



# 6N10

**Power MOSFET**

## 6.5A, 100V N-CHANNEL POWER MOSFET

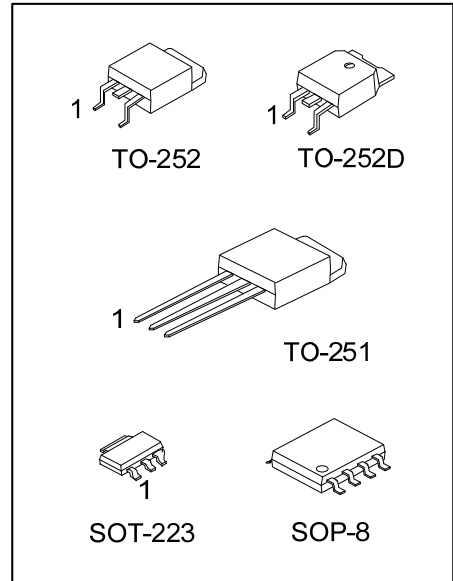
■ DESCRIPTION

The UTC **6N10** is an N-Channel enhancement mode power FET providing customers with excellent switching performance and minimum on-state resistance.

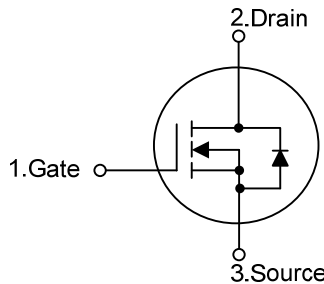
The UTC **6N10** is generally applied in voltage applications, such as DC motor control, audio amplifier and high efficiency switching DC/DC converters.

■ FEATURES

- \*  $R_{DS(ON)} \leq 0.2 \Omega @ V_{GS}=10V, I_D=3.0A$
- \* Fast switching
- \* Improved dv/dt capability



■ SYMBOL



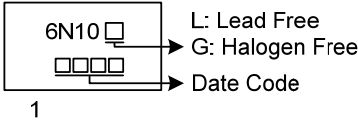
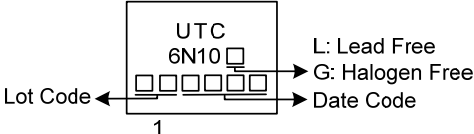
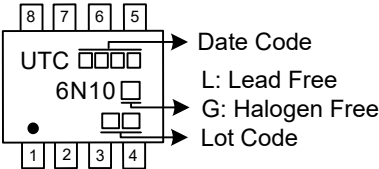
■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment								Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	
6N10L-AA3-R	6N10G-AA3-R	SOT-223	G	D	S	-	-	-	-	-	Tape Reel
6N10L-TM3-T	6N10G-TM3-T	TO-251	G	D	S	-	-	-	-	-	Tube
6N10L-TN3-R	6N10G-TN3-R	TO-252	G	D	S	-	-	-	-	-	Tape Reel
6N10L-TND-R	6N10G-TND-R	TO-252D	G	D	S	-	-	-	-	-	Tape Reel
6N10L-S08-R	6N10G-S08-R	SOP-8	S	S	S	G	D	D	D	D	Tape Reel

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

<p>6N10G-AA3-R</p> <p>(1)Packing Type</p> <p>(2)Package Type</p> <p>(3)Green Package</p>	<p>(1) R: Tape Reel, T: Tube</p> <p>(2) AA3: SOT-223, TM3: TO-251, TN3: TO-252, TND: TO-252D, S08: SOP-8</p> <p>(3) G: Halogen Free and Lead Free, L: Lead Free</p>
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MARKING

PACKAGE	MARKING
SOT-223	
TO-251 TO-252 TO-252D	
SOP-8	

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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		$V_{DS}$	100	V
Gate-Source Voltage		$V_{GS}$	$\pm 20$	V
Continuous Drain Current	Continuous	$I_D$	6.5	A
	Pulsed	$I_{DM}$	8.0	A
Repetitive Avalanche Energy (Duty Cycle $\leq 1\%$ )	L=0.1mH	$E_{AR}$	1.25	mJ
Power Dissipation	SOT-223	$P_D$	2.2	W
	TO-251/TO-252 TO-252D		30	W
	SOP-8		1.6	W
Junction Temperature		$T_J$	+150	$^\circ\text{C}$
Storage Temperature		$T_{STG}$	-55 ~ +150	$^\circ\text{C}$

Note: 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.

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	SOT-223	$\theta_{JA}$	140	$^\circ\text{C/W}$
	TO-251/TO-252 TO-252D		110	$^\circ\text{C/W}$
	SOP-8		50	$^\circ\text{C/W}$
Junction to Case	SOT-223	$\theta_{JC}$	56.8	$^\circ\text{C/W}$
	TO-251/TO-252 TO-252D		4.16	$^\circ\text{C/W}$
	SOP-8		78	$^\circ\text{C/W}$

Note:  $\theta_{JA}$  is the sum of the junction-to-case and case-to-ambient thermal resistance where the case thermal reference is defined as the solder mounting surface of the drain pins.  
 $\theta_{JC}$  is guaranteed by design while  $\theta_{JA}$  is determined by the user's board design.

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

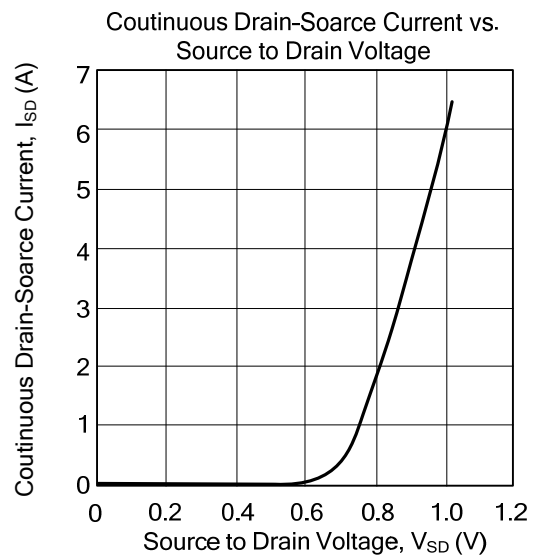
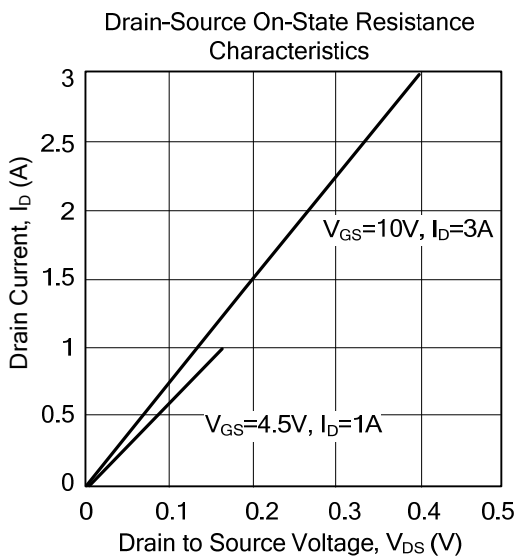
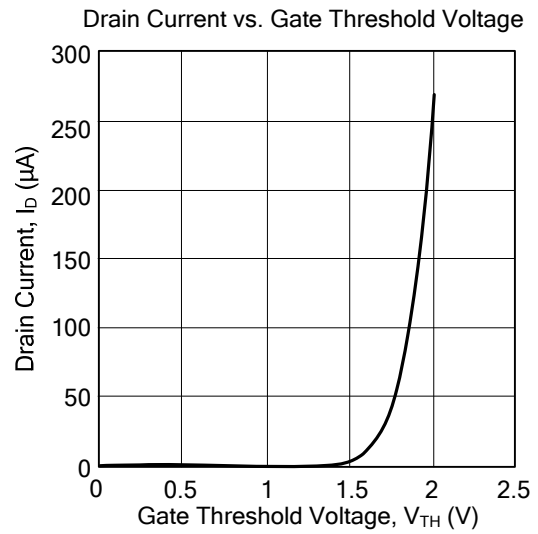
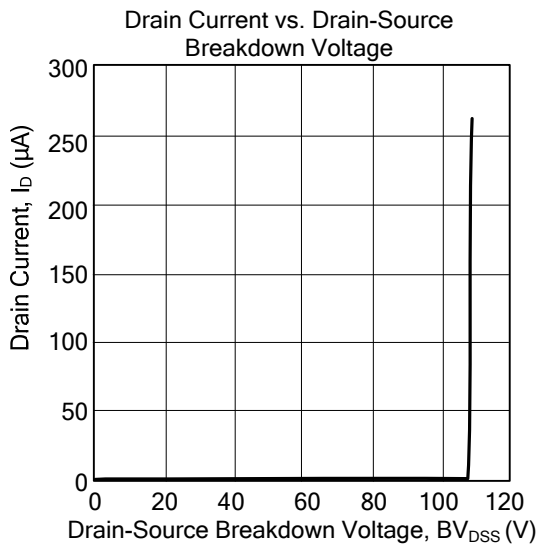
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	I <sub>D</sub> =250μA, V <sub>GS</sub> =0V	100			V
Drain-Source Leakage Current	I <sub>DSS</sub>	V <sub>DS</sub> =100V, V <sub>GS</sub> =0V			1	μA
		V <sub>DS</sub> =100V, V <sub>GS</sub> =0V, T <sub>J</sub> =125°C			50	μA
		V <sub>DS</sub> =100V, V <sub>GS</sub> =0V, T <sub>J</sub> =150°C			250	μA
Gate- Source Leakage Current	Forward	I <sub>GSS</sub>			+100	nA
	Reverse					
On-State Drain Current (Note 2)	I <sub>D(on)</sub>	V <sub>DS</sub> =5.0V, V <sub>GS</sub> =10V	8.0			A
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	V <sub>GS(TH)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	1.0		3.0	V
Static Drain-Source On-State Resistance (Note 2)	R <sub>DS(ON)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =3A		0.150	0.200	Ω
		V <sub>GS</sub> =10V, I <sub>D</sub> =3A, T <sub>J</sub> =125°C			0.350	Ω
		V <sub>GS</sub> =10V, I <sub>D</sub> =3A, T <sub>J</sub> =150°C			0.450	Ω
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =1.0A		0.160	0.225	Ω
Forward Transconductance (Note 2)	g <sub>FS</sub>	V <sub>DS</sub> =15V, I <sub>D</sub> =3.0A		8.5		S
<b>DYNAMIC PARAMETERS (Note1)</b>						
Input Capacitance	C <sub>ISS</sub>	V <sub>GS</sub> =0V, V <sub>DS</sub> =25V, f=1.0MHz		320		pF
Output Capacitance	C <sub>OSS</sub>			80		pF
Reverse Transfer Capacitance	C <sub>RSS</sub>			17		pF
<b>SWITCHING PARAMETERS</b>						
Total Gate Charge (Note 3)	Q <sub>G</sub>	V <sub>DS</sub> =50V, V <sub>GS</sub> =10V, I <sub>D</sub> =1.3A I <sub>G</sub> =100μA		27	75	nC
Gate to Source Charge (Note 3)	Q <sub>GS</sub>			2.4		nC
Gate to Drain Charge (Note 3)	Q <sub>GD</sub>			6.8		nC
Turn-ON Delay Time (Note3)	t <sub>D(ON)</sub>	V <sub>DD</sub> =30V, R <sub>L</sub> =7.5Ω, I <sub>D</sub> =0.5A, V <sub>GEN</sub> =10V, R <sub>G</sub> =25 Ω		28	58	ns
Rise Time (Note 3)	t <sub>R</sub>			30	60	ns
Turn-OFF Delay Time (Note 3)	t <sub>D(OFF)</sub>			148	178	ns
Fall-Time (Note 3)	t <sub>F</sub>			52	82	ns
<b>SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS (T<sub>C</sub>=25°C)</b>						
Maximum Pulsed Drain-Source Diode Forward Current	I <sub>SM</sub>				8.0	A
Drain-Source Diode Forward Voltage (Note 2)	V <sub>SD</sub>	I <sub>F</sub> =6.5A, V <sub>GS</sub> =0V		0.9	1.3	V
Reverse Recovery Time	t <sub>rr</sub>	I <sub>F</sub> =6.5A, di/dt=100A/μs		35	60	ns

Notes: 1. Guaranteed by design, not subject to production testing.

2. Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2%.

3. Independent of operating temperature.

■ TYPICAL CHARACTERISTICS



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