



UP9971

Power MOSFET

N-CHANNEL ENHANCEMENT MODE POWER MOSFET

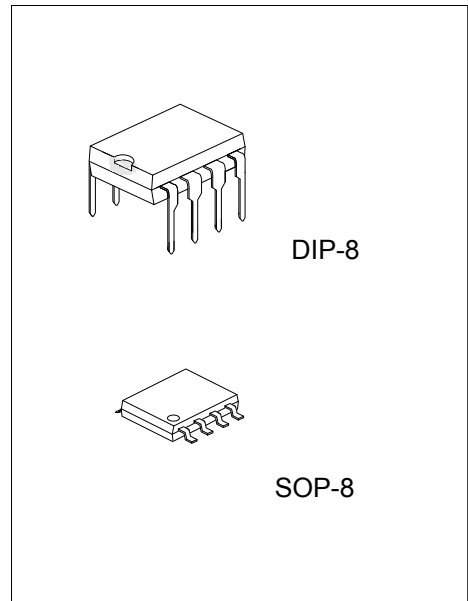
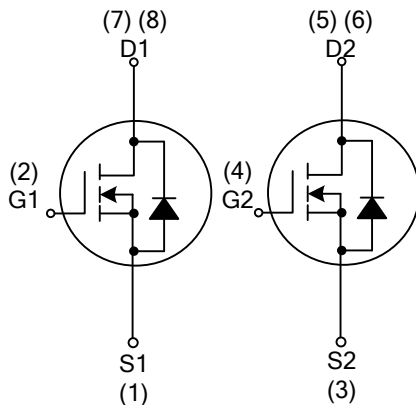
DESCRIPTION

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

- * $R_{DS(ON)} < 50 \text{ m}\Omega$ @ $V_{GS} = 10\text{V}$
- * $R_{DS(ON)} < 60 \text{ m}\Omega$ @ $V_{GS} = 4.5\text{V}$
- * 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



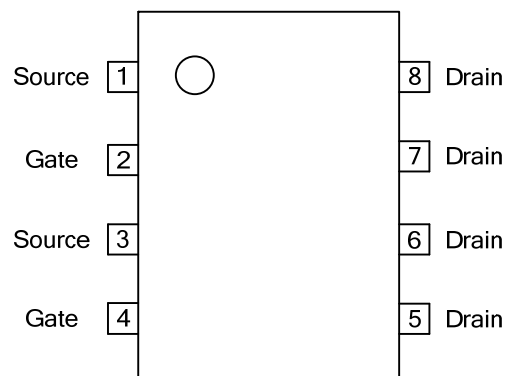
Lead-free: UP9971L
Halogen-free: UP9971G

ORDERING INFORMATION

Ordering Number			Package	Packing
Normal	Lead Free	Halogen Free		
UP9971-D08-R	UP9971L-D08-R	UP9971G-D08-R	DIP-8	Tube
UP9971-S08-R	UP9971L-S08-R	UP9971G-S08-R	SOP-8	Tape Reel

UP9971L-D08-R (1) Packing Type (2) Package Type (3) Lead Plating		(1) R: Tape Reel, T: Tube (2) D08: DIP-8, S08: SOP-8 (3) G: Halogen Free, L: Lead Free, Blank: Pb/Sn
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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 ($V_{\text{GS}}=10\text{V}$)	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}	$-55 \sim +150$	$^{\circ}\text{C}$
Storage Temperature	T_{STG}	$-55 \sim +150$	$^{\circ}\text{C}$

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 $T_{\text{J(MAX)}}$

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

■ THERMAL DATA

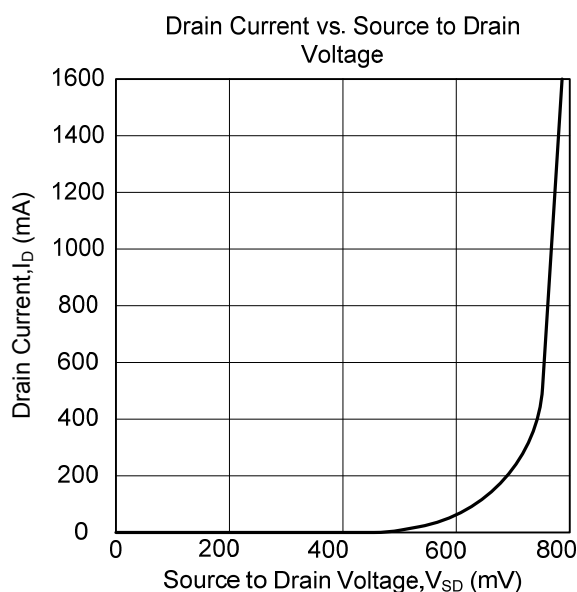
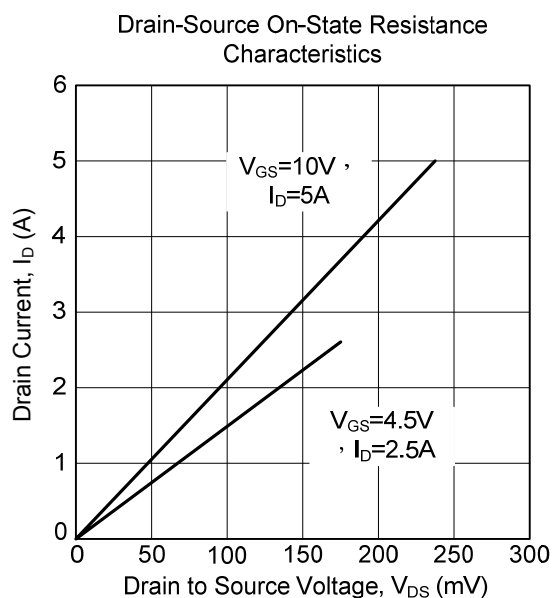
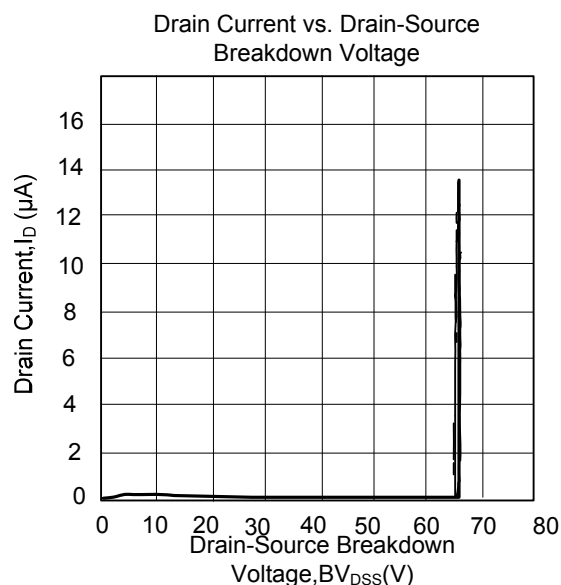
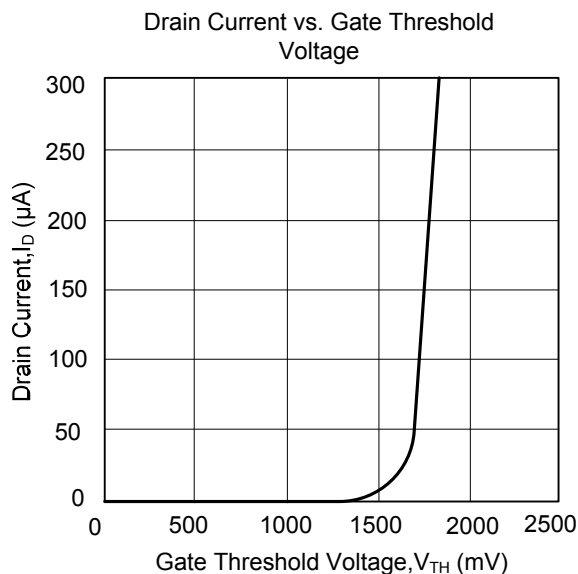
PARAMETER	SYMBOL	RATINGS	UNIT
Junction-to-Ambient	θ_{JA}	62.5	$^{\circ}\text{C/W}$

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

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV _{DSS}	V _{GS} =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		ΔBV _{DSS} /ΔT _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		3	V
Static Drain-Source On-Resistance (Note)		R _{DS(ON)}	V _{GS} =10V, I _D =5A			50	mΩ
			V _{GS} =4.5V, I _D =2.5 A			60	
Forward Transconductance (Note)	SOP-8	g _{FS}	V _{DS} =10V, I _D =5 A		16		S
	DIP-8				7		
DYNAMIC PARAMETERS							
Input Capacitance	SOP-8	C _{ISS}	V _{DS} =25V, V _{GS} =0V, f =1.0MHz		1658		pF
	DIP-8				1560		
Output Capacitance		C _{OSS}			156		pF
Reverse Transfer Capacitance	SOP-8	C _{RSS}			109		pF
	DIP-8				110		
SWITCHING PARAMETERS							
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
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
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 =5 A, V _{GS} =0 V, di/dt=100A/μs		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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