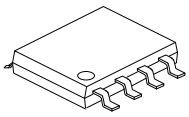
UP2790

Power MOSFET

SWITCHING N- AND P-CHANNEL POWER MOSFET



SOP-8

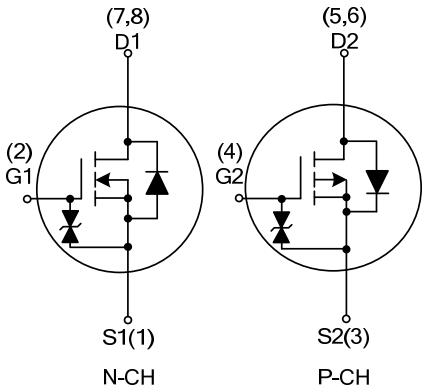
■ DESCRIPTION

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 mΩ (Max.)
  V_{GS}=4.5V, I_D=3A; $R_{DS(ON)}$ = 40 mΩ (Max.)
  P-channel: V_{GS}= -10V, I_D=-3A; $R_{DS(ON)}$ = 60 mΩ (Max.)
  V_{GS}=-4.5V, I_D=-3A; $R_{DS(ON)}$ = 80 mΩ (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

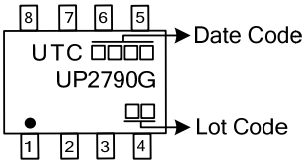
Ordering Number	Package	Pin Assignment								Packing
		1	2	3	4	5	6	7	8	
UP2790G-S08-R	SOP-8	S	G	S	G	D	D	D	D	Tape Reel

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

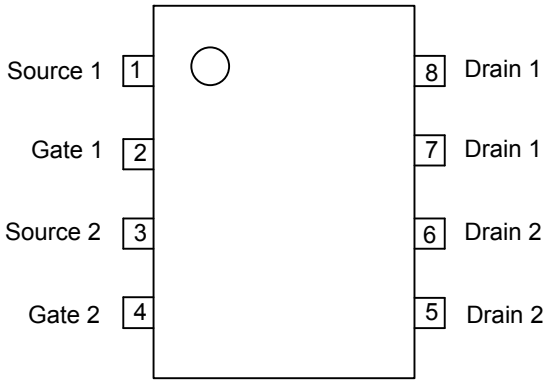
UP2790G-S08-R
(1) Packing Type
(2) Package Type
(3) Green Package

(1) R: Tape Reel
(2) S08: SOP-8
(3) G: Halogen Free and Lead Free

■ MARKING



■ PIN CONFIGURATION



■ ABSOLUTE MAXIMUM RATINGS (T_A =25°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	°C
Storage Temperature	T_{STG}	-55 ~ +150	°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	°C
Storage Temperature	T_{STG}	-55 ~ +150	°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≤10 μs, Duty Cycle≤1%

3. Mounted on ceramic substrate of 2000 mm^2 x 1.6 mm

4. L = 0.1mH, VDD = $\frac{1}{2}$ x V_{DSS}, RG = 25 Ω, Starting TJ = 25°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			7.4		ns
Total Gate Charge	Q_G	V_{DD} =24 V, V_{GS} =10 V, I_D =6 A		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			19		ns
Total Gate Charge	Q_G	V_{DD} =-24 V, V_{GS} =-10 V, I_D =-6 A		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