



# UTT18P06

**Power MOSFET**

## -18.3A, -60V P-CHANNEL POWER MOSFET

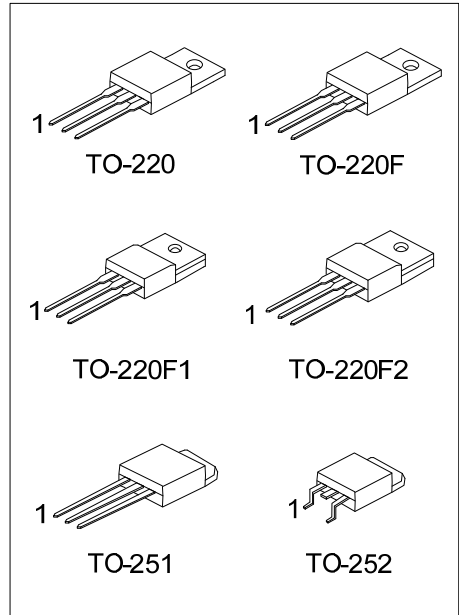
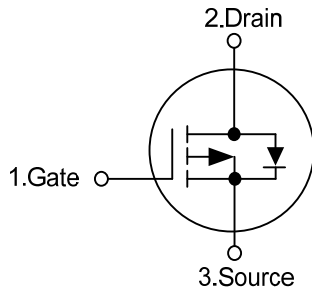
■ **DESCRIPTION**

The UTC **UTT18P06** is a P-channel power MOSFET using UTC's advanced technology to provide the customers with high switching speed, cost-effectiveness and minimum on-state resistance. It can also withstand high energy in the avalanche.

■ **FEATURES**

- \*  $R_{DS(ON)} \leq 0.070 \Omega @ V_{GS} = -10V, I_D = -18.3A$
- \* High Switching Speed

■ **SYMBOL**



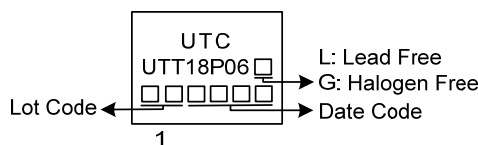
■ **ORDERING INFORMATION**

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UTT18P06L-TA3-T	UTT18P06G-TA3-T	TO-220	G	D	S	Tube
UTT18P06L-TF1-T	UTT18P06G-TF1-T	TO-220F1	G	D	S	Tube
UTT18P06L-TF2-T	UTT18P06G-TF2-T	TO-220F2	G	D	S	Tube
UTT18P06L-TF3-T	UTT18P06G-TF3-T	TO-220F	G	D	S	Tube
UTT18P06L-TM3-T	UTT18P06G-TM3-T	TO-251	G	D	S	Tube
UTT18P06L-TN3-R	UTT18P06G-TN3-R	TO-252	G	D	S	Tape Reel

Note: Pin Assignment: G: Gate D: Drain S: Source

<p>UTT18P06G-TA3-T</p> <p>(1) Packing Type (2) Package Type (3) Green Package</p>	<p>(1) T: Tube, R: Tape Reel (2) TA3: TO-220, TF1: TO-220F1, TF2: TO-220F2 TF3: TO-220F, TM3: TO-251, TN3: TO-252 (3) G: Halogen Free and Lead Free, L: Lead Free</p>
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■ **MARKING**



■ ABSOLUTE MAXIMUM RATINGS ( $T_A=25^\circ\text{C}$ , unless otherwise specified)

PARAMETER			SYMBOL	RATINGS	UNIT
Drain-Source Voltage			$V_{DSS}$	-60	V
Gate-Source Voltage			$V_{GSS}$	$\pm 20$	V
Drain Current	Continuous	$T_C=25^\circ\text{C}$	$I_D$	-18.3	A
	Pulsed		$I_{DM}$	-73.2	A
Single Pulsed Avalanche Current (L=0.1mH)			$I_{AS}$	-18.3	A
Single Pulsed Avalanche Energy (L=0.1mH) (Note 3)			$E_{AS}$	24.2	mJ
Power Dissipation (Note 4)	$T_C=25^\circ\text{C}$	TO-220	$P_D$	90	W
		TO-220F		39	W
		TO-220F1			
		TO-220F2			
		TO-251 TO-252		41	W
Junction Temperature			$T_J$	+150	$^\circ\text{C}$
Storage Temperature			$T_{STG}$	-55 ~ +150	$^\circ\text{C}$

- Notes: 1. Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.  
 2. Repetitive Rating: Pulse width limited by maximum junction temperature.  
 3. Duty cycle  $\leq 1\%$ .  
 4. See SOA curve for voltage derating.

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220/TO-220F	$\theta_{JA}$	62.5	$^\circ\text{C/W}$
	TO-220F1/TO-220F2			
	TO-251/TO-252			
Junction to Case	TO-220	$\theta_{JC}$	1.38	$^\circ\text{C/W}$
	TO-220F/TO-220F1		3.19	
	TO-220F2			
	TO-251/TO-252		3.05 (Note 3)	

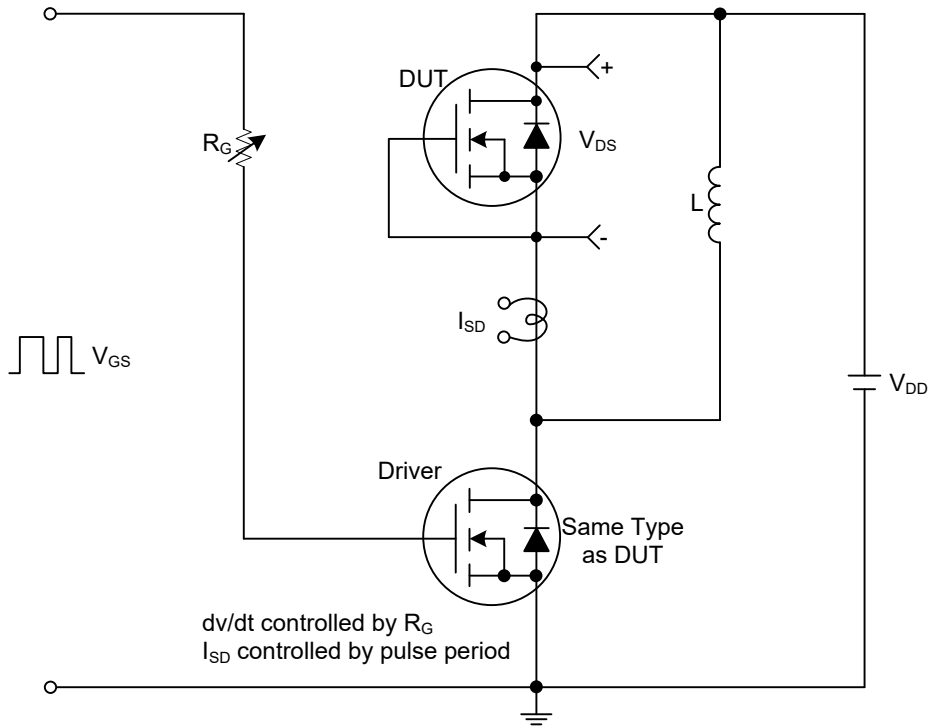
Note: Device mounted on FR-4 substrate  $P_C$  board, 2oz copper, with 1inch square copper plate.

■ ELECTRICAL CHARACTERISTICS (T<sub>J</sub>=25°C, unless otherwise specified)

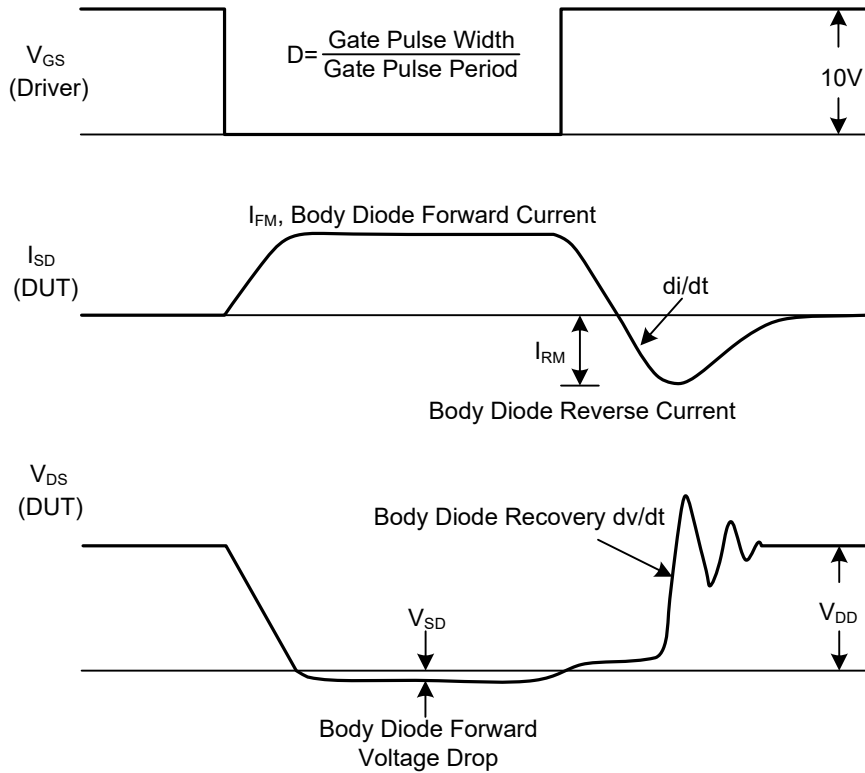
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	I <sub>D</sub> =-250μA, V <sub>GS</sub> =0V	-60			V
Drain-Source Leakage Current	I <sub>DSS</sub>	V <sub>DS</sub> =-60V, V <sub>GS</sub> =0V			-1	μA
Gate-Source Leakage Current	Forward	I <sub>GSS</sub> V <sub>GS</sub> =+20V, V <sub>DS</sub> =0V V <sub>GS</sub> =-20V, V <sub>DS</sub> =0V			+100	nA
	Reverse				-100	nA
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	V <sub>GS(TH)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =-250μA	-1.0		-3.0	V
Static Drain-Source On-State Resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> =-10V, I <sub>D</sub> =-18.3A (Note 1)		0.055	0.070	Ω
On State Drain Current (Note 1)	I <sub>D(ON)</sub>	V <sub>GS</sub> =-10V, V <sub>DS</sub> =-5V	-30			A
<b>DYNAMIC PARAMETERS (Note 2)</b>						
Input Capacitance	C <sub>ISS</sub>	V <sub>GS</sub> =0V, V <sub>DS</sub> =-25V, f=1.0MHz (Note 2)		840	1310	pF
Output Capacitance	C <sub>OSS</sub>			95		pF
Reverse Transfer Capacitance	C <sub>RSS</sub>			70		pF
<b>SWITCHING PARAMETERS</b>						
Total Gate Charge	Q <sub>G</sub>	V <sub>GS</sub> =-10V, V <sub>DS</sub> =-50V, I <sub>D</sub> =-1.3A, I <sub>G</sub> =100μA (Note 3)		35	40	nC
Gate to Source Charge	Q <sub>GS</sub>			6		nC
Gate to Drain Charge	Q <sub>GD</sub>			7.0		nC
Turn-ON Delay Time	t <sub>D(ON)</sub>	V <sub>DD</sub> =-30V, I <sub>D</sub> =-0.5A, R <sub>G</sub> =2.5Ω (Note 3)		50		ns
Rise Time	t <sub>R</sub>			43		ns
Turn-OFF Delay Time	t <sub>D(OFF)</sub>			300		ns
Fall-Time	t <sub>F</sub>			95		ns
<b>SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS (T<sub>C</sub>=25°C) (Note 2)</b>						
Maximum Body-Diode Continuous Current	I <sub>S</sub>				-18.3	A
Maximum Body-Diode Pulsed Current	I <sub>SM</sub>				-73.2	A
Drain-Source Diode Forward Voltage	V <sub>SD</sub>	I <sub>F</sub> =-18.3A, V <sub>GS</sub> =0V (Note 1)		-1.0	-1.5	V
Body Diode Reverse Recovery Time	t <sub>rr</sub>	I <sub>F</sub> =-18.3A, dI <sub>F</sub> /dt=100A/μs		14	61	ns

- Notes: 1. Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2 %  
 2. Guaranteed by design, not subject to production testing  
 3. Independent of operating temperature

■ TEST CIRCUITS AND WAVEFORMS



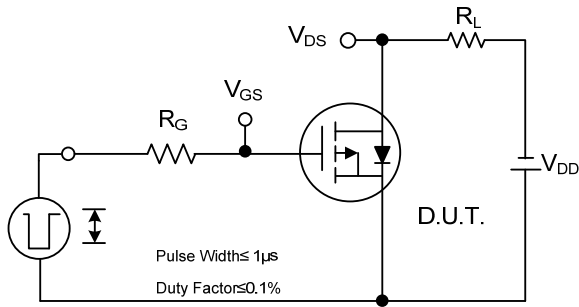
Peak Diode Recovery dv/dt Test Circuit



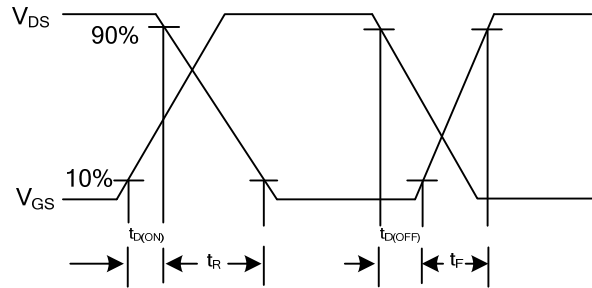
Peak Diode Recovery dv/dt Test Circuit and Waveforms

Peak Diode Recovery dv/dt Waveforms

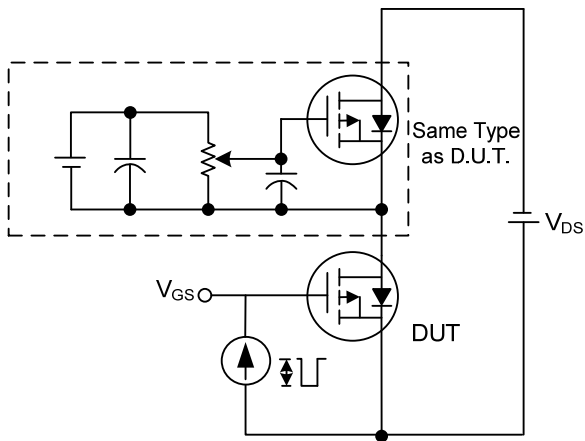
## TEST CIRCUITS AND WAVEFORMS



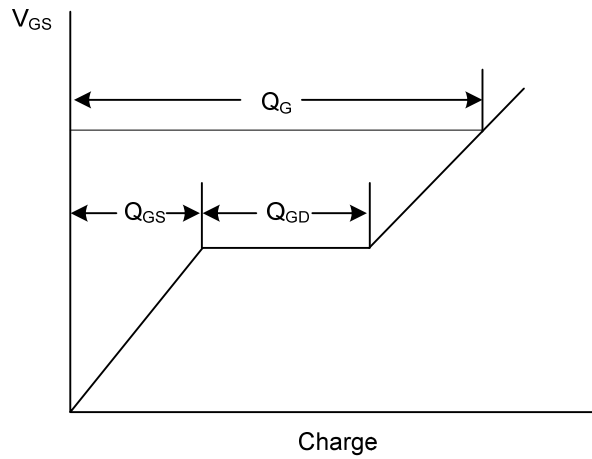
**Switching Test Circuit**



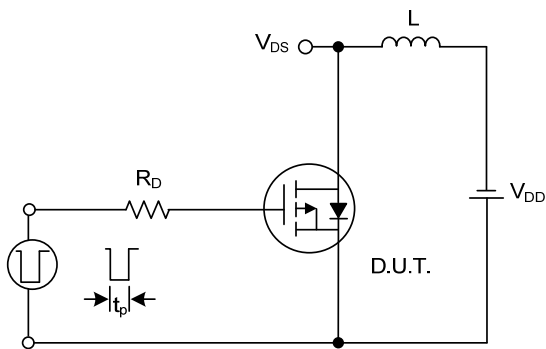
**Switching Waveforms**



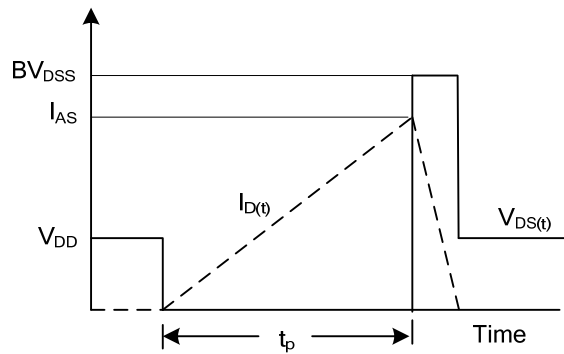
**Gate Charge Test Circuit**



**Gate Charge Waveform**

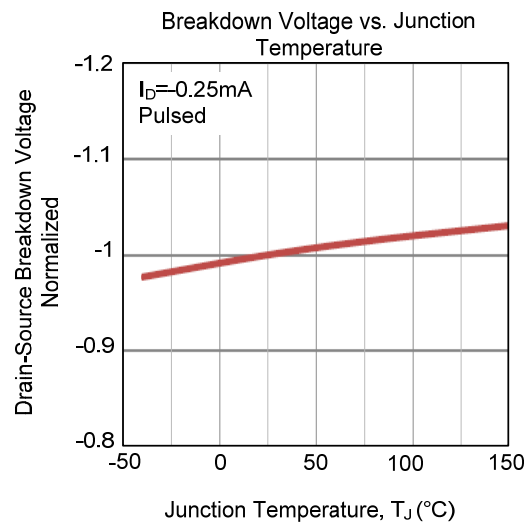
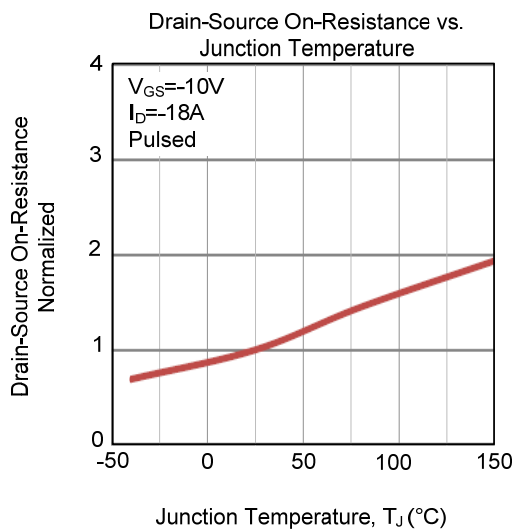
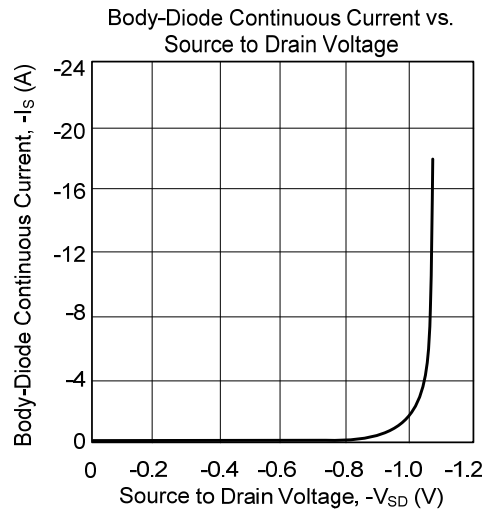
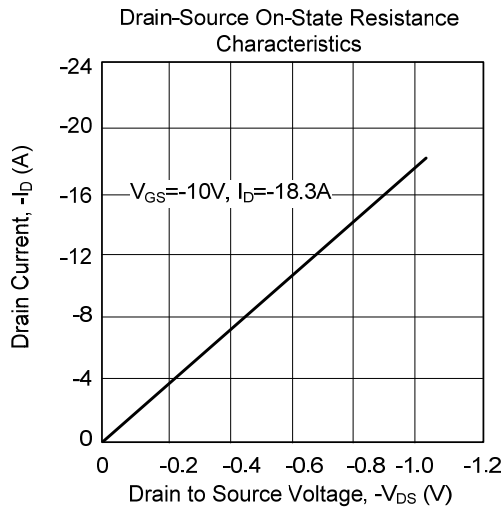
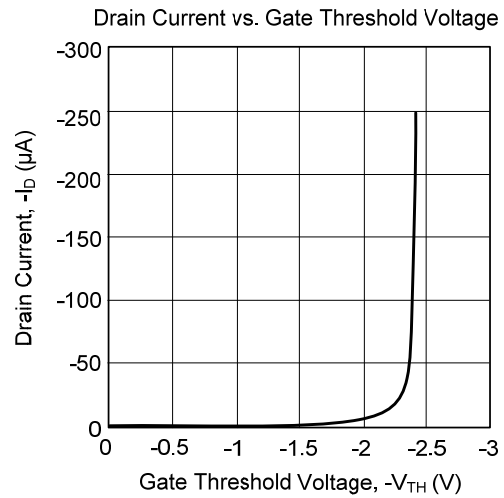
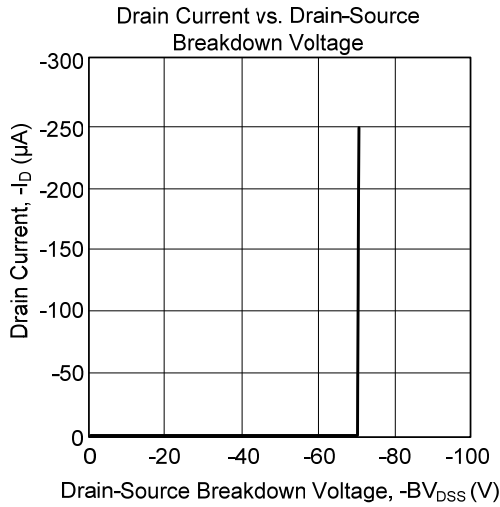


**Unclamped Inductive Switching Test Circuit**

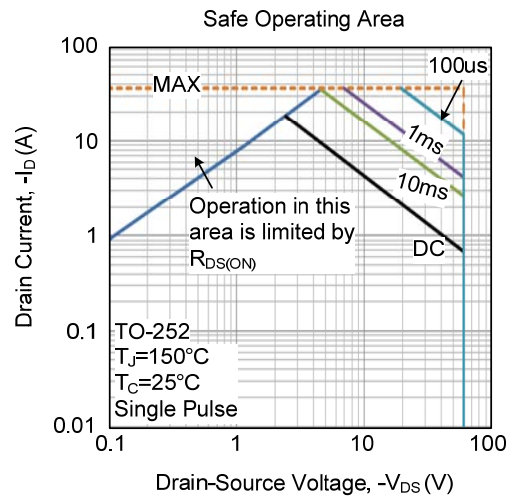
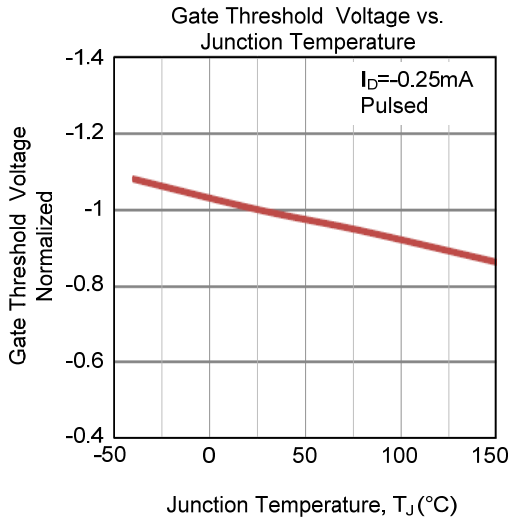


**Unclamped Inductive Switching Waveforms**

## TYPICAL CHARACTERISTICS



■ TYPICAL CHARACTERISTICS (Cont.)



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