



## UP2790

Power MOSFET

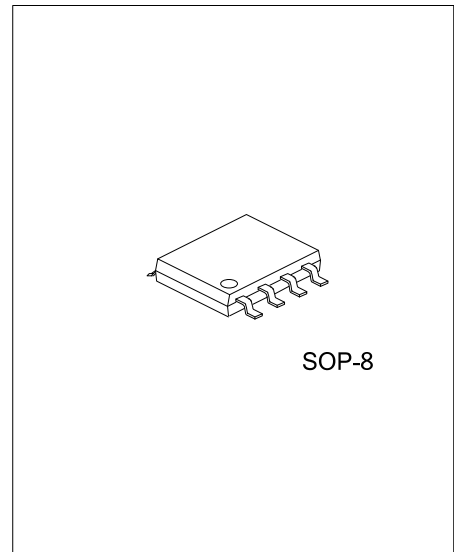
### SWITCHING N- AND P-CANNEL POWER MOSFET

#### DESCRIPTION

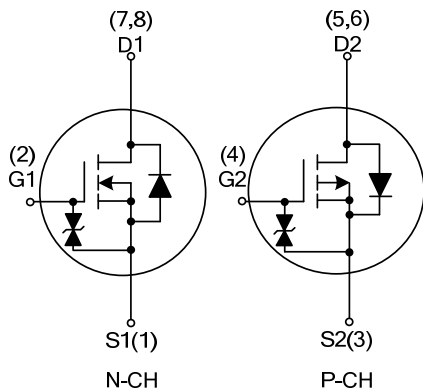
The UTC **UP2790** uses advanced technology to provide excellent  $R_{DS(ON)}$ , low gate charge and operation with low gate voltages. This device is suitable for use in Motor Drive application.

#### FEATURES

- \* Low on-state resistance:
  - N-channel:  $V_{GS} = 10V, I_D = 3A; R_{DS(ON)} = 28\ m\Omega$  (Max.)
  - $V_{GS} = 4.5V, I_D = 3A; R_{DS(ON)} = 40\ m\Omega$  (Max.)
  - P-channel:  $V_{GS} = -10V, I_D = -3A; R_{DS(ON)} = 60\ m\Omega$  (Max.)
  - $V_{GS} = -4.5V, I_D = -3A; R_{DS(ON)} = 80\ m\Omega$  (Max.)
- \* Low input capacitance
  - N-channel :  $C_{ISS}$  with 500 pF (Typ.)
  - P-channel :  $C_{ISS}$  with 460 pF (Typ.)
- \* Built-in gate protection diode



#### SYMBOL



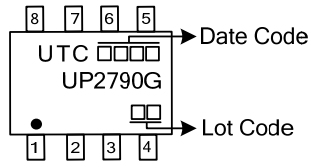
#### ORDERING INFORMATION

Ordering Number	Package	Pin Assignment								Packing
		1	2	3	4	5	6	7	8	
UP2790G-S08-R	SOP-8	S	G	S	G	D	D	D	D	Tape Reel

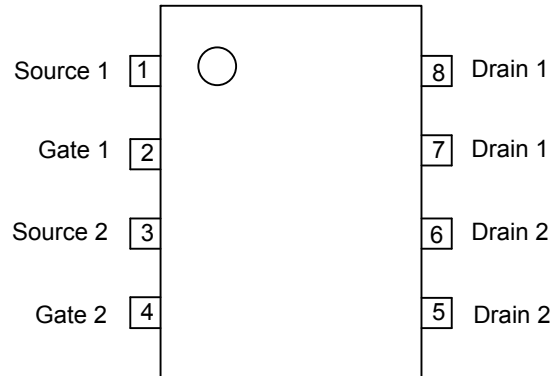
Note: Pin Assignment: G: Gate D: Drain S: Source

<p>UP2790G-S08-R</p> <ul style="list-style-type: none"> <li>(1) Packing Type</li> <li>(2) Package Type</li> <li>(3) Green Package</li> </ul>	<ul style="list-style-type: none"> <li>(1) R: Tape Reel</li> <li>(2) S08: SOP-8</li> <li>(3) G: Halogen Free and Lead Free</li> </ul>
--	---

## MARKING



## PIN CONFIGURATION



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

**N-Channel**

PARAMETER	SYMBOL	RATINGS	UNIT
Drain to Source Voltage ( $V_{GS}=0V$ )	$V_{DSS}$	30	V
Gate to Source Voltage ( $V_{DS}=0V$ )	$V_{GSS}$	$\pm 20$	V
Continuous Drain Current	$I_D$	6	A
Pulsed Drain Current (Note 2)	$I_{DM}$	24	A
Single Avalanche Current (Note 3)	$I_{AS}$	6	A
Single Avalanche Energy (Note 3)	$E_{AS}$	3.6	mJ
Power Dissipation (Note 4)	$P_D$	1.7	W
Junction Temperature	$T_J$	+150	$^\circ\text{C}$
Storage Temperature	$T_{STG}$	-55 ~ +150	$^\circ\text{C}$

**P-Channel**

PARAMETER	SYMBOL	RATINGS	UNIT
Drain to Source Voltage ( $V_{GS}=0V$ )	$V_{DSS}$	-30	V
Gate to Source Voltage ( $V_{DS}=0V$ )	$V_{GSS}$	$\pm 20$	V
Drain Current (DC)	$I_D$	-6	A
Pulsed Drain Current (Note 2)	$I_{DM}$	-24	A
Single Avalanche Current (Note 3)	$I_{AS}$	-6	A
Single Avalanche Energy (Note 3)	$E_{AS}$	3.6	mJ
Power Dissipation (Note 4)	$P_D$	1.7	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.

- $P_W \leq 10 \mu\text{s}$ , Duty Cycle  $\leq 1\%$
- Mounted on ceramic substrate of  $2000 \text{ mm}^2 \times 1.6 \text{ mm}$
- $L = 0.1 \text{ mH}$ ,  $V_{DD} = \frac{1}{2} \times V_{DSS}$ ,  $R_G = 25 \Omega$ , Starting  $T_J = 25^\circ\text{C}$

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

**N-Channel**

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =250uA	30			V
Drain-Source Leakage Current	I <sub>DSS</sub>	V <sub>DS</sub> =30 V, V <sub>GS</sub> =0 V			10	μA
Gate- Source Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> = ±16 V, V <sub>DS</sub> =0 V			±10	μA
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	V <sub>GS(TH)</sub>	V <sub>DS</sub> =10V, I <sub>D</sub> =1mA	1.5		2.5	V
Static Drain-Source On-State Resistance (Note)	R <sub>DS(ON)</sub>	V <sub>GS</sub> =10 V, I <sub>D</sub> =3 A		21	28	mΩ
		V <sub>GS</sub> =4.5 V, I <sub>D</sub> =3 A		28	40	mΩ
		V <sub>GS</sub> =4.0 V, I <sub>D</sub> =3 A		34	53	mΩ
<b>DYNAMIC PARAMETERS</b>						
Input Capacitance	C <sub>ISS</sub>	V <sub>DS</sub> =10 V, V <sub>GS</sub> =0 V, f=1MHz		500		pF
Output Capacitance	C <sub>OSS</sub>			135		pF
Reverse Transfer Capacitance	C <sub>RSS</sub>			77		pF
<b>SWITCHING PARAMETERS</b>						
Turn-ON Delay Time	t <sub>D(ON)</sub>	V <sub>DD</sub> =15V, V <sub>GS</sub> =10 V I <sub>D</sub> =3 A, R <sub>G</sub> =10 Ω		9.2		ns
Turn-ON Rise Time	t <sub>R</sub>			8.8		ns
Turn-OFF Delay Time	t <sub>D(OFF)</sub>			28		ns
Turn-OFF Fall-Time	t <sub>F</sub>	V <sub>DD</sub> =24 V, V <sub>GS</sub> =10 V, I <sub>D</sub> =6 A		7.4		ns
Total Gate Charge	Q <sub>G</sub>			12.6		nC
Gate to Source Charge	Q <sub>GS</sub>			1.7		nC
Gate to Drain Charge	Q <sub>GD</sub>			3.8		nC
<b>SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS</b>						
Drain-Source Diode Forward Voltage	V <sub>SD</sub>	I <sub>S</sub> = 6 A, V <sub>GS</sub> =0V (Note)		0.85		V
Diode Continuous Forward Current	I <sub>S</sub>				6	A
Diode Pulse Current	I <sub>SM</sub>				24	A

**P-Channel**

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =250uA	-30			V
Drain-Source Leakage Current	I <sub>DSS</sub>	V <sub>DS</sub> =-30 V, V <sub>GS</sub> =0 V			-10	μA
Gate- Source Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> = ±16 V, V <sub>DS</sub> =0 V			±10	μA
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	V <sub>GS(TH)</sub>	V <sub>DS</sub> =-10V, I <sub>D</sub> =-1mA	-1.0		-2.5	V
Static Drain-Source On-State Resistance (Note)	R <sub>DS(ON)</sub>	V <sub>GS</sub> =-10 V, I <sub>D</sub> =-3 A		43	60	mΩ
		V <sub>GS</sub> =-4.5 V, I <sub>D</sub> =-3 A		58	80	mΩ
		V <sub>GS</sub> =-4.0 V, I <sub>D</sub> =-3 A		65	110	mΩ
<b>DYNAMIC PARAMETERS</b>						
Input Capacitance	C <sub>ISS</sub>	V <sub>DS</sub> =-10 V, V <sub>GS</sub> =0 V, f=1.0MHz		460		pF
Output Capacitance	C <sub>OSS</sub>			130		pF
Reverse Transfer Capacitance	C <sub>RSS</sub>			77		pF
<b>SWITCHING PARAMETERS</b>						
Turn-ON Delay Time	t <sub>D(ON)</sub>	V <sub>DD</sub> =-15V, V <sub>GS</sub> =-10 V I <sub>D</sub> =-3 A, R <sub>G</sub> =10 Ω,		8.5		ns
Turn-ON Rise Time	t <sub>R</sub>			4.8		ns
Turn-OFF Delay Time	t <sub>D(OFF)</sub>			42		ns
Turn-OFF Fall-Time	t <sub>F</sub>	V <sub>DD</sub> =-24 V, V <sub>GS</sub> =-10 V, I <sub>D</sub> =-6 A		19		ns
Total Gate Charge	Q <sub>G</sub>			11		nC
Gate Source Charge	Q <sub>GS</sub>			1.7		nC
Gate Drain Charge	Q <sub>GD</sub>			3.3		nC

## ■ ELECTRICAL CHARACTERISTICS(Cont.)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS</b>						
Drain-Source Diode Forward Voltage	$V_{SD}$	$I_S = -6A, V_{GS} = 0V$ (Note)		0.92		V
Diode Continuous Forward Current	$I_S$				-6	A
Diode Pulse Current	$I_{SM}$				-24	A

Note: Pulsed

UTC assumes no responsibility for equipment failures that result from using products at values that exceed, even momentarily, rated values (such as maximum ratings, operating condition ranges, or other parameters) listed in products specifications of any and all UTC products described or contained herein. UTC products are not designed for use in life support appliances, devices or systems where malfunction of these products can be reasonably expected to result in personal injury. Reproduction in whole or in part is prohibited without the prior written consent of the copyright owner. The information presented in this document does not form part of any quotation or contract, is believed to be accurate and reliable and may be changed without notice.