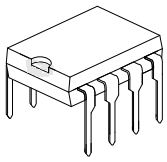
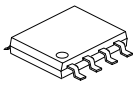
UP9971

Power MOSFET

5A, 60V N-CHANNEL POWER MOSFET



DIP-8



SOP-8

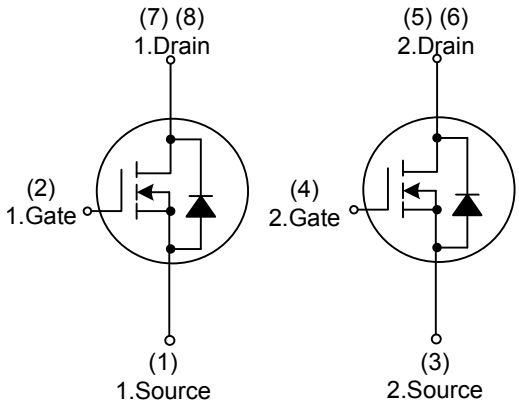
■ DESCRIPTION

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 mΩ @ V_{GS}=10V, I_D=5A
* $R_{DS(ON)}$<72 mΩ @ V_{GS}=4.5V, I_D=2.5A
* 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

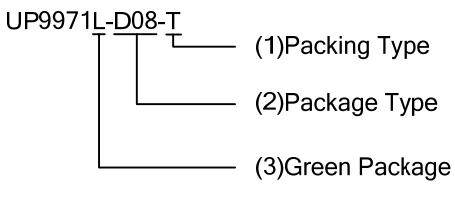
■ SYMBOL



■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment								Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	
UP9971L-D08-T	UP9971G-D08-T	DIP-8	S	G	S	G	D	D	D	D	Tube
-	UP9971G-S08-R	SOP-8	S	G	S	G	D	D	D	D	Tape Reel

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



(1) R: Tape Reel, T: Tube

(2) D08: DIP-8, S08: SOP-8

(3) L: Lead Free, G: Halogen Free and Lead Free

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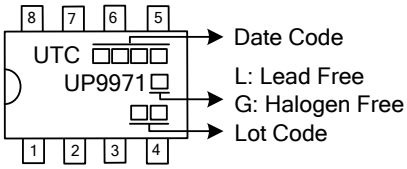
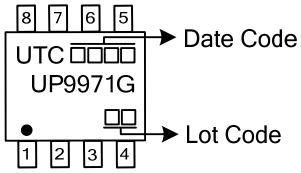
■ MARKING

DIP-8	SOP-8
	

■ ABSOLUTE MAXIMUM RATINGS (T_A=25℃, 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}=10V)		I_D	5	A
Pulsed Drain Current (Note 2,3)	SOP-8	I_{DM}	30	A
	DIP-8		20	A
Power Dissipation		P_D	2	W
Junction Temperature		T_J	+150	°C
Operating Temperature		T_{OPR}	-55 ~ +150	°C
Storage Temperature		T_{STG}	-55 ~ +150	°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≦300μs, Duty cycle≦2%

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	62.5	°C/W

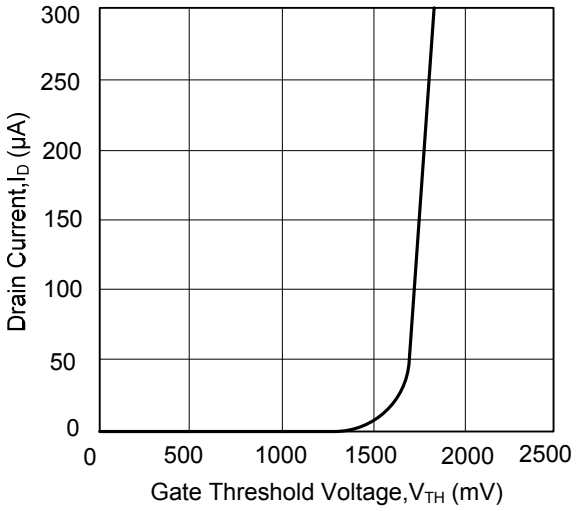
■ ELECTRICAL CHARACTERISTICS (T_J=25°C, unless otherwise specified)

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

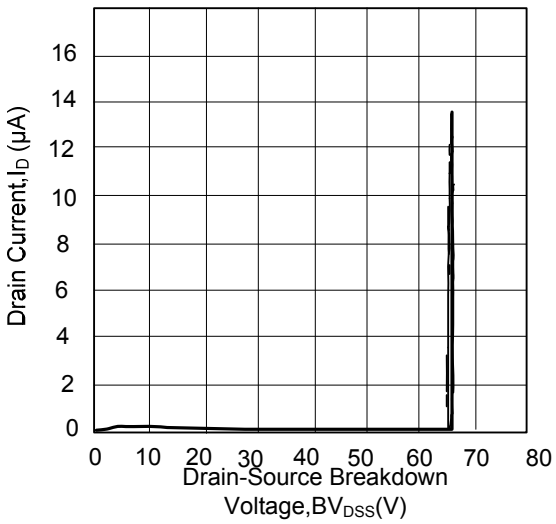
Note: Pulse width≦300μs, Duty cycle≦2%

■ TYPICAL CHARACTERISTICS

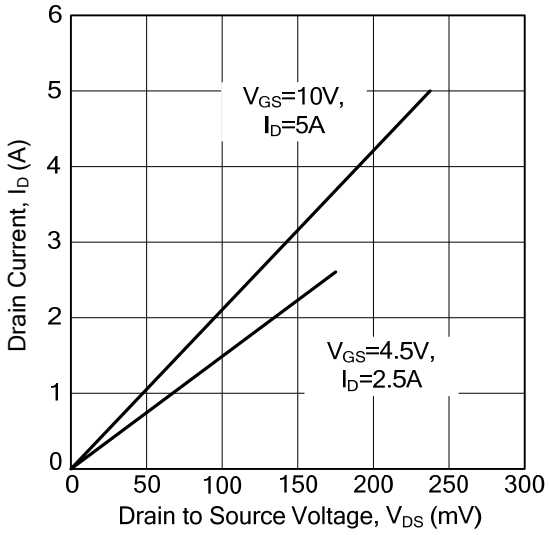
Drain Current vs. Gate Threshold Voltage



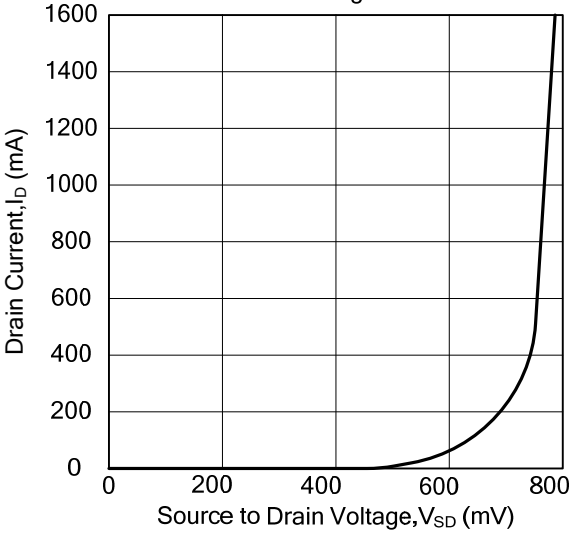
Drain Current vs. Drain-Source Breakdown Voltage



Drain-Source On-State Resistance Characteristics



Drain Current vs. Source to Drain Voltage



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