



UP9971

Power MOSFET

5A, 60V N-CHANNEL POWER MOSFET

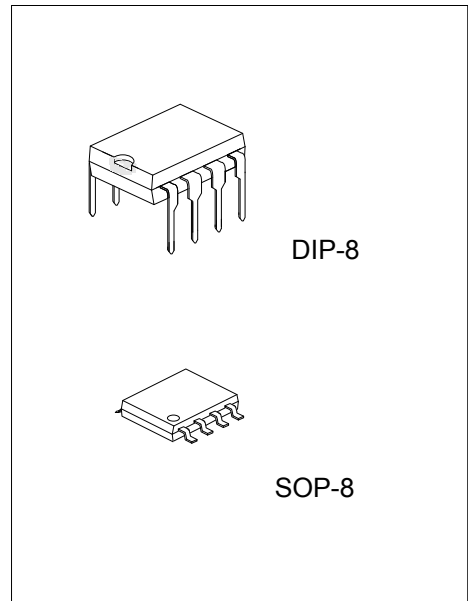
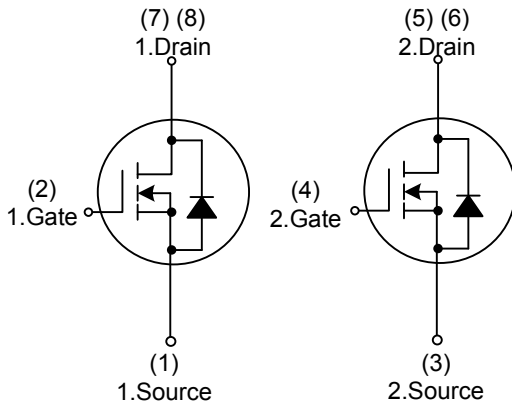
DESCRIPTION

The UTC **UP9971** uses UTC's advanced technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with low gate voltages. This device is suitable for being used as a load switch or in PWM applications.

FEATURES

- * $R_{DS(ON)} < 60 \text{ m}\Omega @ V_{GS} = 10\text{V}$
- * $R_{DS(ON)} < 72 \text{ m}\Omega @ V_{GS} = 4.5\text{V}$
- * Ultra low gate charge (typical 32.5 nC)
- * Low reverse transfer Capacitance (C_{RSS} = typical 109 pF)
- * Fast switching capability
- * Avalanche energy Specified
- * Improved dv/dt capability, high ruggedness

SYMBOL

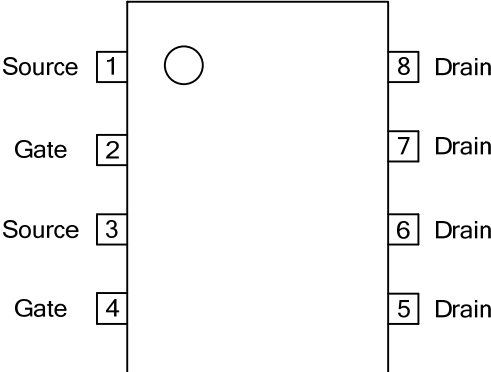


ORDERING INFORMATION

Ordering Number		Package	Packing
Lead Free	Halogen Free		
UP9971L-D08-T	UP9971G-D08-T	DIP-8	Tube
UP9971L-S08-R	UP9971G-S08-R	SOP-8	Tape Reel
UP9971L-S08-T	UP9971G-S08-T	SOP-8	Tube

<p>UP9971L-D08-R</p> <p>(1) Packing Type</p> <p>(2) Package Type</p> <p>(3) Lead Free</p>	<p>(1) R: Tape Reel, T: Tube</p> <p>(2) D08: DIP-8, S08: SOP-8</p> <p>(3) G: Halogen Free, L: Lead Free</p>
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■ PIN CONFIGURATION



■ 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}	± 25	V
Continuous Drain Current ($V_{GS}=10\text{V}$)	I_D	5	A
Pulsed Drain Current (Note 2,3)	SOP-8	30	A
	DIP-8	20	
Power Dissipation	P_D	2	W
Junction Temperature	T_J	+150	$^{\circ}\text{C}$
Operating Temperature	T_{OPR}	-55 ~ +150	$^{\circ}\text{C}$
Storage Temperature	T_{STG}	-55 ~ +150	$^{\circ}\text{C}$

Note: 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. Pulse width limited by $T_{J(MAX)}$

3. Pulse width $\leq 300\mu\text{s}$, Duty cycle $\leq 2\%$

■ THERMAL DATA

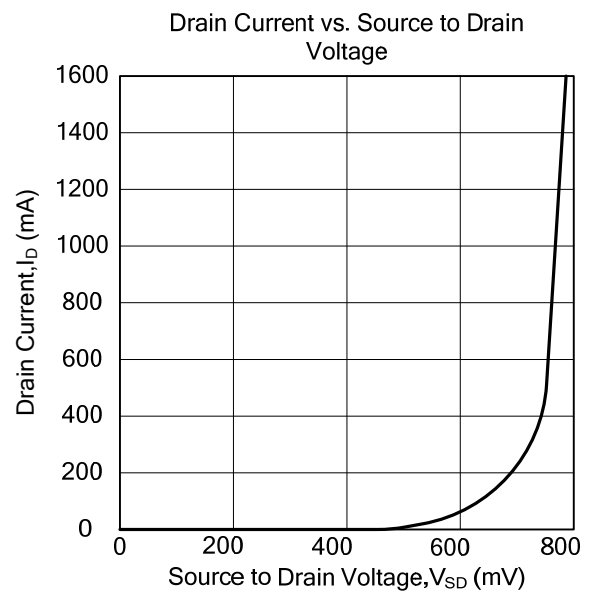
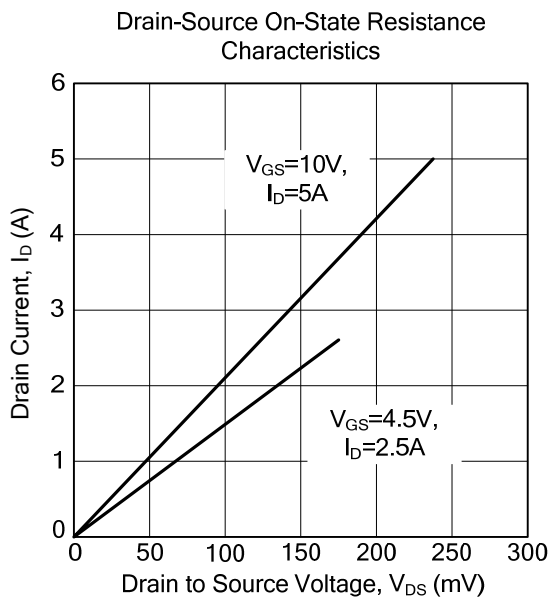
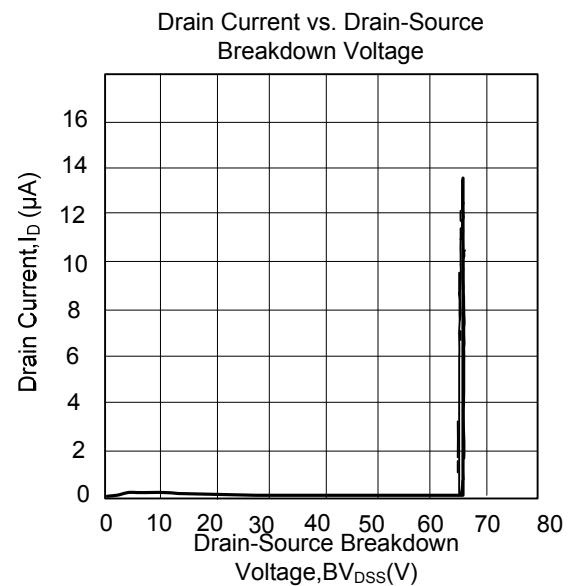
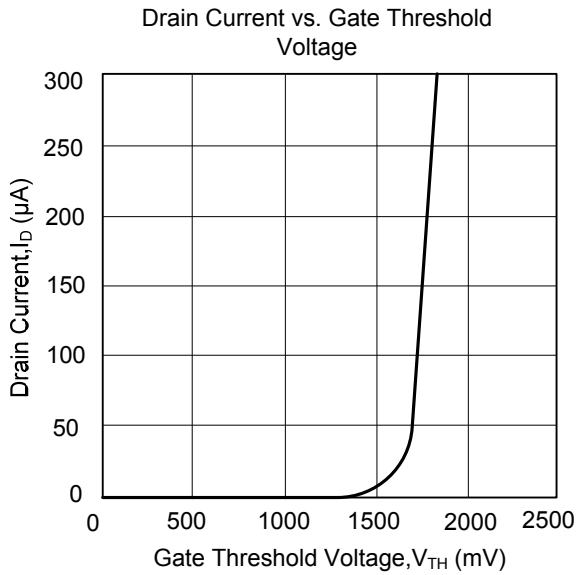
PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	62.5	$^{\circ}\text{C/W}$

■ ELECTRICAL CHARACTERISTICS ($T_J=25^{\circ}\text{C}$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT	
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0\text{V}, I_D=250\mu\text{A}$	60			V	
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=60\text{V}, V_{GS}=0\text{V}$			1	μA	
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm 25\text{V}$			± 100	nA	
Breakdown Voltage Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_J$	Reference to $25^{\circ}\text{C}, I_D=1\text{mA}$		0.06		$\text{V}/^{\circ}\text{C}$	
ON CHARACTERISTICS							
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}, I_D=250\mu\text{A}$	1.5		3	V	
Static Drain-Source On-Resistance (Note)	$R_{DS(ON)}$	$V_{GS}=10\text{V}, I_D=5\text{A}$			60	m Ω	
		$V_{GS}=4.5\text{V}, I_D=2.5\text{A}$			72		
Forward Transconductance (Note)	SOP-8	$V_{DS}=10\text{V}, I_D=5\text{A}$		16		S	
	DIP-8			7			
DYNAMIC PARAMETERS							
Input Capacitance	SOP-8	$V_{DS}=25\text{V}, V_{GS}=0\text{V}, f=1.0\text{MHz}$		1658		pF	
	DIP-8			1560			
Output Capacitance				156		pF	
Reverse Transfer Capacitance	SOP-8				109		pF
	DIP-8				110		
SWITCHING PARAMETERS							
Turn-ON Delay Time (Note)	$t_{D(ON)}$	$V_{GS}=10\text{V}, V_{DS}=30\text{V}, R_D=6\Omega, R_G=3.3\Omega, I_D=5\text{A}$		9.6		ns	
Turn-ON Rise Time	t_R			10		ns	
Turn-OFF Delay Time	$t_{D(OFF)}$			30		ns	
Turn-OFF Fall-Time	t_F			5.5		ns	
Total Gate Charge (Note)	Q_G	$V_{DS}=48\text{V}, V_{GS}=10\text{V}, I_D=5\text{A}$		32.5		nC	
Gate Source Charge	Q_{GS}			4.9		nC	
Gate Drain Charge	Q_{GD}			8.8		nC	
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Diode Forward Voltage (Note)	V_{SD}	$I_S=1.6\text{A}, V_{GS}=0\text{V}$			1.2	V	
Body Diode Reverse Recovery Time	t_{rr}	$I_S=5\text{A}, V_{GS}=0\text{V}, di/dt=100\text{A}/\mu\text{s}$		29.2		ns	
Body Diode Reverse Recovery Charge	Q_{RR}			48		nC	

Note: Pulse width $\leq 300\mu\text{s}$, Duty cycle $\leq 2\%$

■ TYPICAL CHARACTERISTICS



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