



UP2790

Power MOSFET

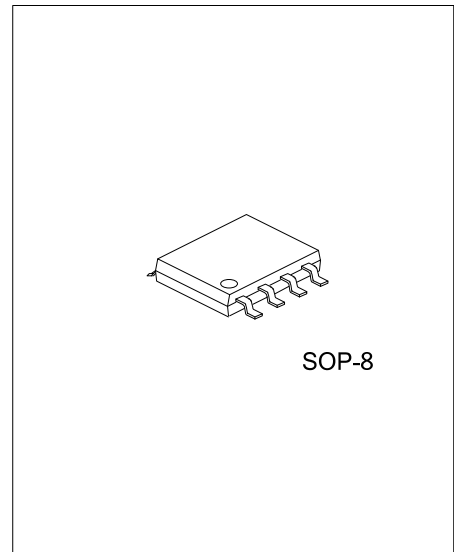
SWITCHING N- AND P-CHANNEL POWER MOSFET

DESCRIPTION

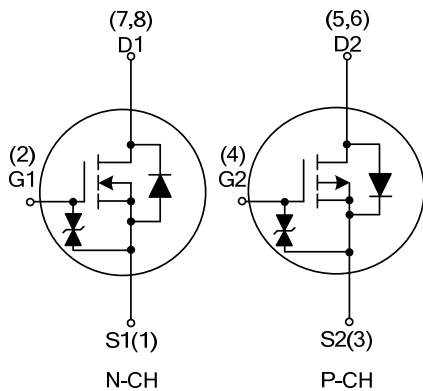
The UTC **UP2790** uses advanced technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with low gate voltages. This device is suitable for use in Motor Drive application.

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



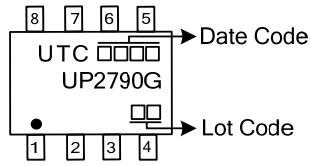
ORDERING INFORMATION

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

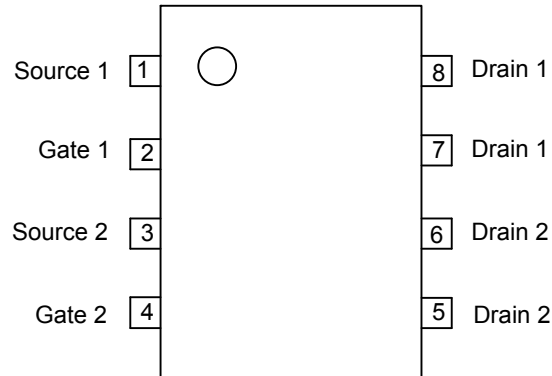
Note: Pin Assignment: G: Gate D: Drain S: Source

UP2790G-S08-R	(1) Packing Type	(1) R: Tape Reel
	(2) Package Type	(2) S08: SOP-8
	(3) Green Package	(3) G: Halogen Free and Lead Free

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}	± 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}	± 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.

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

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

N-Channel

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

P-Channel

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

■ ELECTRICAL CHARACTERISTICS(Cont.)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
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

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