

V_{DSS}	30V
$R_{DS(on)}(Max.)$	17.6m Ω
I_D	$\pm 8A$
P_D	2W

●Features

- 1) Low on - resistance.
- 2) High power small mold package (HUML2020L8).
- 3) Pb-free lead plating ; RoHS compliant
- 4) Halogen free
- 5) 100% Rg and UIS tested.

●Application

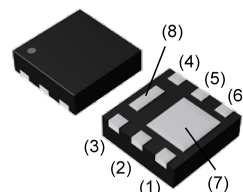
Switching

●Absolute maximum ratings ($T_a = 25^\circ C$)

Parameter	Symbol	Value	Unit
Drain - Source voltage	V_{DSS}	30	V
Continuous drain current	I_D	± 8	A
Pulsed drain current	$I_{D,pulse}^{*1}$	± 32	A
Gate - Source voltage	V_{GSS}	± 20	V
Power dissipation	P_D^{*2}	2	W
Junction temperature	T_j	150	$^\circ C$
Range of storage temperature	T_{stg}	-55 to +150	$^\circ C$

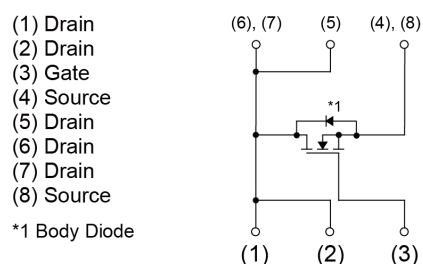
●Outline

HUML2020L8



DFN2020-8S

●Inner circuit



●Packaging specifications

Type	Packing	Embossed Tape
	Reel size (mm)	180
	Tape width (mm)	8
	Basic ordering unit (pcs)	3000
	Taping code	TR
	Marking	HC

● Thermal resistance

Parameter	Symbol	Values			Unit
		Min.	Typ.	Max.	
Thermal resistance, junction - ambient	R_{thJA}^{*2}	-	-	62.5	°C/W

● Electrical characteristics ($T_a = 25^\circ\text{C}$)

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Drain - Source breakdown voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 1mA$	30	-	-	V
Breakdown voltage temperature coefficient	$\frac{\Delta V_{(BR)DSS}}{\Delta T_j}$	$I_D = 1mA$ referenced to 25°C	-	28	-	mV/°C
Zero gate voltage drain current	I_{DSS}	$V_{DS} = 30V, V_{GS} = 0V$	-	-	1	μA
Gate - Source leakage current	I_{GSS}	$V_{GS} = \pm 20V, V_{DS} = 0V$	-	-	±100	nA
Gate threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	1.0	-	2.5	V
Gate threshold voltage temperature coefficient	$\frac{\Delta V_{GS(th)}}{\Delta T_j}$	$I_D = 1mA$ referenced to 25°C	-	-3.87	-	mV/°C
Static drain - source on - state resistance	$R_{DS(on)}^{*3}$	$V_{GS} = 10V, I_D = 8A$	-	13.5	17.6	mΩ
		$V_{GS} = 4.5V, I_D = 8A$	-	17.6	22.8	
Gate input resistance	R_G	f=1MHz, open drain	-	2.5	-	Ω
Forward Transfer Admittance	$ Y_{fs} ^{*3}$	$V_{DS} = 5V, I_D = 8A$	5	-	-	S

*1 $P_w \leq 10\mu s$, Duty cycle $\leq 1\%$

*2 Mounted on Cu Board (40×40×0.8mm)

*3 Pulsed

●Electrical characteristics ($T_a = 25^\circ\text{C}$)

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Input capacitance	C_{iss}	$V_{GS} = 0V$	-	295	-	pF
Output capacitance	C_{oss}	$V_{DS} = 15V$	-	89	-	
Reverse transfer capacitance	C_{rss}	$f = 1\text{MHz}$	-	24	-	
Turn - on delay time	$t_{d(on)}^{*3}$	$V_{DD} \approx 15V, V_{GS} = 10V$	-	6.9	-	ns
Rise time	t_r^{*3}	$I_D = 4A$	-	3.6	-	
Turn - off delay time	$t_{d(off)}^{*3}$	$R_L \approx 3.75\Omega$	-	17.3	-	
Fall time	t_f^{*3}	$R_G = 10\Omega$	-	2.4	-	

●Gate charge characteristics ($T_a = 25^\circ\text{C}$)

Parameter	Symbol	Conditions		Values			Unit
				Min.	Typ.	Max.	
Total gate charge	Q_g^{*3}	$V_{DD} \approx 15V$ $I_D = 8A$	$V_{GS} = 10V$	-	5.8	-	nC
Gate - Source charge	Q_{gs}^{*3}		$V_{GS} = 4.5V$	-	2.8	-	
Gate - Drain charge	Q_{gd}^{*3}			-	1.4	-	
				-	0.5	-	

●Body diode electrical characteristics (Source-Drain) ($T_a = 25^\circ\text{C}$)

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Body diode continuous forward current	I_S	$T_a = 25^\circ\text{C}$	-	-	1.67	A
Body diode pulse current	I_{SP}^{*1}		-	-	32	A
Forward voltage	V_{SD}^{*3}	$V_{GS} = 0V, I_S = 1.67A$	-	-	1.2	V

●Electrical characteristic curves

Fig.1 Power Dissipation Derating Curve

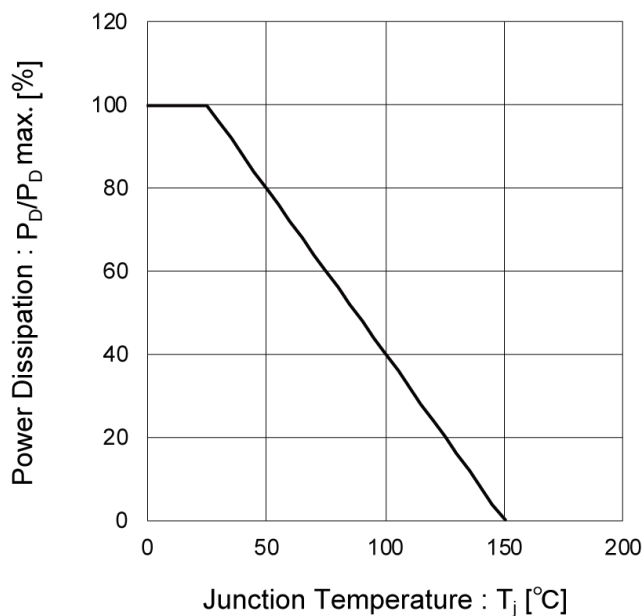


Fig.2 Maximum Safe Operating Area

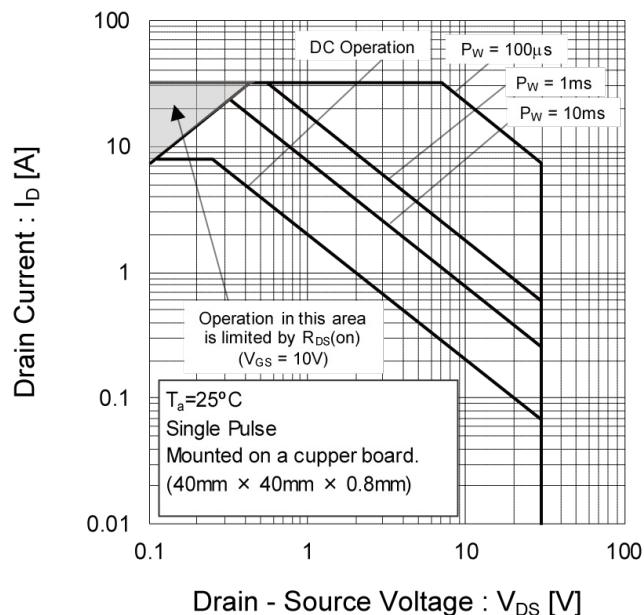


Fig.3 Normalized Transient Thermal Resistance vs. Pulse Width

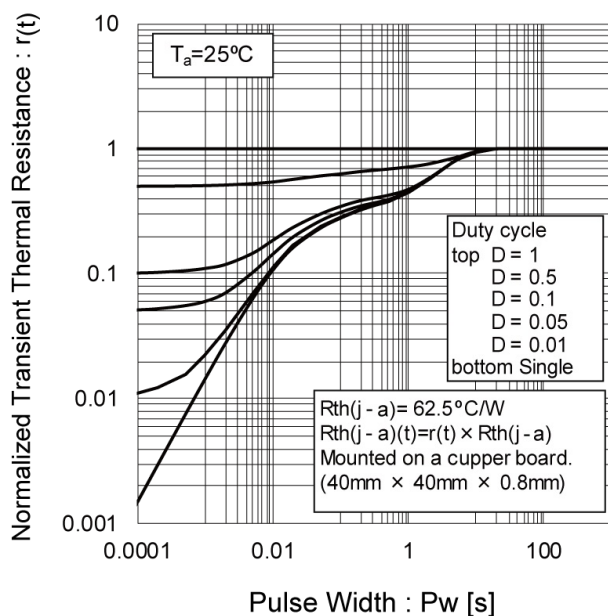
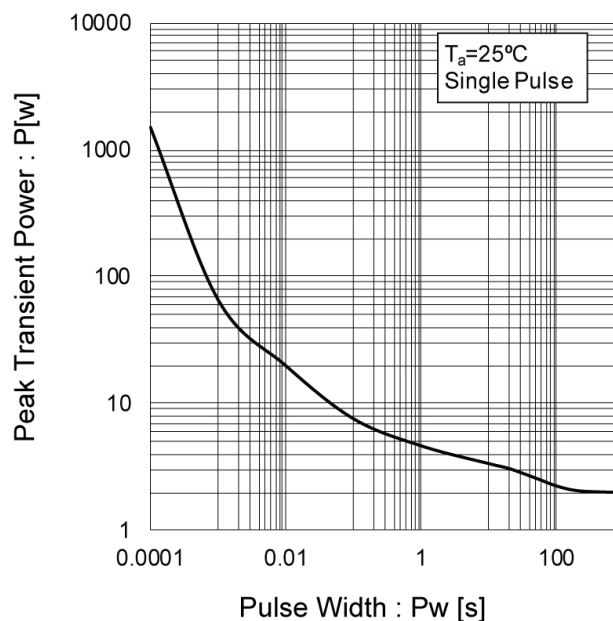


Fig.4 Single Pulse Maximum Power dissipation



●Electrical characteristic curves

Fig.5 Typical Output Characteristics(I)

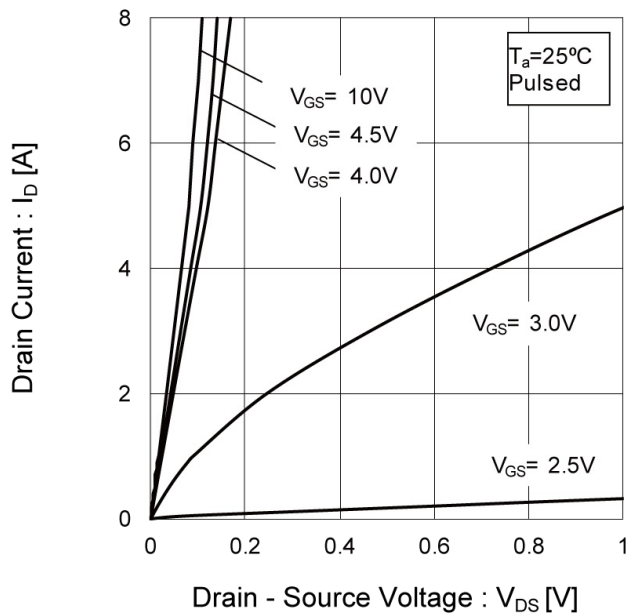


Fig.6 Typical Output Characteristics(II)

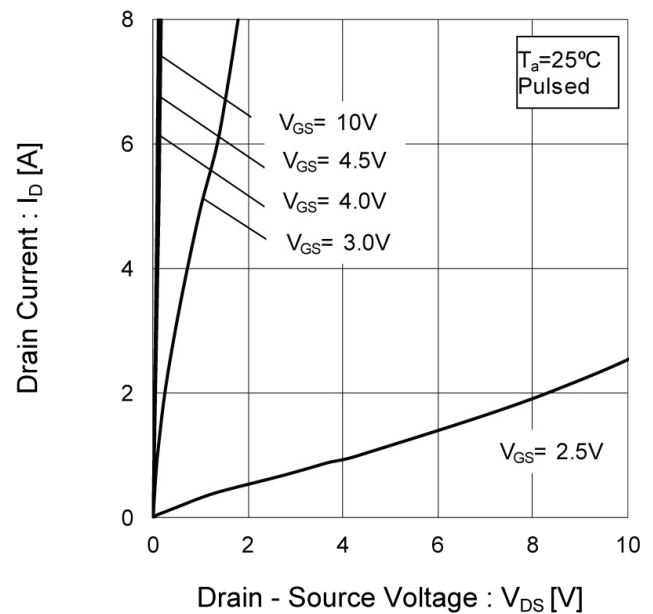


Fig.7 Breakdown Voltage vs. Junction Temperature

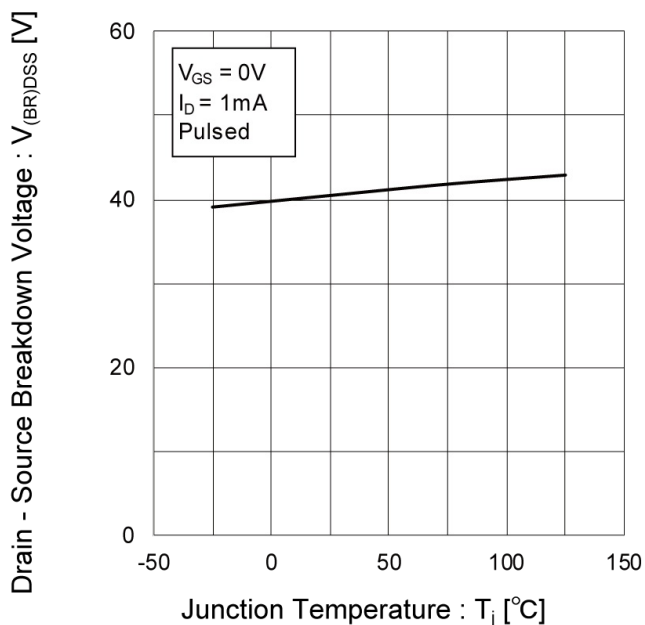
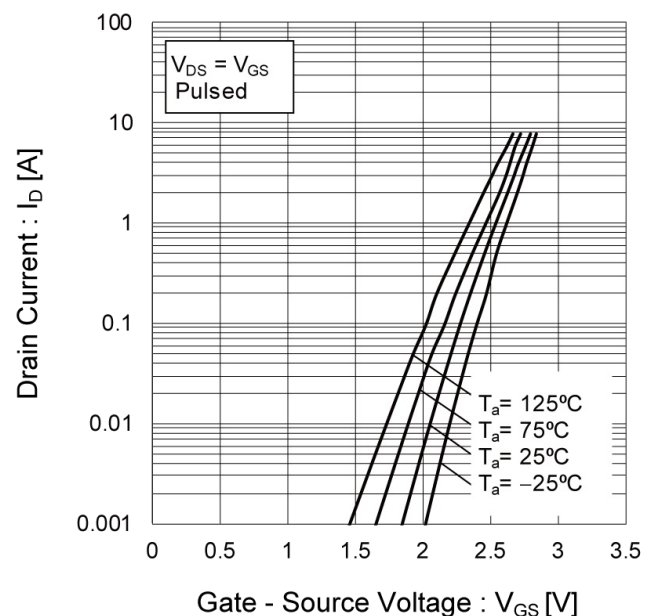


Fig.8 Typical Transfer Characteristics



●Electrical characteristic curves

Fig.9 Gate Threshold Voltage vs. Junction Temperature

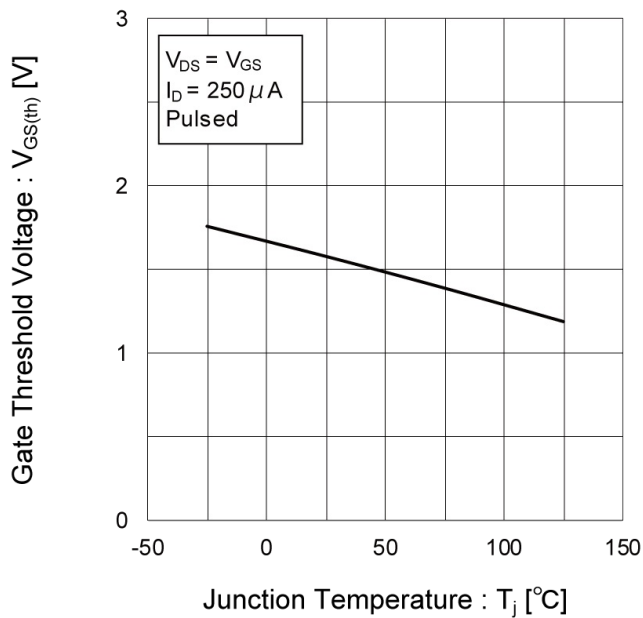


Fig.10 Forward Transfer Admittance vs. Drain Current

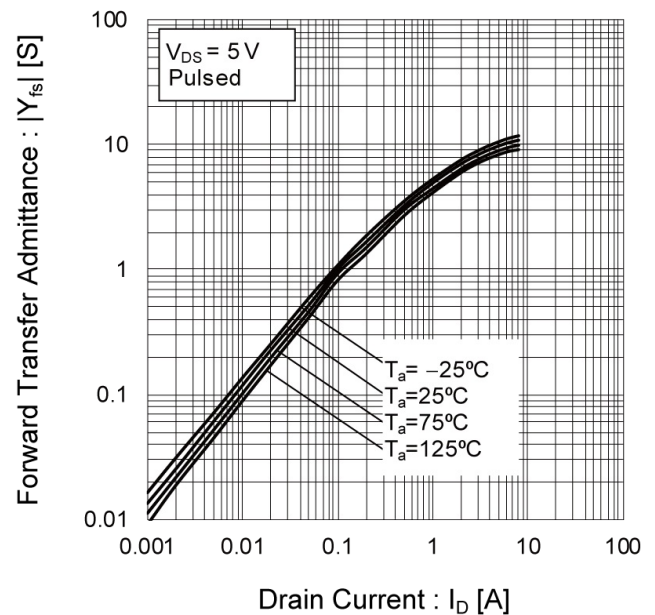


Fig.11 Drain Current Derating Curve

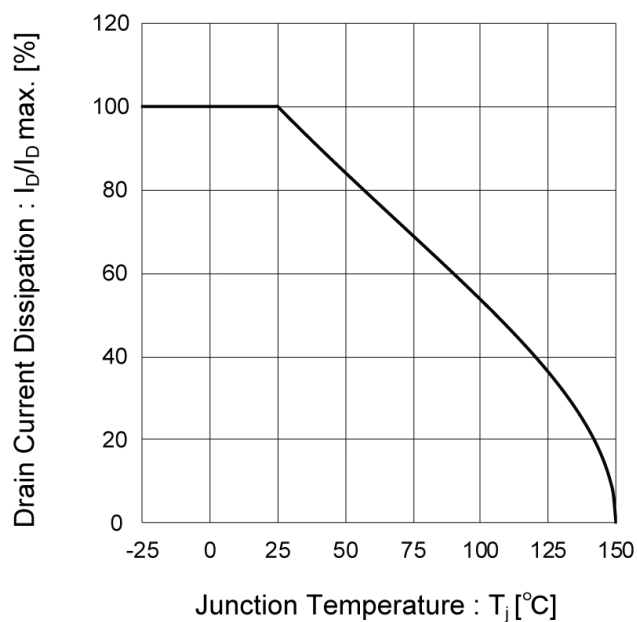
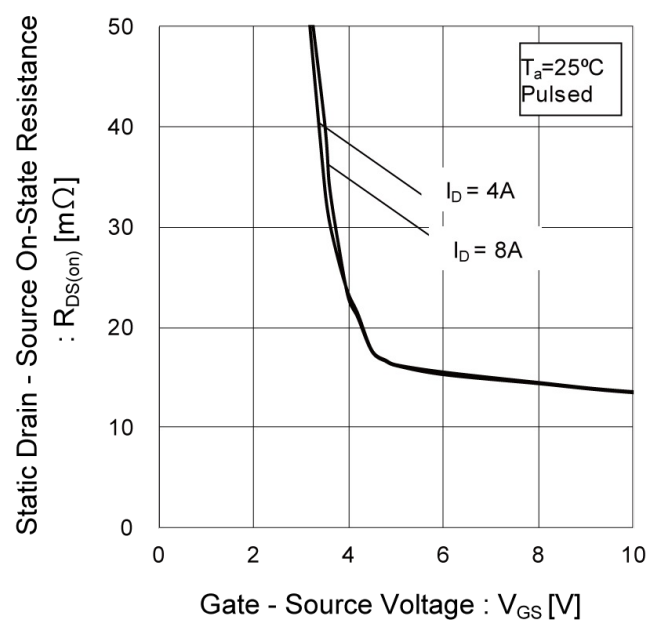


Fig.12 Static Drain - Source On - State Resistance vs. Gate Source Voltage



●Electrical characteristic curves

Fig.13 Static Drain - Source On - State Resistance vs. Junction Temperature

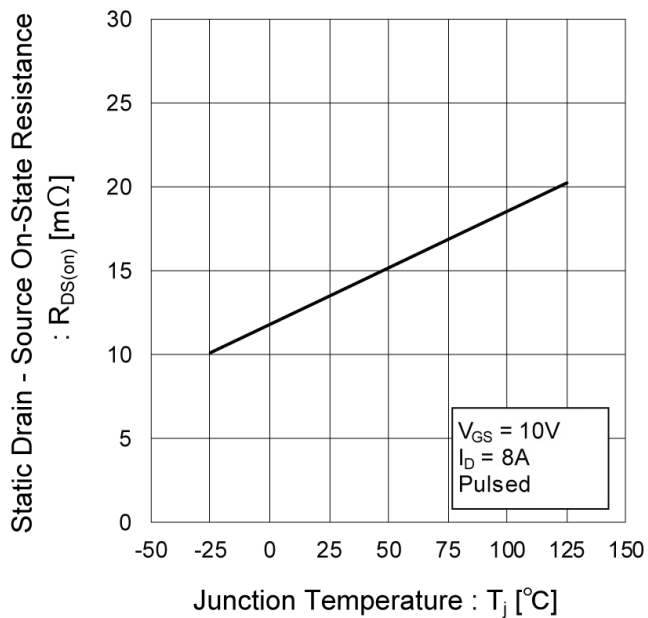


Fig.14 Static Drain - Source On - State Resistance vs. Drain Current (I)

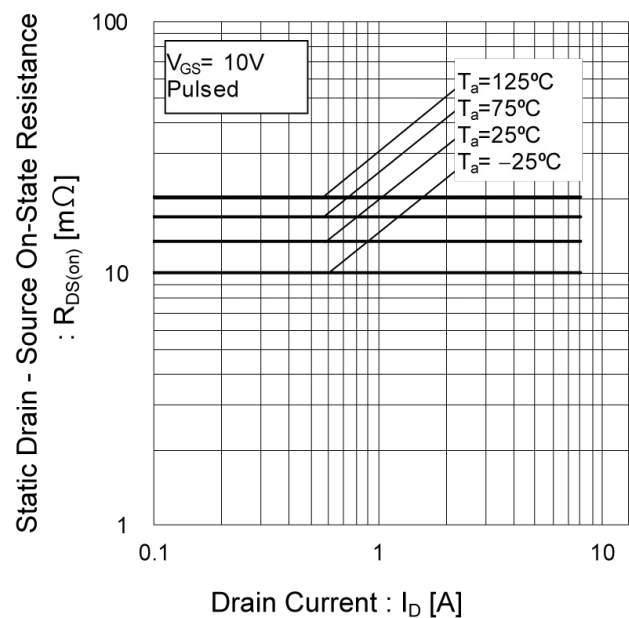
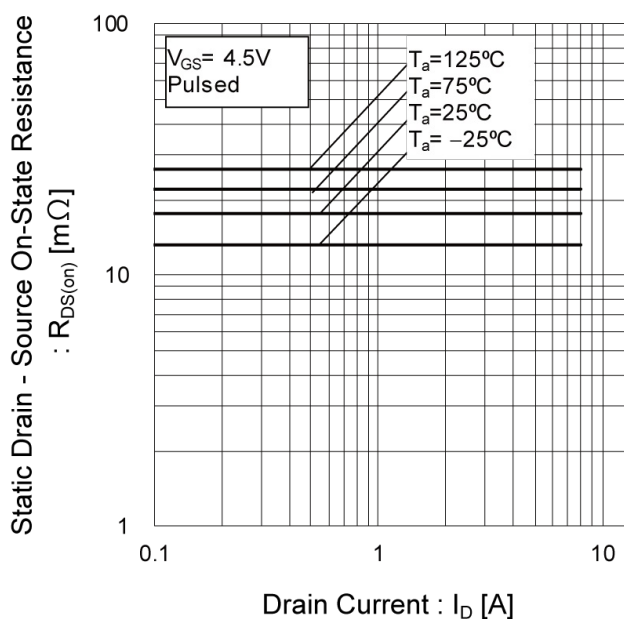


Fig.15 Static Drain - Source On - State Resistance vs. Drain Current (II)



●Electrical characteristic curves

Fig.16 Typical Capacitance vs.
Drain - Source Voltage

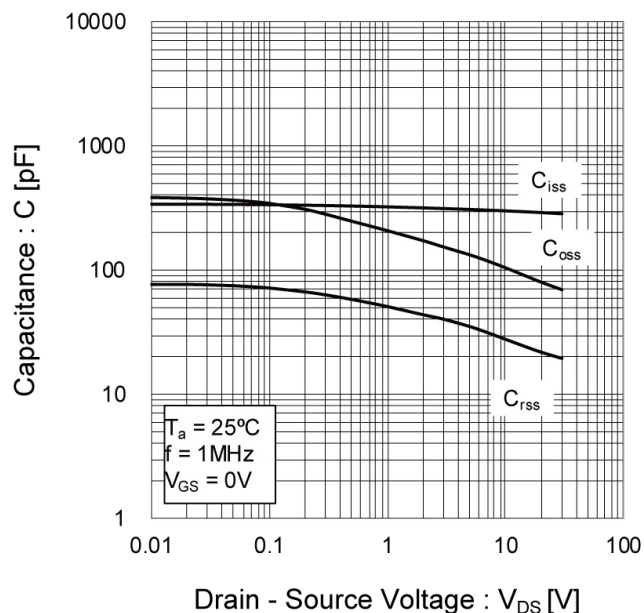


Fig.17 Switching Characteristics

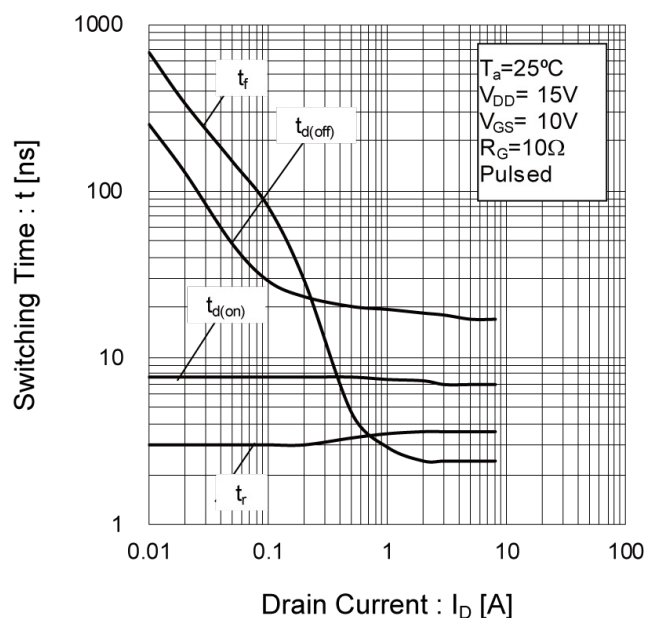


Fig.18 Dynamic Input Characteristics

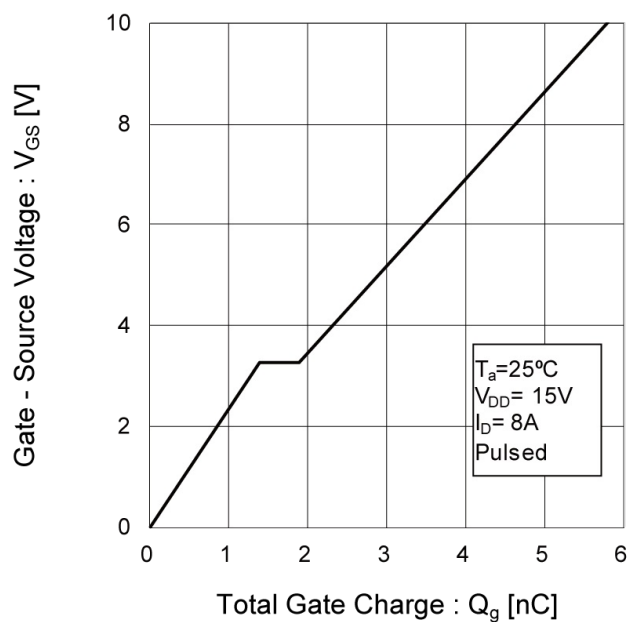
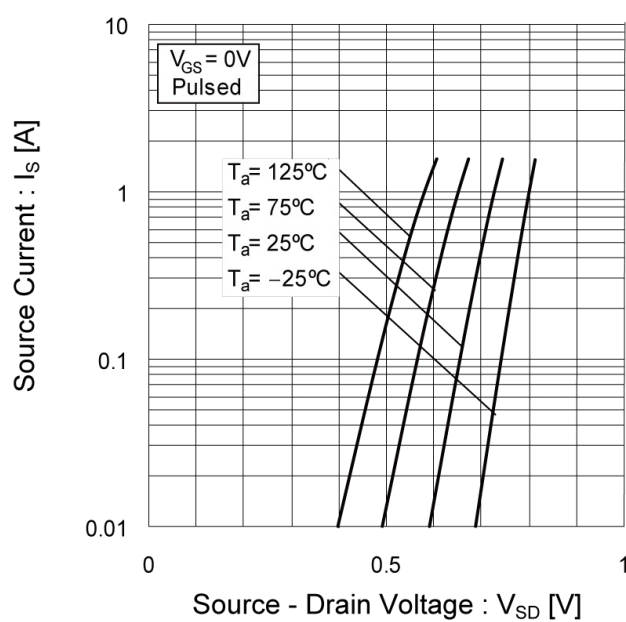


Fig.19 Source Current vs.
Source Drain Voltage



● Measurement circuits

Fig. 1-1 SWITCHING TIME MEASUREMENT CIRCUIT

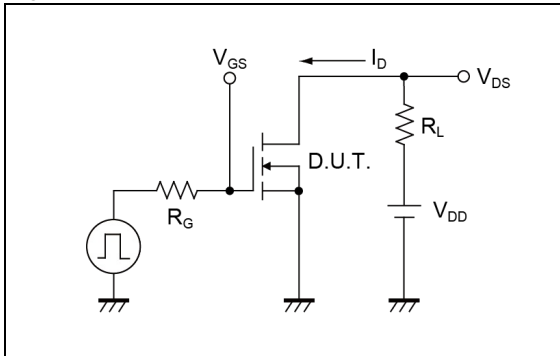


Fig. 1-2 SWITCHING WAVEFORMS

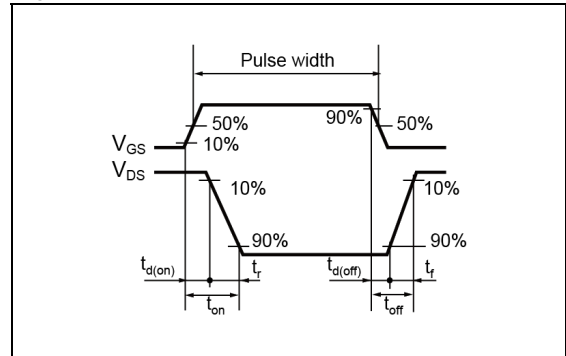


Fig. 2-1 GATE CHARGE MEASUREMENT CIRCUIT

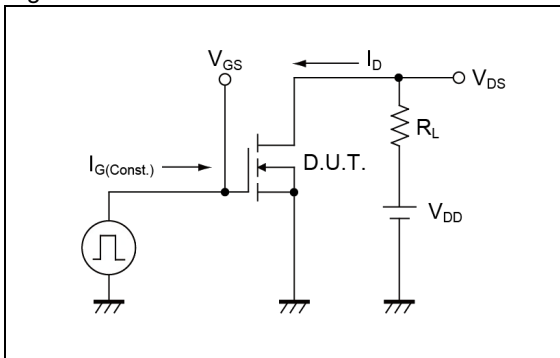
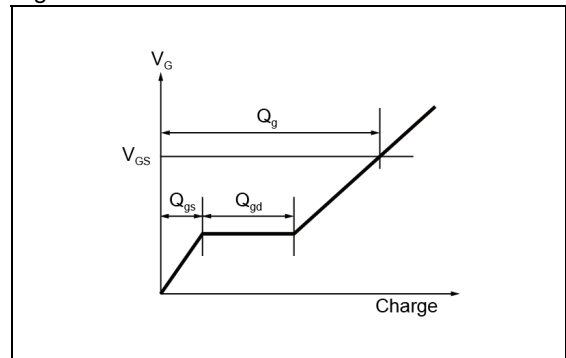


Fig. 2-2 GATE CHARGE WAVEFORM



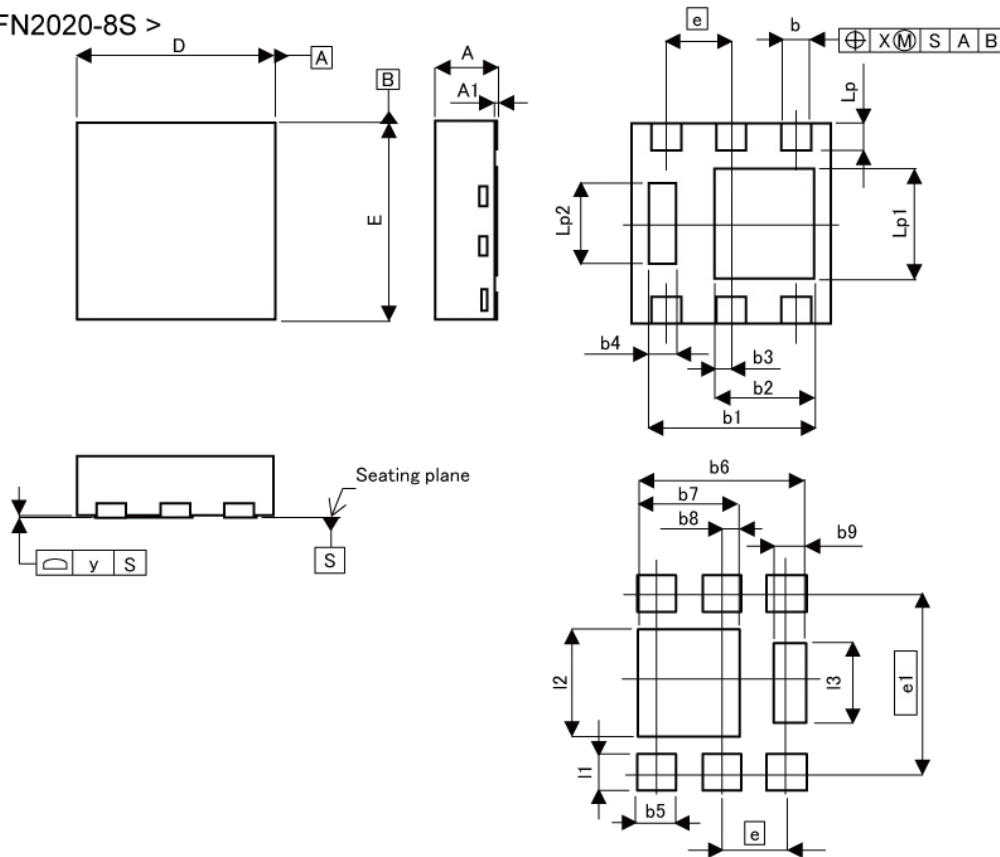
● Notice

This product might cause chip aging and breakdown under the large electrified environment.
Please consider to design ESD protection circuit.

●Dimensions

HUML2020L8 (Single)

< DFN2020-8S >



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

DIM	MILIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	0.55	0.65	0.022	0.026
A1	0.00	0.05	0.000	0.002
b	0.25	0.35	0.010	0.014
b1	1.55	1.75	0.061	0.069
b2	0.95	1.05	0.037	0.041
b3	0.175		0.007	
b4	0.20	0.30	0.008	0.012
D	1.90	2.10	0.075	0.083
E	1.90	2.10	0.075	0.083
e	0.65		0.026	
Lp	0.225	0.325	0.009	0.013
Lp1	1.05	1.15	0.041	0.045
Lp2	0.75	0.85	0.030	0.033
x	-	0.10	-	0.004
y	-	0.10	-	0.004

DIM	MILIMETERS		INCHES	
	MIN	MAX	MIN	MAX
b5	-	0.45	-	0.018
b6	-	1.75	-	0.069
b7	-	1.05	-	0.041
b8	0.175		0.007	
b9	-	0.30	-	0.012
e1	1.725		0.068	
l1	-	0.425	-	0.017
l2	-	1.15	-	0.045
l3	-	0.85	-	0.033

Dimension in mm/inches

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