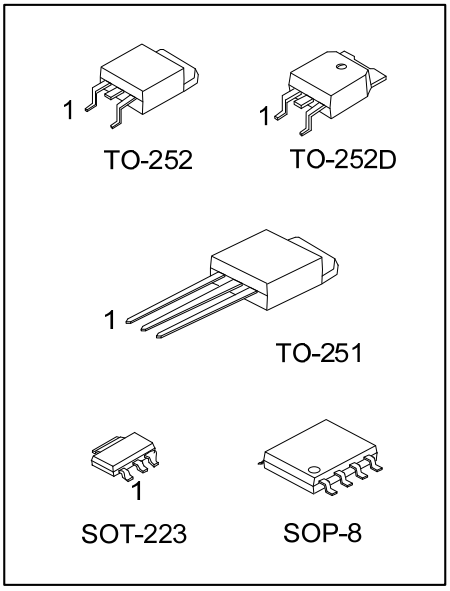
6.5A, 100V N-CHANNEL POWER MOSFET



■ DESCRIPTION

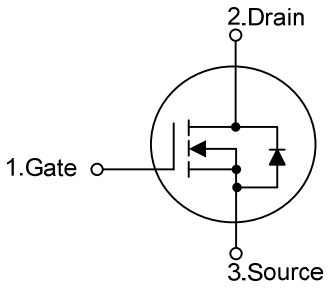
The UTC **6N10** is an N-Channel enhancement mode power FET providing customers with excellent switching performance and minimum on-state resistance.

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

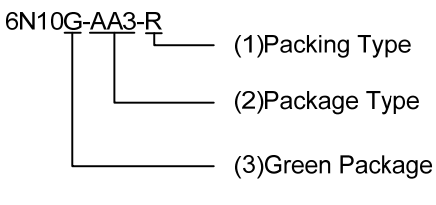
■ SYMBOL



■ ORDERING INFORMATION

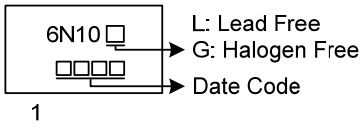
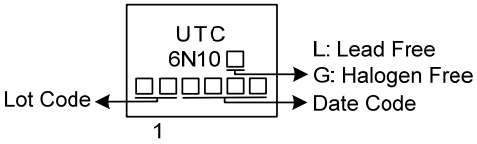
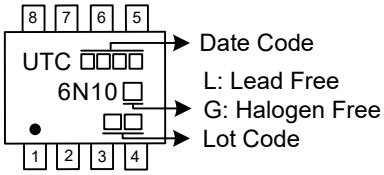
Ordering Number		Package	Pin Assignment								Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	
6N10L-AA3-R	6N10G-AA3-R	SOT-223	G	D	S	-	-	-	-	-	Tape Reel
6N10L-TM3-T	6N10G-TM3-T	TO-251	G	D	S	-	-	-	-	-	Tube
6N10L-TN3-R	6N10G-TN3-R	TO-252	G	D	S	-	-	-	-	-	Tape Reel
6N10L-TND-R	6N10G-TND-R	TO-252D	G	D	S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



(1) R: Tape Reel, T: Tube
(2) AA3: SOT-223, TM3: TO-251, TN3: TO-252, TND: TO-252D, S08: SOP-8
(3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING

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

■ ABSOLUTE MAXIMUM RATINGS (T_C =25°C, unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DS}	100	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current	Continuous	I_D	6.5	A
	Pulsed	I_{DM}	8.0	A
Repetitive Avalanche Energy (Duty Cycle ≤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	°C
Storage Temperature		T_{STG}	-55 ~ +150	°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	θ_{JA}	140	°C/W
	TO-251/TO-252 TO-252D		110	°C/W
	SOP-8		50	°C/W
Junction to Case	SOT-223	θ_{JC}	56.8	°C/W
	TO-251/TO-252 TO-252D		4.16	°C/W
	SOP-8		78	°C/W

Note: θ_{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.
θ_{JC} is guaranteed by design while θ_{JA} is determined by the user's board deign.

■ ELECTRICAL CHARACTERISTICS (T_J=25°C, unless otherwise noted)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV_{DSS}	I_D=250μA, V_{GS}=0V	100			V
Drain-Source Leakage Current		I_{DSS}	V_{DS}=100V, V_{GS}=0V			1	μA
			V_{DS}=100V, V_{GS}=0V, T_J=125°C			50	μA
			V_{DS}=100V, V_{GS}=0V, T_J=150°C			250	μA
Gate- Source Leakage Current	Forward	I_{GSS}	V_{GS}=+20V, V_{DS}=0V			+100	nA
	Reverse		V_{GS}=-20V, V_{DS}=0V			-100	nA
On-State Drain Current (Note 2)		$I_{D(on)}$	V_{DS}=5.0V, V_{GS}=10V	8.0			A
ON CHARACTERISTICS							
Gate Threshold Voltage		$V_{GS(TH)}$	V_{DS}=V_{GS}, I_D=250μA	1.0		3.0	V
Static Drain-Source On-State Resistance (Note 2)		$R_{DS(ON)}$	V_{GS}=10V, I_D=3A		0.150	0.200	Ω
			V_{GS}=10V, I_D=3A, T_J=125°C			0.350	Ω
			V_{GS}=10V, I_D=3A, T_J=150°C			0.450	Ω
			V_{GS}=4.5V, I_D=1.0A		0.160	0.225	Ω
Forward Transconductance (Note 2)		g_{FS}	V_{DS}=15V, I_D=3.0A		8.5		S
DYNAMIC PARAMETERS (Note1)							
Input Capacitance		C_{ISS}	V_{GS}=0V, V_{DS}=25V, f=1.0MHz		320		pF
Output Capacitance		C_{OSS}			80		pF
Reverse Transfer Capacitance		C_{RSS}			17		pF
SWITCHING PARAMETERS							
Total Gate Charge (Note 3)		Q_G	V_{DS}=50V, V_{GS}=10V, I_D=1.3A I_G=100μA		27	75	nC
Gate to Source Charge (Note 3)		Q_{GS}			2.4		nC
Gate to Drain Charge (Note 3)		Q_{GD}			6.8		nC
Turn-ON Delay Time (Note3)		$t_{D(ON)}$	V_{DD}=30V, R_L=7.5Ω, I_D=0.5A, V_{GEN}=10V, R_G=25 Ω		28	58	ns
Rise Time (Note 3)		t_R			30	60	ns
Turn-OFF Delay Time (Note 3)		$t_{D(OFF)}$			148	178	ns
Fall-Time (Note 3)		t_F			52	82	ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS (T_C=25°C)							
Maximum Pulsed Drain-Source Diode Forward Current		I_{SM}				8.0	A
Drain-Source Diode Forward Voltage (Note 2)		V_{SD}	I_F=6.5A, V_{GS}=0V		0.9	1.3	V
Reverse Recovery Time		t_{rr}	I_F=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