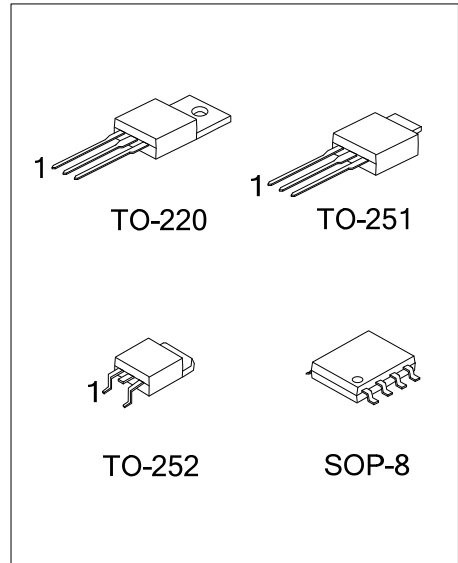
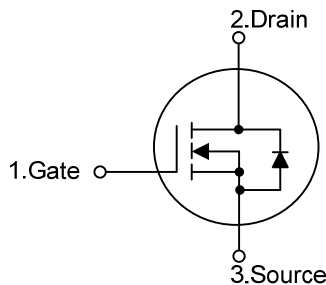


**12N10****Power MOSFET****12A, 100V N-CHANNEL
POWER MOSFET****DESCRIPTION**

The UTC **12N10** is an N-channel mode power MOSFET using UTC's advanced technology to provide customers with minimum on-state resistance for extremely high dense cell design, rugged avalanche characteristics and less critical alignment steps.

FEATURES

- * $R_{DS(on)} \leq 0.15 \Omega$ @ $V_{GS}=10V$, $I_D=6.0A$
- $R_{DS(on)} \leq 0.18 \Omega$ @ $V_{GS}=4.5V$, $I_D=6.0A$
- * High switching speed
- * Low gate charge

SYMBOL**ORDERING INFORMATION**

Ordering Number		Package	Pin Assignment								Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	
12N10L-TA3-T	12N10G-TA3-T	TO-220	G	D	S	-	-	-	-	-	Tube
12N10L-TM3-T	12N10G-TM3-T	TO-251	G	D	S	-	-	-	-	-	Tube
12N10L-TN3-R	12N10G-TN3-R	TO-252	G	D	S	-	-	-	-	-	Tape Reel
12N10L-S08-R	12N10G-S08-R	SOP-8	S	S	S	G	D	D	D	D	Tape Reel

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

12N10G-TA3-T (1) Packing Type (2) Package Type (3) Green Package		(1) T: Tube, R: Tape Reel (2) TA3: TO-220, TM3: TO-251, TN3: TO-252 S08: SOP-8 (3) G: Halogen Free and Lead Free, L: Lead Free
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MARKING

TO-220 / TO-251 / TO-252	SOP-8
UTC 12N10 Lot Code 1 L: Lead Free G: Halogen Free Date Code	8765 UTC 12N10 1234 Date Code L: Lead Free G: Halogen Free Lot Code

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

PARAMETER			SYMBOL	RATINGS	UNIT
Drain-Source Voltage ($V_{GS}=0$)			V_{DSS}	100	V
Gate-Source Voltage			V_{GSS}	± 20	V
Drain Current	Continuous	$T_C=25^{\circ}\text{C}$	I_D	12	A
		$T_C=100^{\circ}\text{C}$		7.2	A
	Pulsed (Note 2)		I_{DM}	24	A
Power Dissipation	TO-220		P_D	58	W
	TO-251/TO-252			34.5	W
	SOP-8			4.7	W
Avalanche Energy (Note 3)			E_{AS}	64	mJ
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. Repetitive Rating : Pulse width limited by maximum junction temperature.

3. $L=0.1\text{mH}$, $I_{AS}=35.7\text{A}$, $V_{DD}=50\text{V}$, $R_G=25\ \Omega$, Starting $T_J = 25^{\circ}\text{C}$

4. $I_{SD} \leq 12\text{A}$, $di/dt \leq 100\text{A}/\mu\text{s}$, $V_{DD} \leq BV_{DSS}$, Starting $T_J = 25^{\circ}\text{C}$

■ **THERMAL DATA**

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220	θ_{JA}	62.5	$^{\circ}\text{C}/\text{W}$
	TO-251/TO-252		100	$^{\circ}\text{C}/\text{W}$
	SOP-8		90 (Note)	$^{\circ}\text{C}/\text{W}$
Junction to Case	TO-220	θ_{JC}	2.15	$^{\circ}\text{C}/\text{W}$
	TO-251/TO-252		3.62	$^{\circ}\text{C}/\text{W}$
	SOP-8		26.6 (Note)	$^{\circ}\text{C}/\text{W}$

Note: Device mounted on 1in^2 FR-4 board with 2oz. Copper, $t = 10\text{sec}$.

■ **ELECTRICAL CHARACTERISTICS** ($T_C=25^\circ\text{C}$, unless otherwise specified)

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} =Max rating, V _{GS} =0V			1	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 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		R _{DS(ON)}	V _{GS} =10V, I _D =6.0A			0.15	Ω
			V _{GS} =4.5V, I _D =6.0A			0.18	Ω
DYNAMIC PARAMETERS							
Input Capacitance		C _{ISS}	V _{GS} =0V, V _{DS} =25V, f=1.0MHz		740		pF
Output Capacitance		C _{OSS}			114		pF
Reverse Transfer Capacitance		C _{RSS}			15		pF
SWITCHING PARAMETERS (Note 1,2)							
Total Gate Charge		Q _G	V _{DS} =80V, V _{GS} =10V I _D =12A, I _G =1mA (Note 1,2)		24		nC
Gate to Source Charge		Q _{GS}			5.6		nC
Gate to Drain Charge		Q _{GD}			5.4		nC
Turn-ON Delay Time		t _{D(ON)}	V _{DD} =50V, V _{GS} =10V, I _D =12A R _G =25Ω (Note 1, 2)		6		ns
Rise Time		t _R			14.5		ns
Turn-OFF Delay Time		t _{D(OFF)}			38		ns
Fall-Time		t _F			16		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Body-Diode Continuous Current		I _S				12	A
Maximum Body-Diode Pulsed Current		I _{SM}				24	A
Drain-Source Diode Forward Voltage (Note 1)		V _{SD}	I _S =12A, V _{GS} =0V			1.2	V
Reverse Recovery Time (Note 1)		t _{rr}	I _S =8.0A, V _{GS} =0V dI _F /dt=100A/μs		63		ns
Reverse Recovery Charge		Q _{rr}			317		nC

Notes: 1. Pulse Test: Pulse width $\leq 300\mu\text{s}$, Duty cycle $\leq 2\%$.

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

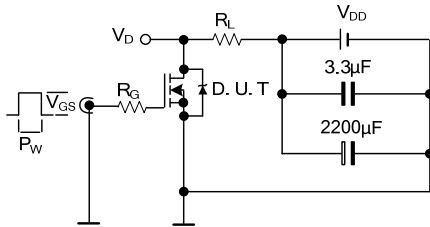


Fig. 1 Switching Times Test Circuit for Resistive Load

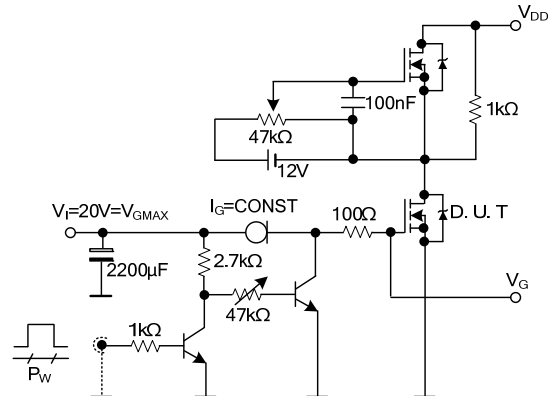


Fig. 2 Gate Charge Test Circuit

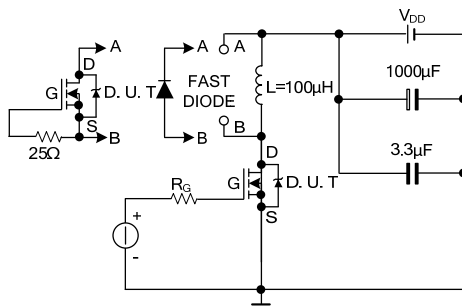


Fig. 3 Test Circuit for Inductive Load Switching and Diode Recovery Times

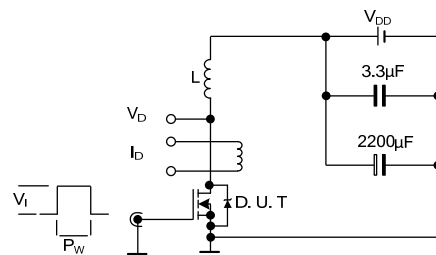


Fig. 4 Unclamped Inductive Load Test Circuit

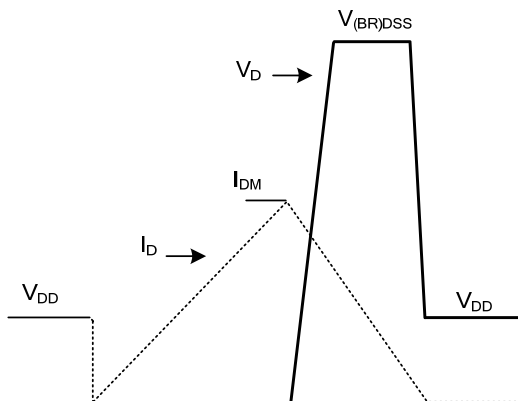
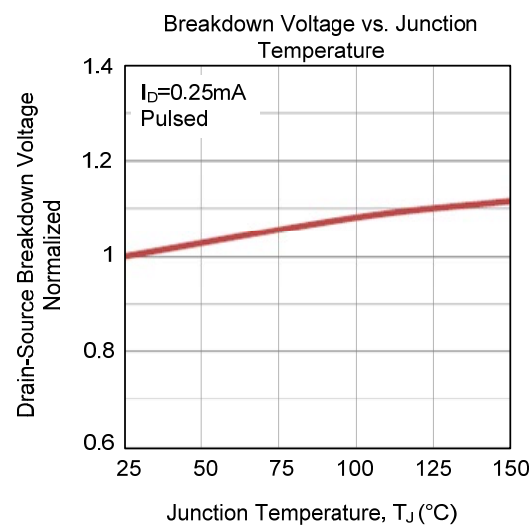
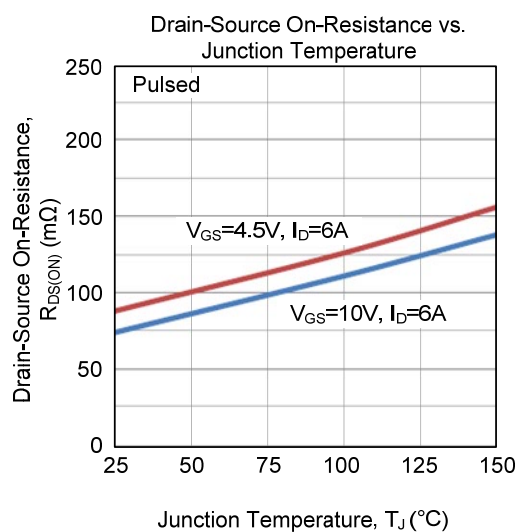
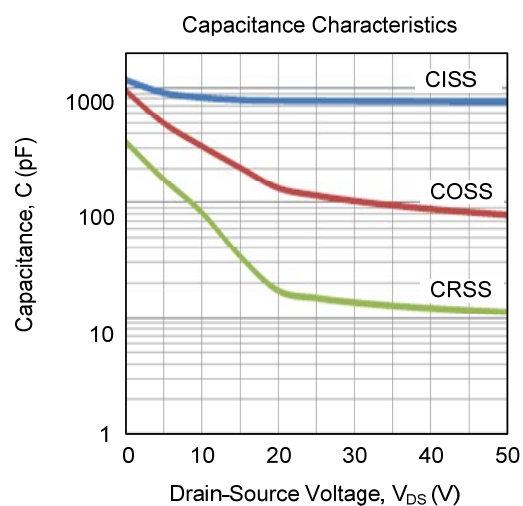
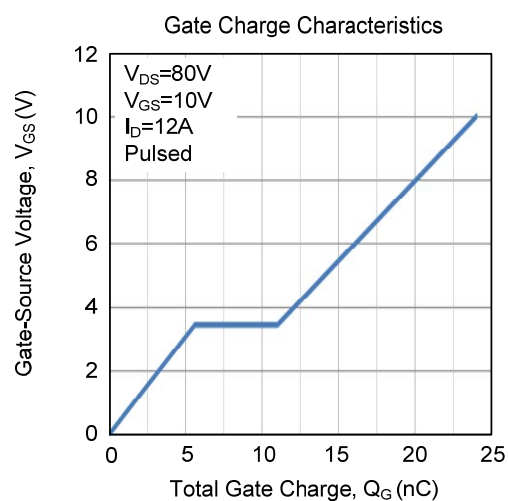
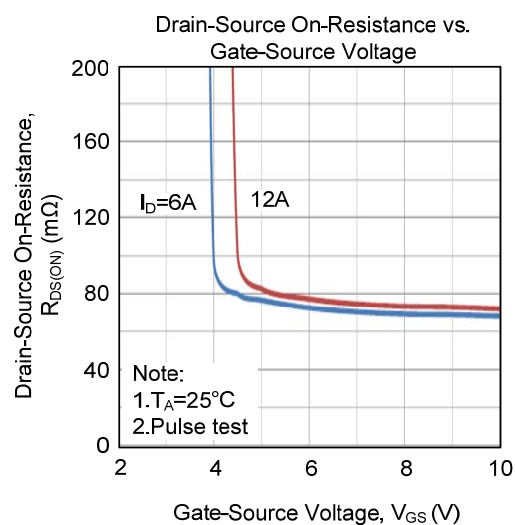
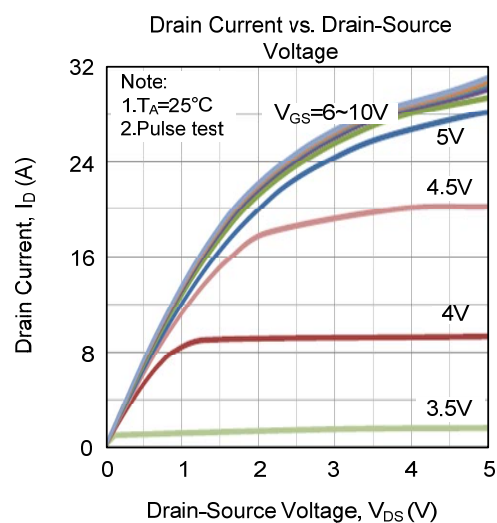
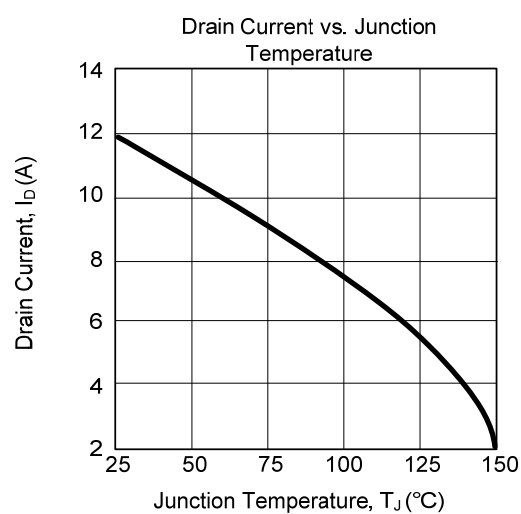
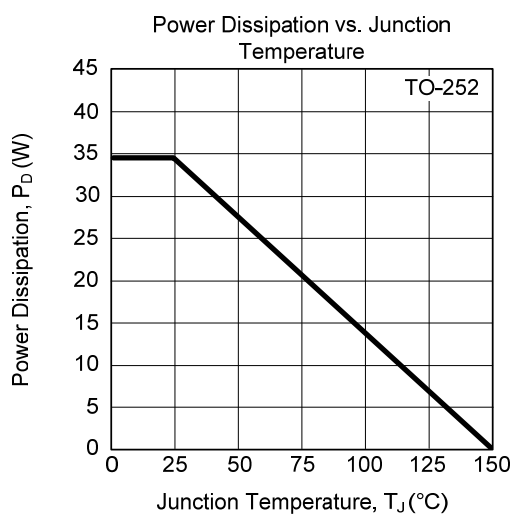
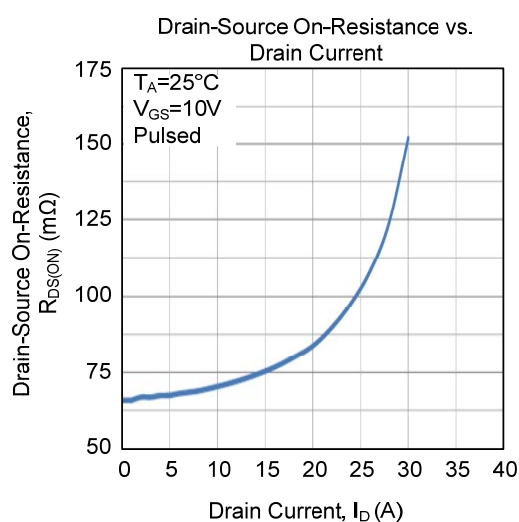
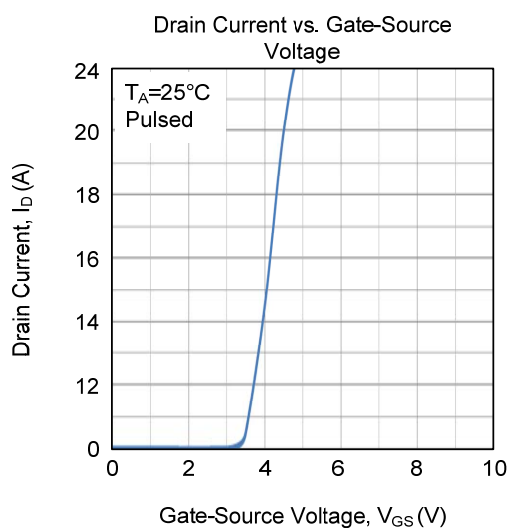
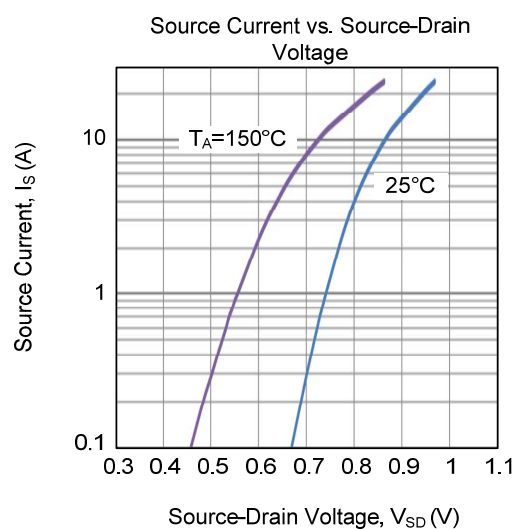
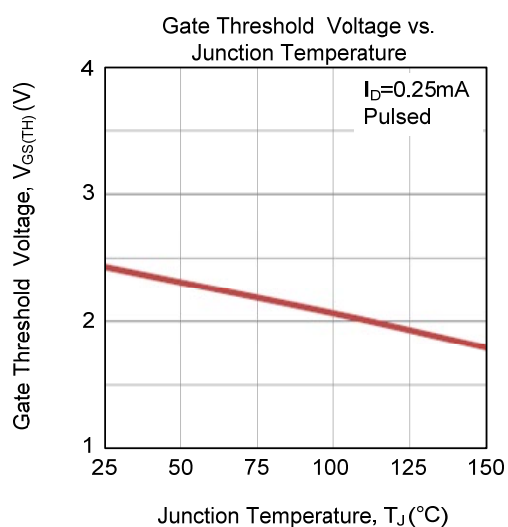


Fig. 5 Unclamped Inductive Waveform

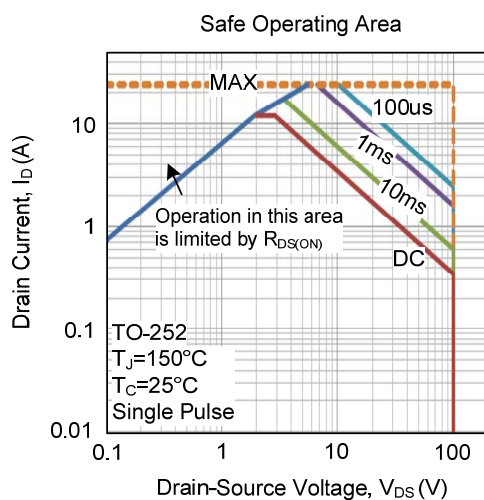
■ TYPICAL CHARACTERISTICS



TYPICAL CHARACTERISTICS (Cont.)



■ TYPICAL CHARACTERISTICS (Cont.)



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