameter	Symbol	Conditions		Values		Unit	
Parameter	Symbol	Conditions	Min.	Тур.	Max.	Offic	
Continuous forward current	I _S	T = 25°C	-	-	-13	Α	
Pulse forward current	I _{SP} *2	T _a = 25℃	-	-	-52	Α	
Forward voltage	V _{SD} *3	V _{GS} = 0V, I _S = -13A	-	-	-1.2	V	

Fig.1 Power Dissipation Derating Curve

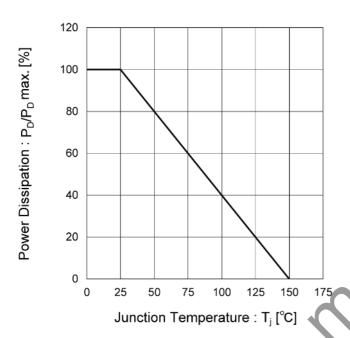
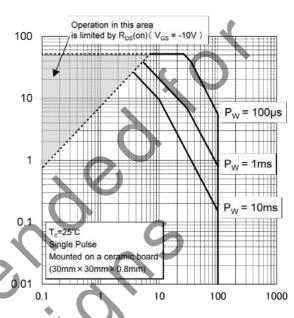


Fig.2 Maximum Safe Operating Area



Drain Current: -l_D [A]

Drain - Source Voltage : -V_{DS} [V]

Fig.3 Normalized Transient Thermal Resistance vs. Pulse Width

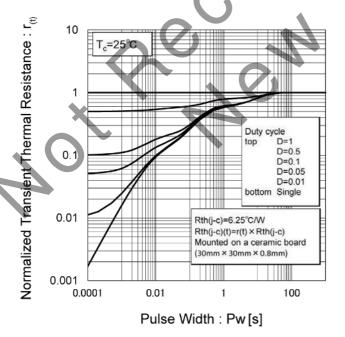
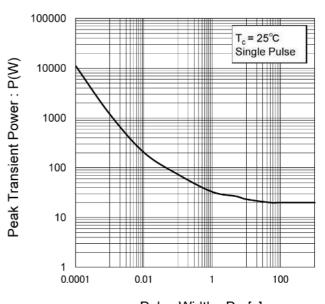


Fig.4 Single Pulse Maximum Power dissipation



Pulse Width: Pw[s]

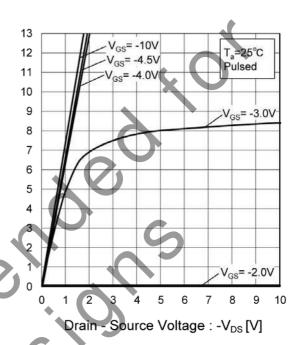
Drain Current : -I_D [A]

• Electrical characteristic curves

Fig.5 Typical Output Characteristics(I)

13 T_a=25°C 12 Pulsed 11 10 9 V_{GS}= -10V 8 V_{GS}= -4.5V 7 V_{GS}= -4.0V 6 $V_{GS} = -3.0V$ 5 4 3 2 /V_{GS}= -2.0V 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 0 Drain - Source Voltage : -VDS [V]

Fig.6 Typical Output Characteristics(II)



Drain Current: -I_D [A]

Fig.7 Breakdown Voltage vs.
Junction Temperature

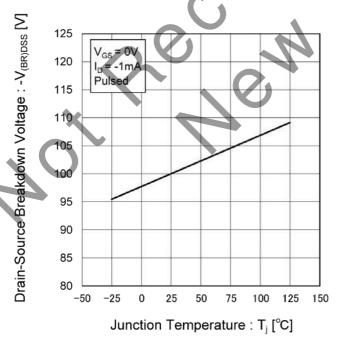


Fig.8 Typical Transfer Characteristics

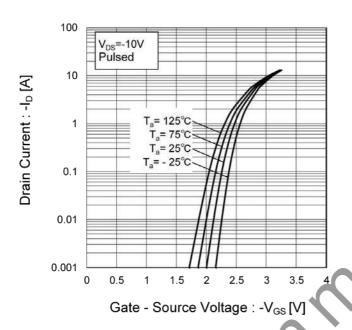


Fig.9 Gate Threshold Voltage vs.
Junction Temperature

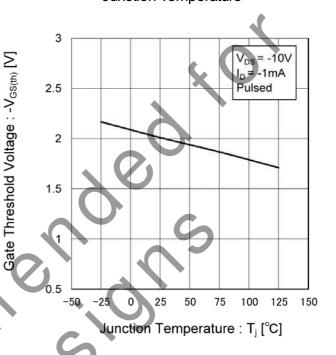
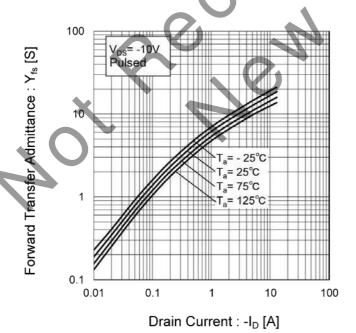


Fig.10 Forward Transfer Admittance vs.

Drain Current



ROHM

Fig.11 Drain Current Derating Curve

Fig.12 Static Drain - Source On - State Resistance vs. Gate Source Voltage

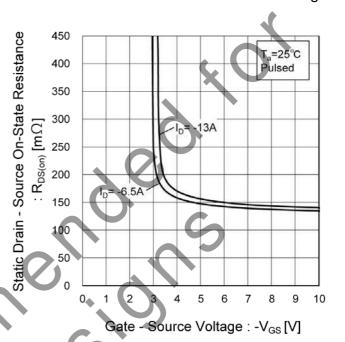
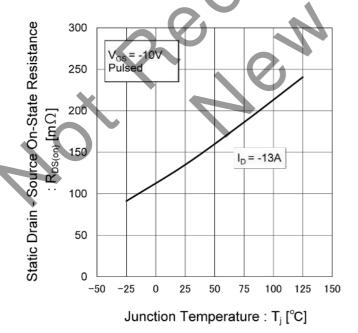


Fig.13 Static Drain - Source On - State

Resistance vs. Junction Temperature

Junction Temperature : T_i [°C]



7/11

Fig.14 Static Drain - Source On - State Resistance vs. Drain Current (I)

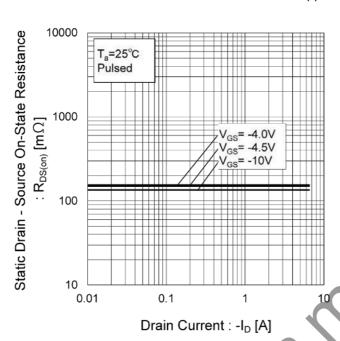


Fig.15 Static Drain - Source On - State Resistance vs. Drain Current (II)

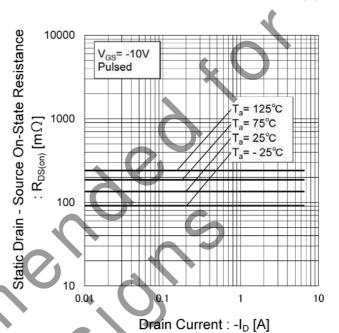
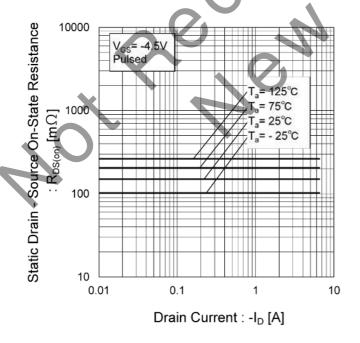


Fig.16 Static Drain - Source On - State
Resistance vs. Drain Current (III)

Fig.17 Static Drain - Source On - State
Resistance vs. Drain Current (IV)



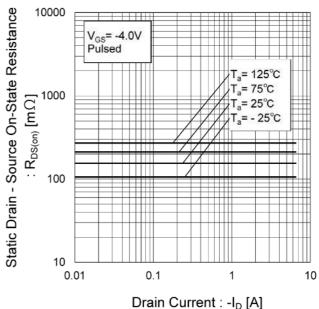


Fig.18 Typical Capacitance vs.

Drain - Source Voltage

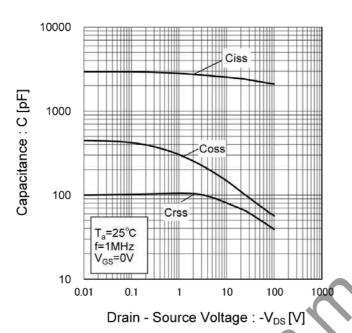


Fig.19 Switching Characteristics

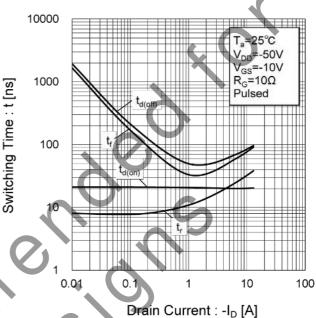


Fig.20 Dynamic Input Characteristics

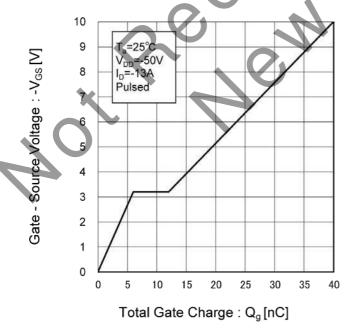
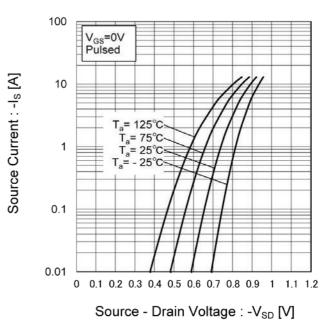


Fig.21 Source Current vs.

Source Drain Voltage



9/11

Measurement circuits

Fig.1-1 Switching Time Measurement Circuit

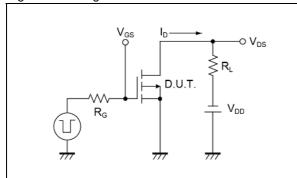


Fig.2-1 Gate Charge Measurement Circuit

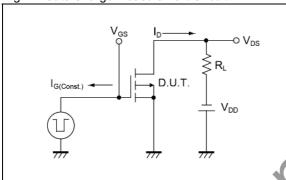


Fig.1-2 Switching Waveforms

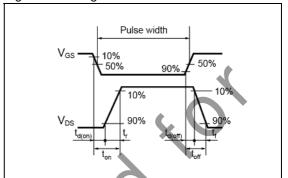
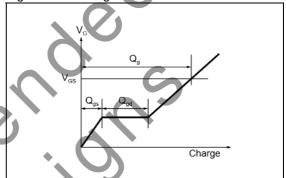
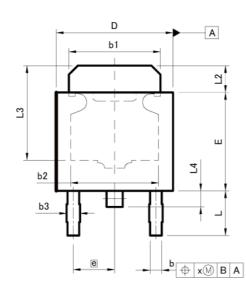


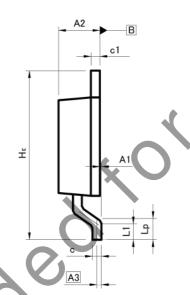
Fig.2-2 Gate Charge Waveform

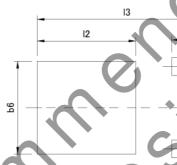


Dimensions

TO-252 DPAK (CPT3)







Pattern of terminal position areas [Not a pattern of soldering pads]

DIM	MILIME	TERS	INC	HES
	MIN	MAX	MIN	MAX
A1	0.00	0.15	0.000	0.006
A2	2.20	2.50	0.087	0.098
A3	0.2	5	0.0	10
Ь	0.55	0.75	0.022	0.030
b1	5.00	5.30	0.197	0.209
b2	4.9	0	0.1	93
b3	0.7	5	0.0	30
C	0.40	0.60	0.016	0.024
c1	0.40	0.60	0.016	0.024
D	6.30	6.70	0.248	0.264
E	5.40	5.80	0.213	0.228
е	2.3	0	0.0	91
HE	9.00	10.00	0.354	0.394
L	2.20	2.80	0.087	0.110
L1	0.80	1.40	0.031	0.055
L2	1.20	1.80	0.047	0.071
L3	5.3	0	0.2	09
L4	0.9	0	0.0	35
Lp	1.00	1.60	0.039	0.063
×	127	0.25	77	0.010

DIM	MILIM	MILIMETERS		HES
DIM	MIN	MAX	MIN	MAX
b5		1.00		0.04
b6	2	5.20	=	0.205
11	/ = 2	2.50		0.098
12	100	5.50	30	0.217
13	9220	10.00	F-200	0.204

Dimension in mm/inches



Notice

Precaution on using ROHM Products

Our Products are designed and manufactured for application in ordinary electronic equipments (such as AV equipment, OA equipment, telecommunication equipment, home electronic appliances, amusement equipment, etc.). If you intend to use our Products in devices requiring extremely high reliability (such as medical equipment (Note 1), transport equipment, traffic equipment, aircraft/spacecraft, nuclear power controllers, fuel controllers, car equipment including car accessories, safety devices, etc.) and whose malfunction or failure may cause loss of human life, bodily injury or serious damage to property ("Specific Applications"), please consult with the ROHM sales representative in advance. Unless otherwise agreed in writing by ROHM in advance, ROHM shall not be in any way responsible or liable for any damages, expenses or losses incurred by you or third parties arising from the use of any ROHM's Products for Specific Applications.

(Note1) Medical Equipment Classification of the Specific Applications

JAPAN	USA	EU	CHINA
CLASSⅢ	CLASSⅢ	CLASS II b	CLASSII
CLASSIV	CLASSIII	CLASSⅢ	CLASSII

- 2. ROHM designs and manufactures its Products subject to strict quality control system. However, semiconductor products can fail or malfunction at a certain rate. Please be sure to implement, at your own responsibilities, adequate safety measures including but not limited to fail-safe design against the physical injury, damage to any property, which a failure or malfunction of our Products may cause. The following are examples of safety measures:
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 - [b] Installation of redundant circuits to reduce the impact of single or multiple circuit failure
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 - [b] Use of our Products outdoors or in places where the Products are exposed to direct sunlight or dust
 - [c] Use of our Products in places where the Products are exposed to sea wind or corrosive gases, including Cl₂, H₂S, NH₃, SO₂, and NO₂
 - [d] Use of our Products in places where the Products are exposed to static electricity or electromagnetic waves
 - [e] Use of our Products in proximity to heat-producing components, plastic cords, or other flammable items
 - [f] Sealing or coating our Products with resin or other coating materials
 - [g] Use of our Products without cleaning residue of flux (even if you use no-clean type fluxes, cleaning residue of flux is recommended); or Washing our Products by using water or water-soluble cleaning agents for cleaning residue after soldering
 - [h] Use of the Products in places subject to dew condensation
- 4. The Products are not subject to radiation-proof design.
- 5. Please verify and confirm characteristics of the final or mounted products in using the Products.
- 6. In particular, if a transient load (a large amount of load applied in a short period of time, such as pulse. is applied, confirmation of performance characteristics after on-board mounting is strongly recommended. Avoid applying power exceeding normal rated power, exceeding the power rating under steady-state loading condition may negatively affect product performance and reliability.
- 7 De-rate Power Dissipation depending on ambient temperature. When used in sealed area, confirm that it is the use in the range that does not exceed the maximum junction temperature.
- 8. Confirm that operation temperature is within the specified range described in the product specification.
- 9. ROHM shall not be in any way responsible or liable for failure induced under deviant condition from what is defined in this document.

Precaution for Mounting / Circuit board design

- 1. When a highly active halogenous (chlorine, bromine, etc.) flux is used, the residue of flux may negatively affect product performance and reliability.
- 2. In principle, the reflow soldering method must be used on a surface-mount products, the flow soldering method must be used on a through hole mount products. If the flow soldering method is preferred on a surface-mount products, please consult with the ROHM representative in advance.

For details, please refer to ROHM Mounting specification

Precautions Regarding Application Examples and External Circuits

- 1. If change is made to the constant of an external circuit, please allow a sufficient margin considering variations of the characteristics of the Products and external components, including transient characteristics, as well as static characteristics.
- 2. You agree that application notes, reference designs, and associated data and information contained in this document are presented only as guidance for Products use. Therefore, in case you use such information, you are solely responsible for it and you must exercise your own independent verification and judgment in the use of such information contained in this document. ROHM shall not be in any way responsible or liable for any damages, expenses or losses incurred by you or third parties arising from the use of such information.

Precaution for Electrostatic

This Product is electrostatic sensitive product, which may be damaged due to electrostatic discharge. Please take proper caution in your manufacturing process and storage so that voltage exceeding the Products maximum rating will not be applied to Products. Please take special care under dry condition (e.g. Grounding of human body / equipment / solder iron, isolation from charged objects, setting of lonizer, friction prevention and temperature / humidity control).

Precaution for Storage / Transportation

- 1. Product performance and soldered connections may deteriorate if the Products are stored in the places where:
 - [a] the Products are exposed to sea winds or corrosive gases, including Cl2, H2S, NH3, SO2, and NO2
 - [b] the temperature or humidity exceeds those recommended by ROHM
 - [c] the Products are exposed to direct sunshine or condensation
 - [d] the Products are exposed to high Electrostatic
- 2. Even under ROHM recommended storage condition, solderability of products out of recommended storage time period may be degraded. It is strongly recommended to confirm solderability before using Products of which storage time is exceeding the recommended storage time period.
- 3. Store / transport cartons in the correct direction, which is indicated on a carton with a symbol. Otherwise bent leads may occur due to excessive stress applied when dropping of a carton.
- 4. Use Products within the specified time after opening a humidity barrier bag. Baking is required before using Products of which storage time is exceeding the recommended storage time period.

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A two-dimensional barcode printed on ROHM Products label is for ROHM's internal use only.

Precaution for Disposition

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- 3. The information contained in this document is provided on an "as is" basis and ROHM does not warrant that all information contained in this document is accurate an d/or error-free. ROHM shall not be in an y way responsible or liable for any damages, expenses or losses incurred by you or third parties resulting from inaccuracy or errors of or concerning such information.