



UF1010E

Power MOSFET

N-CHANNEL POWER MOSFET

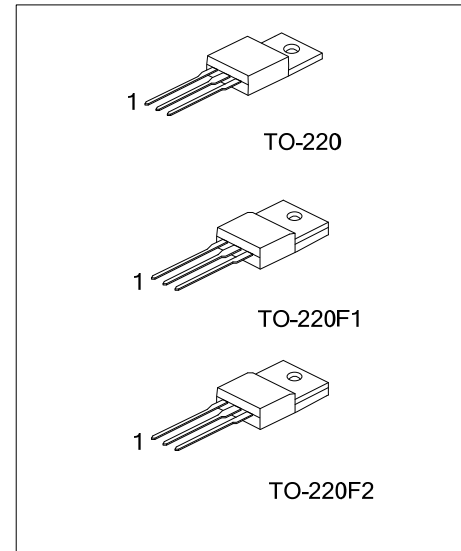
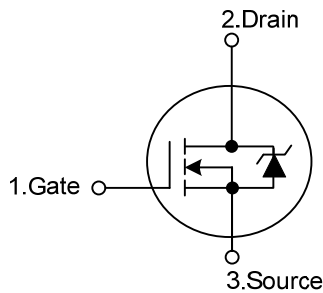
DESCRIPTION

Using high technology of UTC, UTC **UF1010E** has the features such as: low $R_{DS(ON)}$, fast switching, and low gate charge. Like features of all power MOSFET devices' features, UTC **UF1010E** can satisfy almost all the requirements of high efficient device form customers.

FEATURES

- * $R_{DS(ON)} < 12 \text{ m}\Omega @ V_{GS} = 10\text{V}$
- * Ultra low gate charge : 130 nC
- * Low $C_{RSS} = 140 \text{ pF (typ.)}$
- * Fast switching capability
- * Avalanche energy specified
- * Improved dv/dt capability
- * High ruggedness

SYMBOL



ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UF1010EL-TA3-T	UF1010EG-TA3-T	TO-220	G	D	S	Tube
UF1010EL-TF1-T	UF1010EG-TF1-T	TO-220F1	G	D	S	Tube
UF1010EL-TF2-T	UF1010EG-TF2-T	TO-220F2	G	D	S	Tube

<p>UF1010EL-TA3-T</p> <p>(1) Packing Type</p> <p>(2) Package Type</p> <p>(3) Lead Free</p>	<p>(1) T: Tube</p> <p>(2) TA3: TO-220, TF1: TO-220F1, TF2: TO-220F2</p> <p>(3) G: Halogen Free, L: Lead Free</p>
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■ ABSOLUTE MAXIMUM RATINGS ($T_J=25^{\circ}\text{C}$, unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT
Gate to Source Voltage		V_{GS}	± 20	V
Drain Current	Continuous ($V_{GS}=10\text{V}$)	I_D	84	A
	Pulsed (Note 2)	I_{DM}	330	
Avalanche Current (Note 2)		I_{AR}	50	A
Avalanche Energy	Repetitive (Note 2)	E_{AR}	17	mJ
	Single Pulsed (Note3)	E_{AS}	1180	mJ
Power Dissipation ($T_C=25^{\circ}\text{C}$)	TO-220	P_D	200	W
	TO-220F1/ TO-220F2		54	
Junction Temperature		T_J	+150	$^{\circ}\text{C}$
Storage Temperature		T_{STG}	-55 ~ +150	$^{\circ}\text{C}$

Note: 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. Pulse width limited by $T_{J(MAX)}$

3. $T_J=25^{\circ}\text{C}$, $L=260\mu\text{H}$, $R_G=25\Omega$, $I_{AS}=50\text{A}$

■ THERMAL DATA

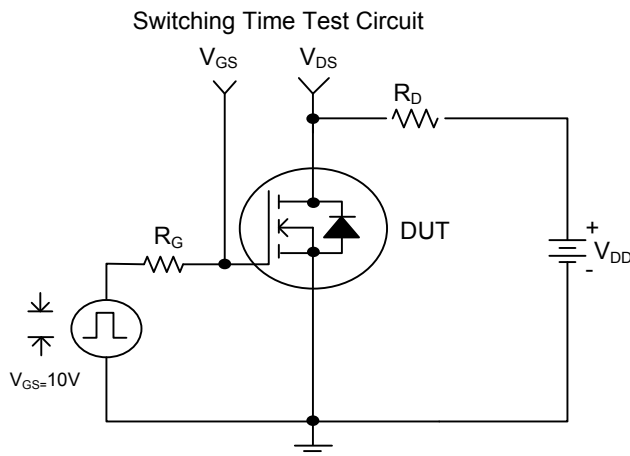
PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220	θ_{JA}	62	$^{\circ}\text{C/W}$
	TO-220F1/ TO-220F2		62.5	
Junction to Case	TO-220	θ_{Jc}	0.75	$^{\circ}\text{C/W}$
	TO-220F1/ TO-220F2		2.3	

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

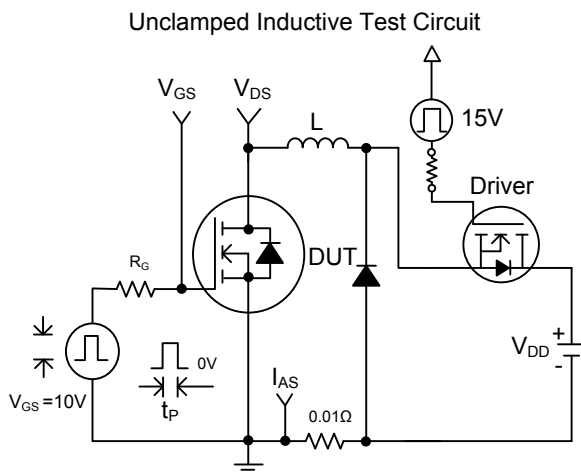
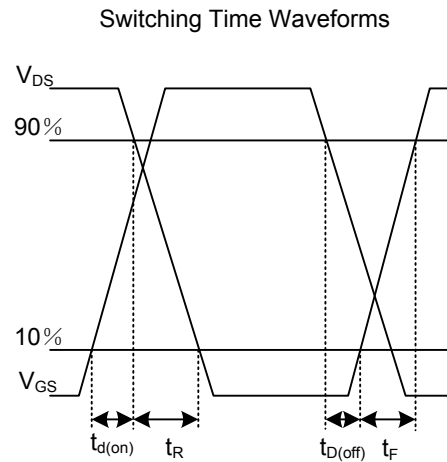
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0 V, I _D =250 μA	60			V
Drain-Source Leakage Current	I _{DSS}	V _{DS} =60 V, V _{GS} =0 V			25	μA
		V _{DS} =48 V, V _{GS} =0 V, T _J =150°C			250	μA
Gate-Source Leakage Current	I _{GSS}	V _{GS} =±20 V, V _{DS} =0 V			±100	nA
Breakdown Voltage Temperature Coefficient	ΔBV _{DSS} /ΔT _J	Reference to 25°C, I _D =1mA		0.064		V/°C
ON CHARACTERISTICS						
Gate Threshold Voltage	V _{GS(TH)}	V _{DS} =V _{GS} , I _D =250 μA	2.0		4.0	V
Static Drain-Source On Resistance(Note)	R _{DS(ON)}	V _{GS} =10 V, I _D =50 A			12	mΩ
DYNAMIC PARAMETERS						
Input Capacitance	C _{ISS}	V _{DS} =25 V, V _{GS} =0 V, f=1MHz		3210		pF
Output Capacitance	C _{OSS}			690		pF
Reverse Transfer Capacitance	C _{RSS}			140		pF
SWITCHING PARAMETERS						
Total Gate Charge	Q _G	I _D =50A, V _{DS} =48V, V _{GS} =10V			130	nC
Gate-to-Source Charge	Q _{GS}				28	nC
Gate-to-Drain ("Miller") Charge	Q _{GD}				44	nC
Turn ON Delay Time	t _{D(ON)}	V _{DD} =30V, I _D =50A, R _G =3.6Ω V _{GS} = 10V		12		ns
Turn ON Rise Time	t _R			78		ns
Turn OFF Delay Time	t _{D(OFF)}			48		ns
Turn OFF Fall Time	t _F			53		ns
Internal Drain Inductance	L _D			4.5		nH
Internal Source Inductance	L _S			7.5		nH
Diode Forward Voltage	V _{SD}	T _J = 25°C, I _S = 50A, V _{GS} = 0V			1.3	V
Maximum Continuous Drain-Source Diode Forward Current	I _S				84	A
Maximum Pulsed Drain-Source Diode Forward Current	I _{SM}				330	A
Reverse Recovery Time	t _{rr}	T _J =25°C, I _F =50A,		73	110	ns
Reverse Recovery Charge	Q _{RR}	di/dt=100A/μs		220	330	nC

Note: Pulse width ≤ 400μs; duty cycle ≤ 2%.

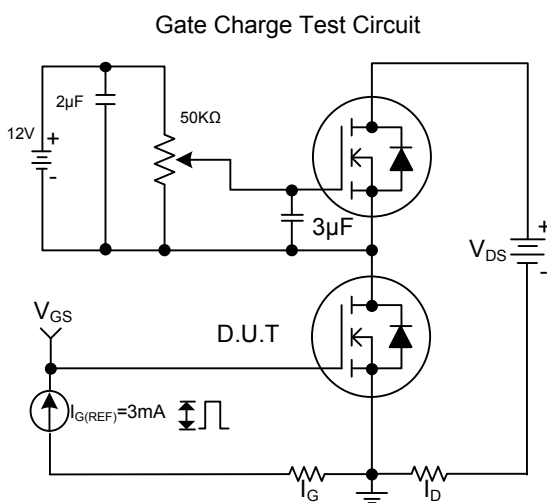
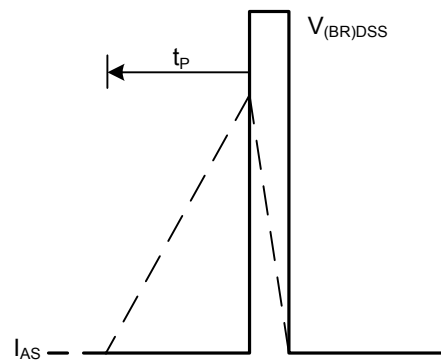
■ TEST CIRCUITS AND WAVEFORMS



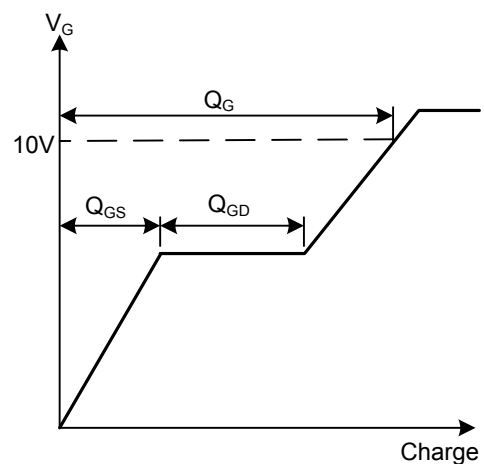
Pulse Width $\leq 1\mu\text{s}$ Duty Cycle $\leq 0.1\%$



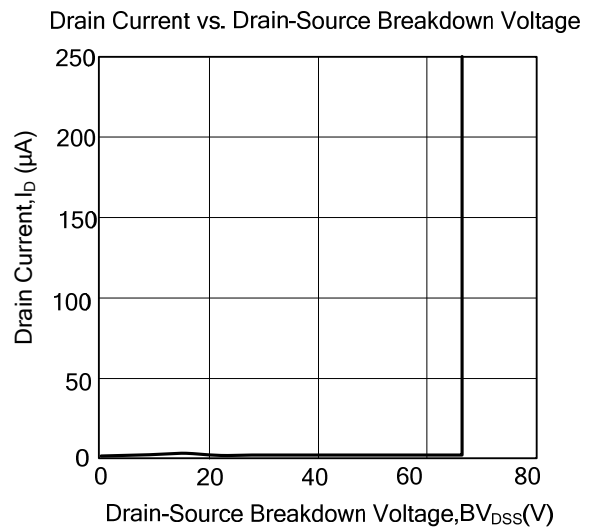
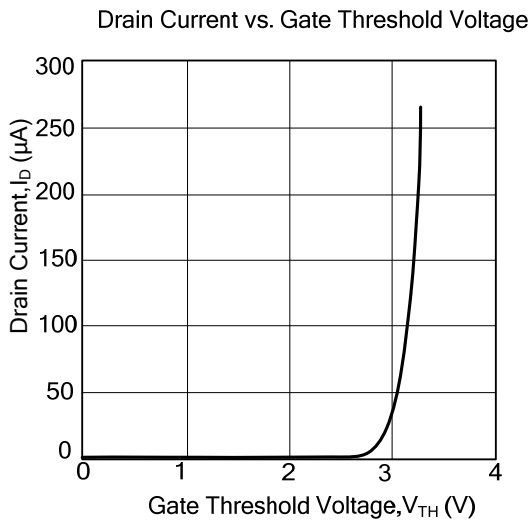
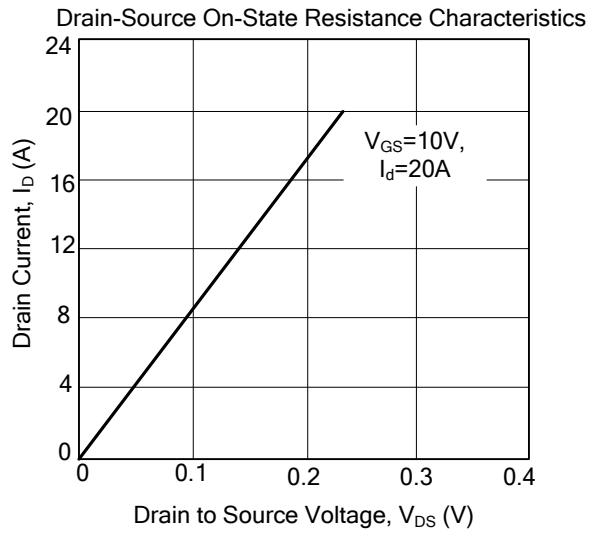
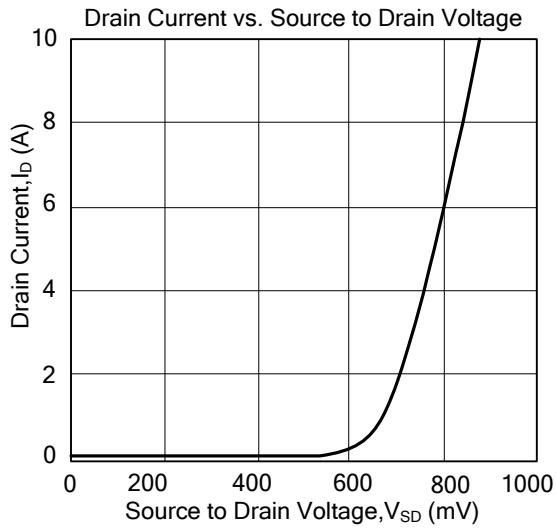
Unclamped Inductive Waveforms



Basic Gate Charge Waveform



TYPICAL CHARACTERISTICS



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