



# PJS6631

## 20V P- MOSFET Load Switch with Level Shift & Adjustable Slew Rate

**Voltage**      **20 V**      **Current**      **2.0A**

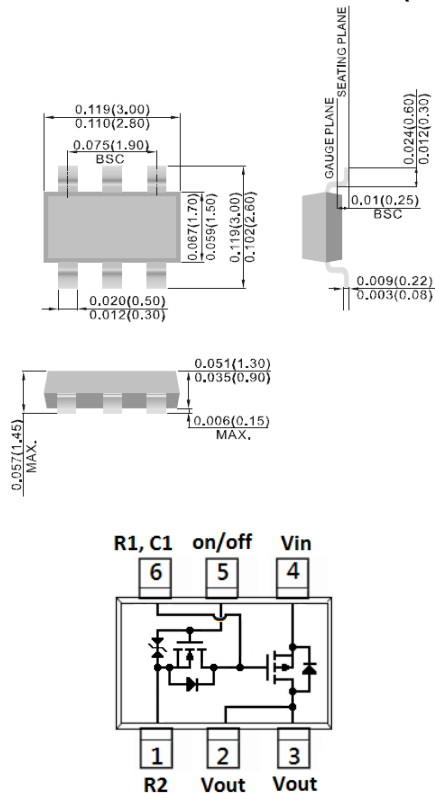
### Features

- Vdrop = 0.2V@Vin=12V, IL=2.0A, RDS(ON)= 100mΩ
- Vdrop = 0.2V@Vin=5.0V, IL=1.8A, RDS(ON)= 110mΩ
- Vdrop = 0.2V@Vin=2.5V, IL=1.4A, RDS(ON)= 140mΩ
- Advanced Trench Process Technology
- Adjustable Turn on/off Slew Rate Control through external R1, R2 and C1.
- Lead free in compliance with EU RoHS 2011/65/EU directive.
- Green molding compound as per IEC61249 Std. (Halogen Free)

### Mechanical Data

- Case: SOT-23 6L Package
- Terminals: Solderable per MIL-STD-750, Method 2026
- Approx. Weight: 0.0005 ounces, 0.014 grams
- Marking: SL1

SOT-23 6L      Unit : inch(mm)



### Maximum Ratings and Thermal Characteristics (T<sub>A</sub>=25°C unless otherwise noted)

PARAMETER	SYMBOL	Ratings	UNITS
Input Voltage Range <sup>(Note 1)</sup>	V <sub>IN</sub>	20	V
On/Off Voltage Range	V <sub>ON</sub> /V <sub>OFF</sub>	12	V
Continuous Load Current t <sup>(Note 2,3)</sup>	I <sub>D</sub>	2	A
Pulsed Load Current <sup>(Note 4)</sup>	I <sub>D</sub>	8	A
Power Dissipation <sup>(Note 2)</sup>	P <sub>D</sub>	0.83	W
Operating Junction and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55~150	°C
ESD, MIL-STD-883D HBM (100pF/1.5kohm) (Von/off pin)	V <sub>ESD</sub>	2	kV
Typical Junction to Ambient <sup>(Note 2)</sup>	R <sub>θJA</sub>	150	°C/W



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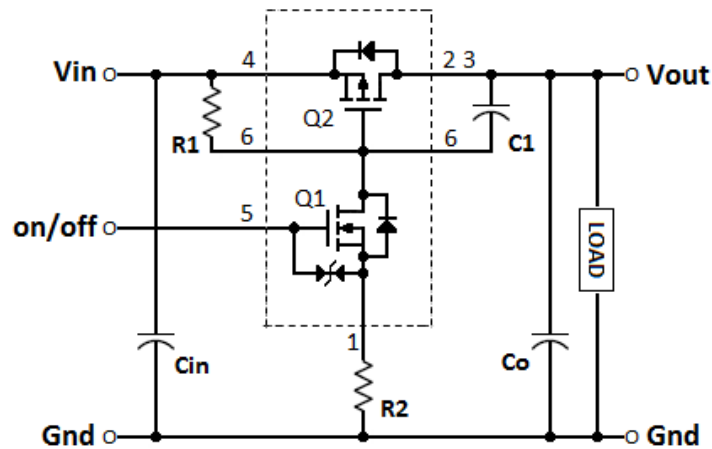
## Electrical Characteristics ( $T_A=25^{\circ}\text{C}$ unless otherwise noted)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNITS
<b>Off Characteristics</b>						
Leakage Current	$I_{FL}$	$V_{IN}=20\text{V}, V_{ON}/V_{OFF}=0\text{V}$	-	-	1	$\mu\text{A}$
Diode Forward Voltage	$V_{SD}$	$I_S=-1.0\text{A}$	-	-0.76	-1.2	V
<b>On Characteristics</b>						
Input Voltage Range	$V_{IN}$		2.5	-	20	V
On/Off Voltage Range	$V_{ON}/V_{OFF}$		2.5	-	12	V
Drain-Source On-State Resistance ( $Q_2$ )	$R_{DS(on)}$	$V_{GS}=-12\text{V}, I_D=-2.0\text{A}$	-	84	100	m $\Omega$
		$V_{GS}=-5.0\text{V}, I_D=-1.8\text{A}$	-	90	110	
		$V_{GS}=-2.5\text{V}, I_D=-1.4\text{A}$	-	110	140	

**NOTES :**

- $V_{IN}$  Range can be up to 20V, but R1 and R2 must be scaled such that  $V_{GS}$  do not exceed 12V.
- $R_{\theta JA}$  is the sum of the junction-to-case and case-to-ambient thermal resistance where the case thermal reference is defined as the solder mounting surface of the drain pins mounted on a 1 inch FR-4 with 2oz. square pad of copper
- The maximum current rating is package limited
- Pulse test: pulse width  $\leq 300\mu\text{s}$ , duty cycle  $\leq 2\%$

## Application Circuits

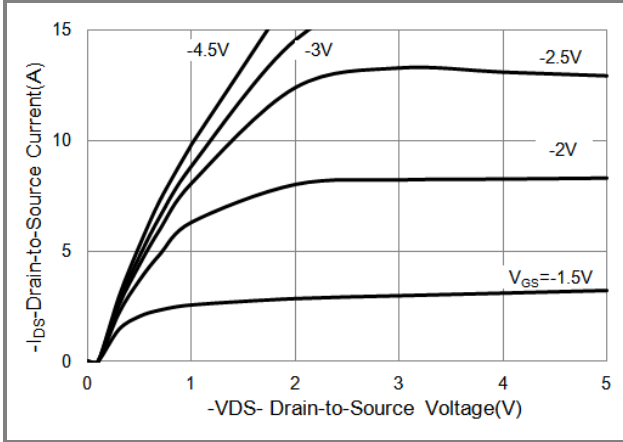


Component Table		
R1	Pull-Up Resistor	Typical 10k $\Omega$ to 1M $\Omega$
R2	Optional Slew-Rate Control	Typical 0k $\Omega$ to 100k $\Omega$
C1	Optional Slew-Rate Control	Typical 1 $\mu\text{F}$
<b>Note:</b> R1 should be at least 10 * R2 to ensure Q1 turn-on		

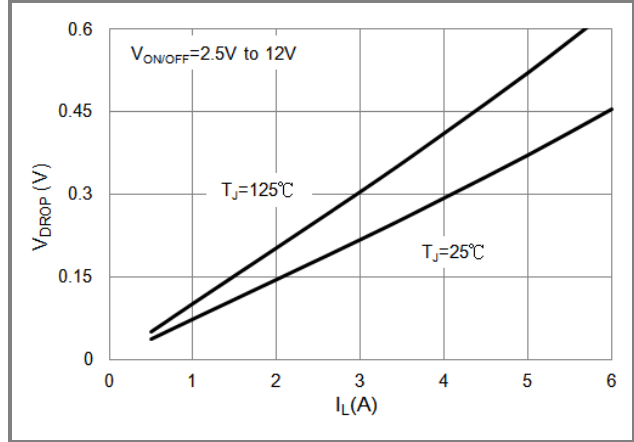


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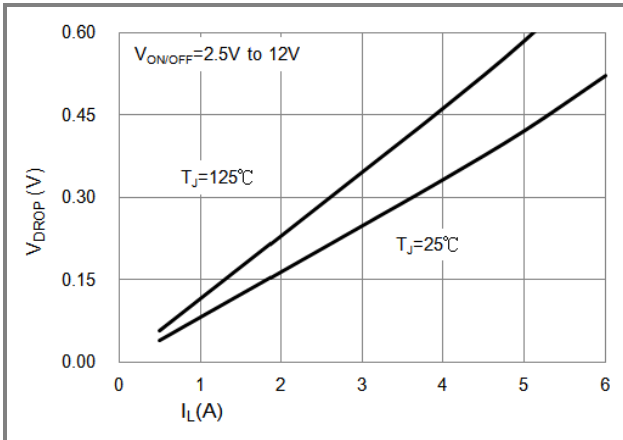
## TYPICAL CHARACTERISTIC CURVES



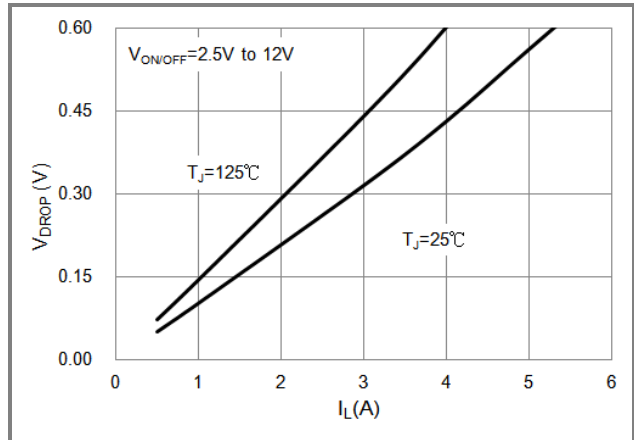
**Fig.1 Output Characteristics**



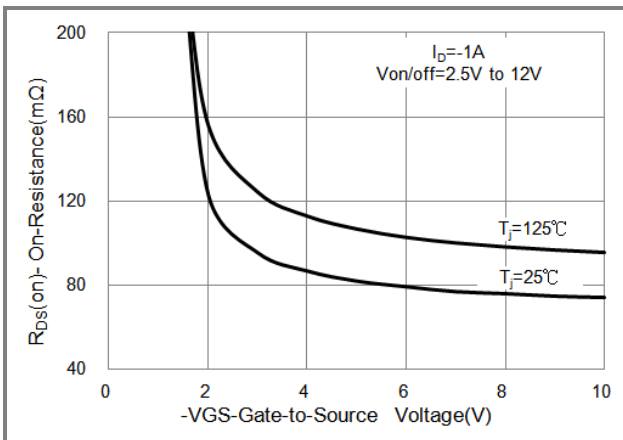
**Fig.2 Vdrop vs Load Current at Vin= 12V**



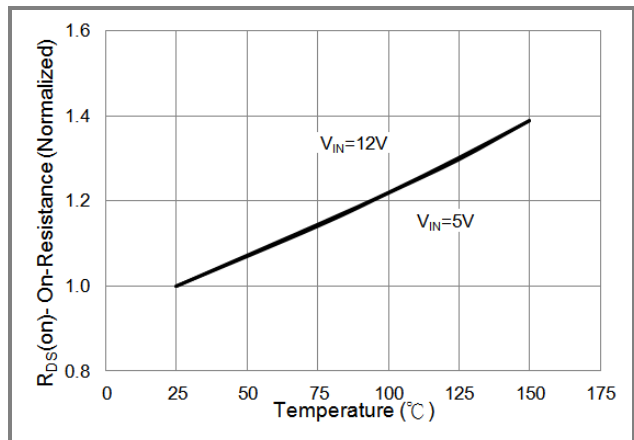
**Fig.3 Vdrop vs Load Current at Vin= 4.5V**



**Fig.4 Vdrop vs Load Current at Vin= 2.5V**



**Fig.5 On-Resistance Variation with VGS.**



**Fig.6 Normalize Rds(on) vs Junction Temperature**



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## TYPICAL CHARACTERISTIC CURVES

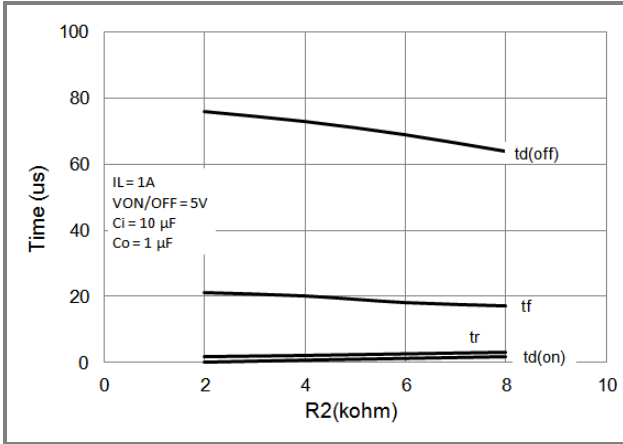


Fig.7 Switching Variation R2 at Vin=12V, R1=20k

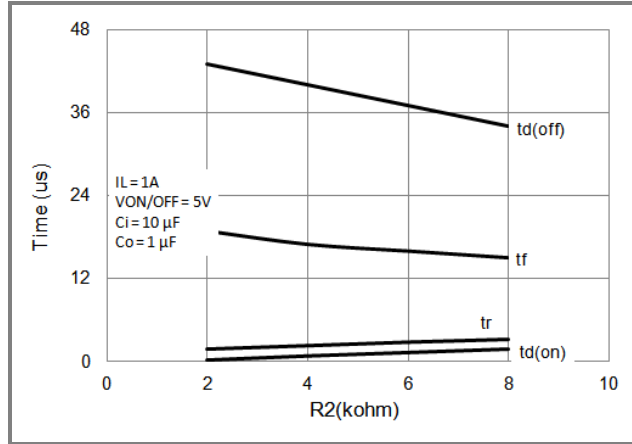


Fig.8 Switching Variation R2 at Vin=5V, R1=20k

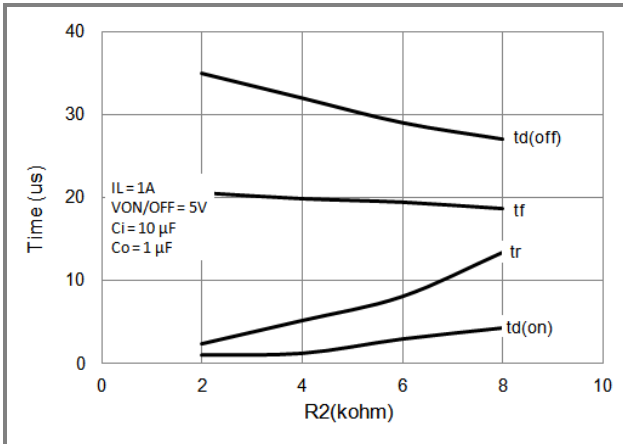


Fig.9 Switching Variation R2 at Vin=3.3V, R1=20k

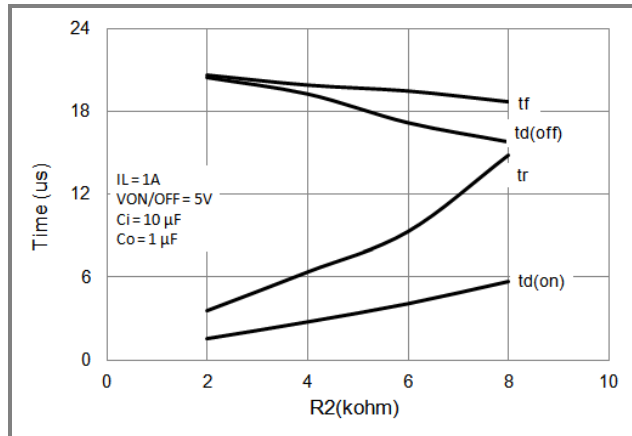


Fig.10 Switching Variation R2 at Vin=2.5V, R1=20k

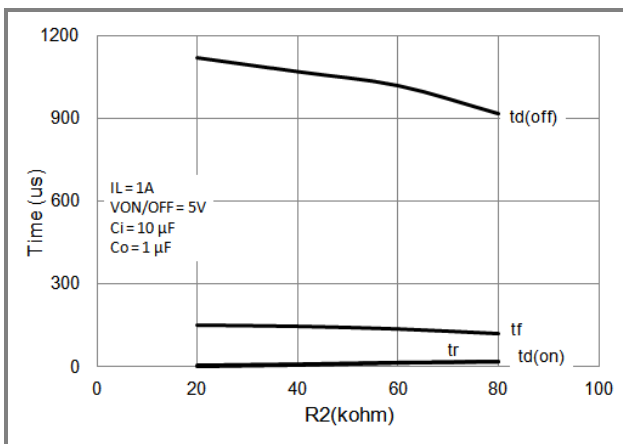


Fig.11 Switching Variation R2 at Vin=12V, R1=300k

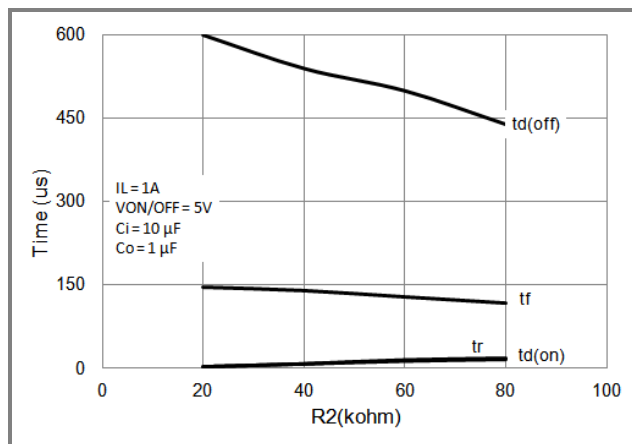


Fig.12 Switching Variation R2 at Vin=5V, R1=300k



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## TYPICAL CHARACTERISTIC CURVES

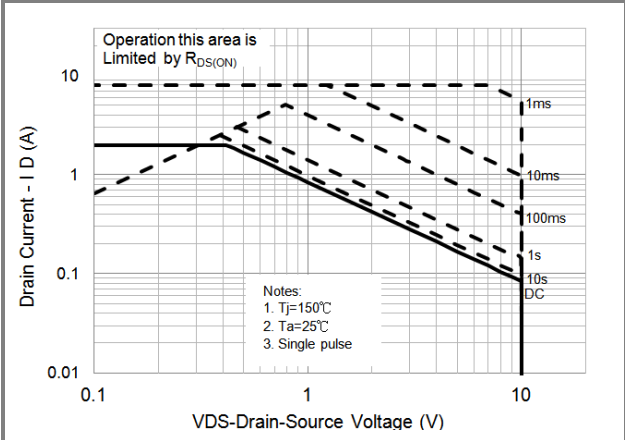


Fig.13 Switching Variation R2 at  $V_{in}=12\text{V}$ ,  $R_1=20\text{k}\Omega$

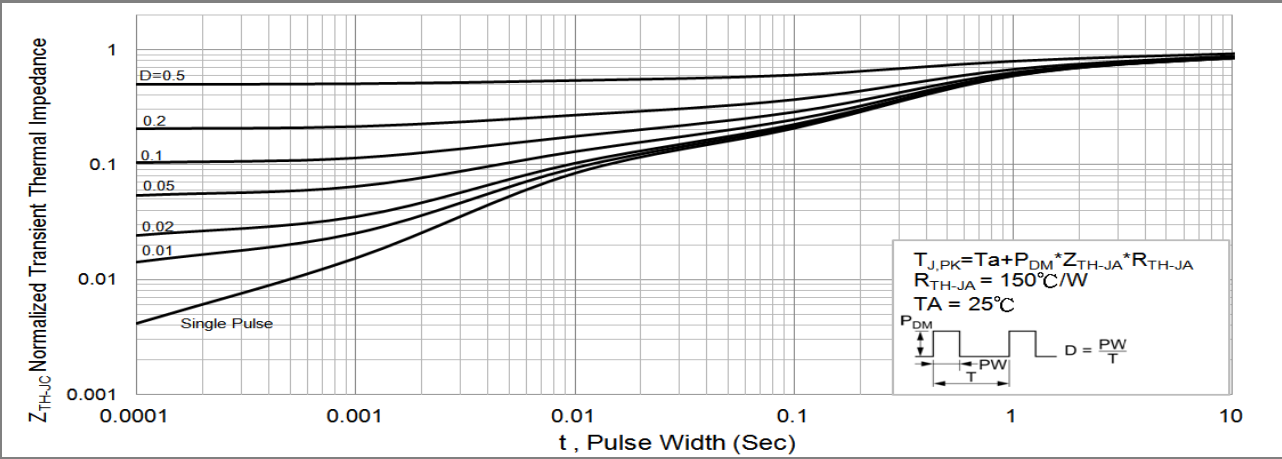


Fig.14 Transient Thermal Response Curve

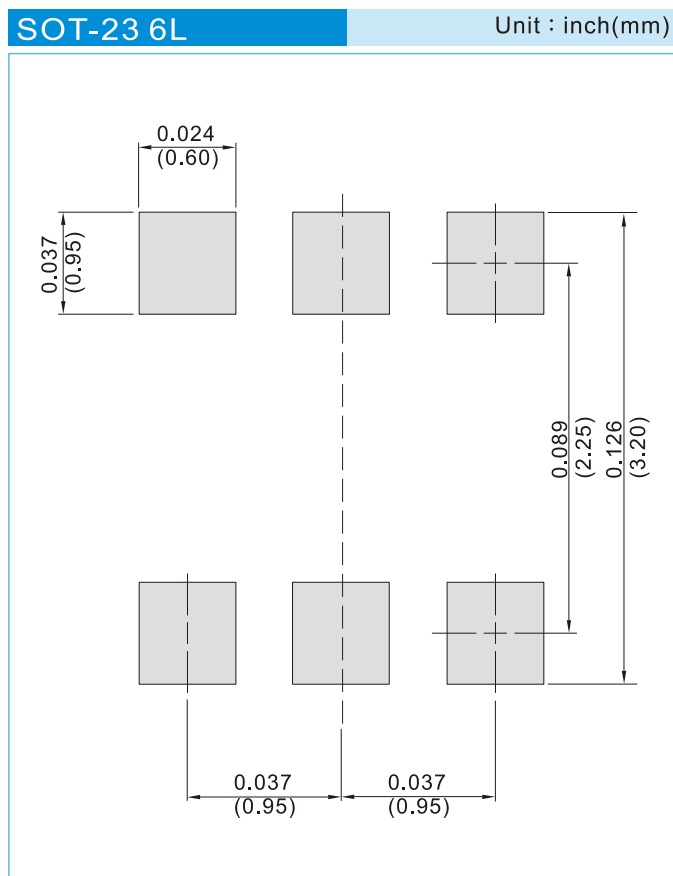


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## PART NO PACKING CODE VERSION

Part No Packing Code	Package Type	Packing type	Marking	Version
PJS6631_S1_00001	SOT-23 6L	3K pcs / 7" reel	SL1	Halogen free
PJS6631_S2_00001	SOT-23 6L	10K pcs / 13" reel	SL1	Halogen free

## MOUNTING PAD LAYOUT





## PJS6631

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