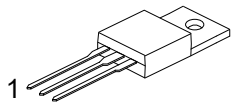
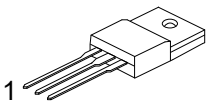
UF1010E

Power MOSFET

N-CHANNEL POWER MOSFET



TO-220



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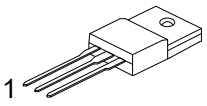

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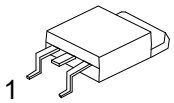


TO-263

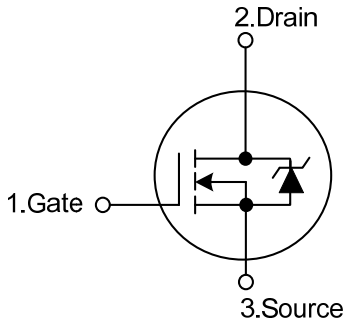
■ DESCRIPTION

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

* $R_{DS(ON)} \leq 12\ m\Omega$ @ V_{GS}=10V, I_D=50A
* 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
UF1010EL-TQ2-T	UF1010EG-TQ2-T	TO-263	G	D	S	Tube
UF1010EL-TQ2-R	UF1010EG-TQ2-R	TO-263	G	D	S	Tape Reel

UF1010EG-TA3-T
(1)Packing Type
(2)Package Type
(3)Green Package

(1) T: Tube, R: Tape Reel
(2) TA3: TO-220, TF1: TO-220F1, TF2: TO-220F2
TQ2: TO-263
(3) G: Halogen Free and Lead Free, L: Lead Free

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

PARAMETER		SYMBOL	RATINGS	UNIT
Gate to Source Voltage		V_{GSS}	±20	V
Drain Current	Continuous (V_{GS}=10V)	I_D	84	A
	Pulsed (Note 2)	I_{DM}	330	A
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°C)	TO-220/TO-263	P_D	200	W
	TO-220F1/TO-220F2		54	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. Repetitive Rating: Pulse width limited by maximum junction temperature.
3. L = 260μH, I_{AS} = 50A, R_G = 25 Ω, Starting T_J = 25°C.

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220/TO-263	θ_{JA}	62	°C/W
	TO-220F1/TO-220F2		62.5	°C/W
Junction to Case	TO-220/TO-263	θ_{Jc}	0.75	°C/W
	TO-220F1/TO-220F2		2.3	°C/W

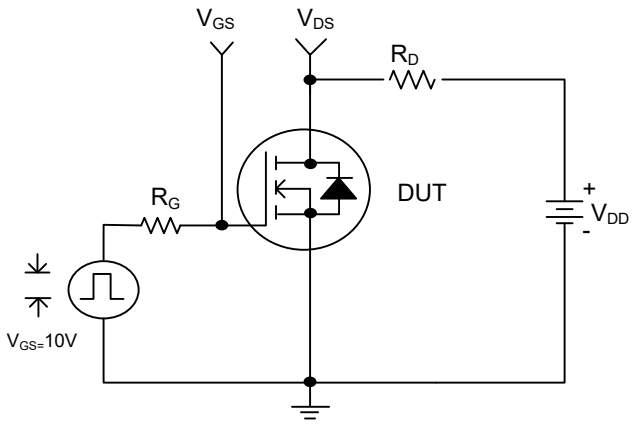
■ ELECTRICAL CHARACTERISTICS (T_J=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V, I_D=250μA	60			V
Drain-Source Leakage Current	I_{DSS}	V_{DS}=60V, V_{GS}=0V			25	μA
		V_{DS}=48V, V_{GS}=0V, T_J=150°C			250	μA
Gate-Source Leakage Current	I_{GSS}	V_{GS}=±20V, V_{DS}=0V			±100	nA
Breakdown Voltage Temperature Coefficient	$\triangle BV_{DSS}/\triangle T_J$	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=250μA	2.0		4.0	V
Static Drain-Source On Resistance(Note)	$R_{DS(ON)}$	V_{GS}=10V, I_D=50A			12	mΩ
DYNAMIC PARAMETERS						
Input Capacitance	C_{ISS}	V_{DS}=25V, V_{GS}=0V, f=1MHz		3210		pF
Output Capacitance	C_{OSS}			690		pF
Reverse Transfer Capacitance	C_{RSS}			110		pF
SWITCHING PARAMETERS						
Total Gate Charge	Q_G	I_D =50A, V_{DS}=48V, V_{GS}=10V		80	130	nC
Gate-to-Source Charge	Q_{GS}			26	28	nC
Gate-to-Drain ("Miller") Charge	Q_{GD}			28	44	nC
Turn ON Delay Time	$t_{D(ON)}$	V_{DD}=30V, V_{GS}=10V, I_D=50A, R_G=3.6Ω		16		ns
Turn ON Rise Time	t_R			24		ns
Turn OFF Delay Time	$t_{D(OFF)}$			43		ns
Turn OFF Fall Time	t_F			18		ns
Internal Drain Inductance	L_D			4.5		nH
Internal Source Inductance	L_S			7.5		nH
Diode Forward Voltage	V_{SD}	I_S=50A, V_{GS}=0V, T_J=25°C			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}	I_F=50A, V_{GS}=0V, di/dt=100A/μs, T_J=25°C		89	110	ns
Reverse Recovery Charge	Q_{rr}			220	330	nC

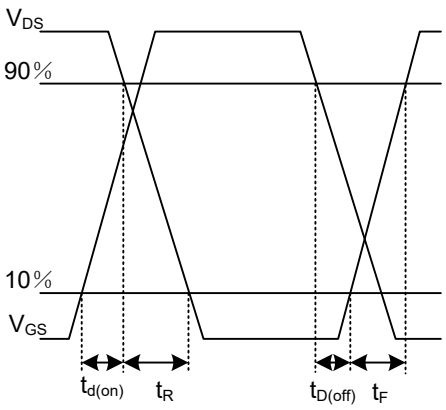
Note: Pulse width ≤ 400μs; duty cycle ≤ 2%.

■ TEST CIRCUITS AND WAVEFORMS

Switching Time Test Circuit

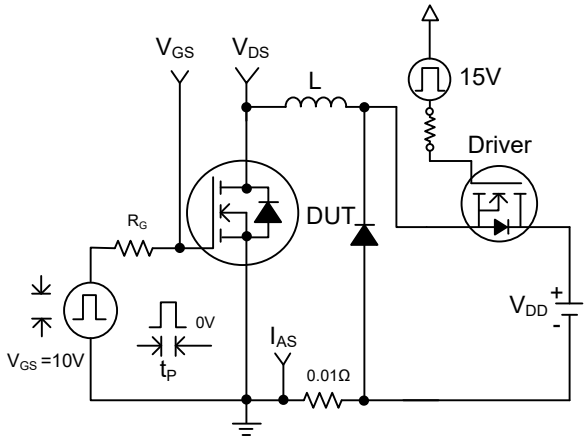


Switching Time Waveforms

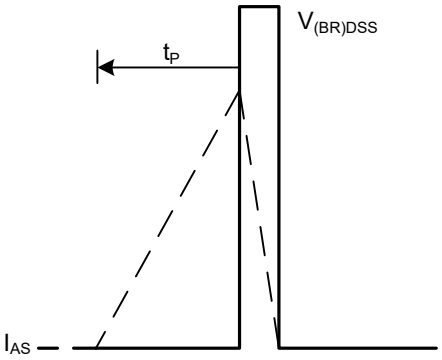


Pulse Width≤1μs Duty Cycle≤0.1%

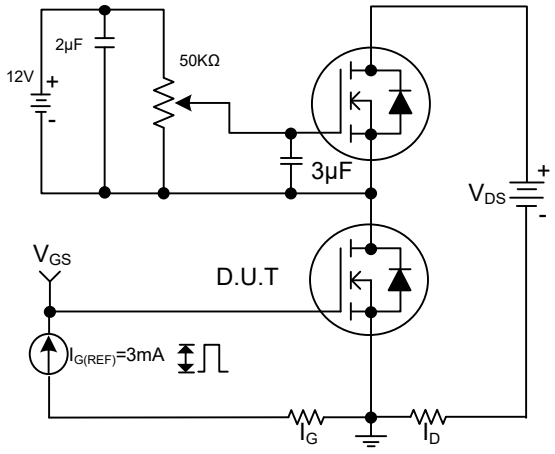
Unclamped Inductive Test Circuit



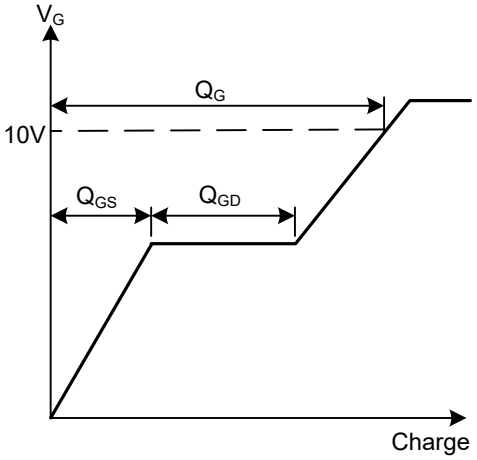
Unclamped Inductive Waveforms



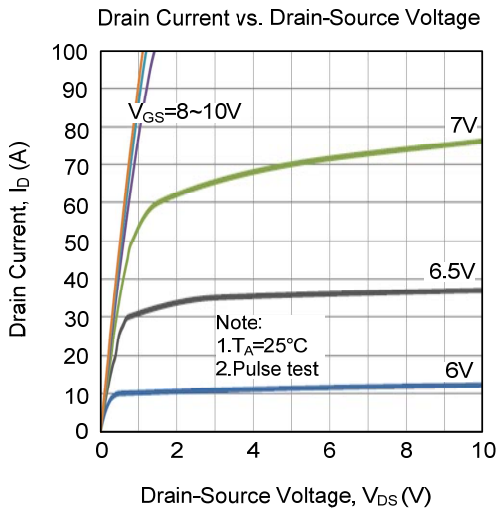
Gate Charge Test Circuit

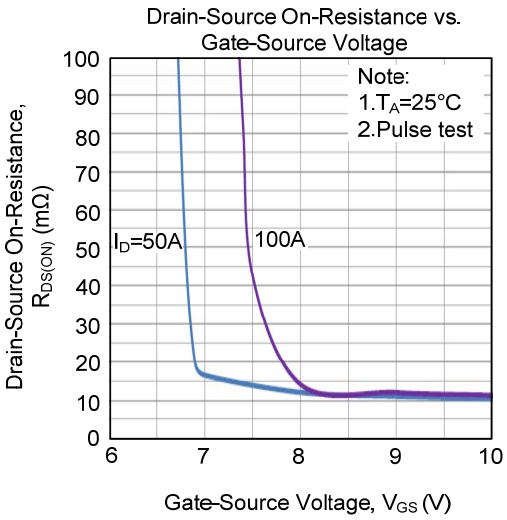


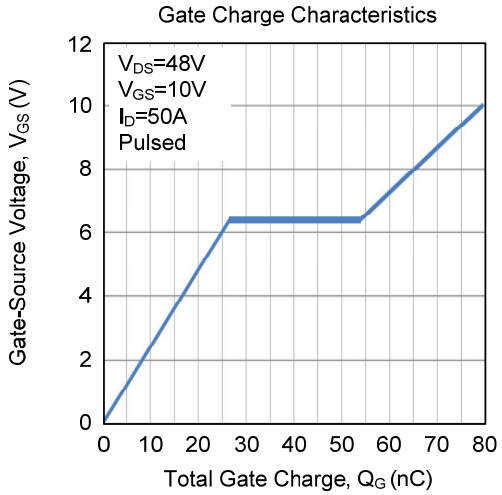
Basic Gate Charge Waveform

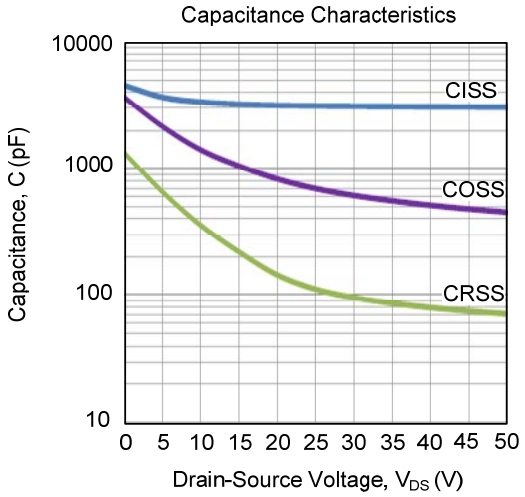


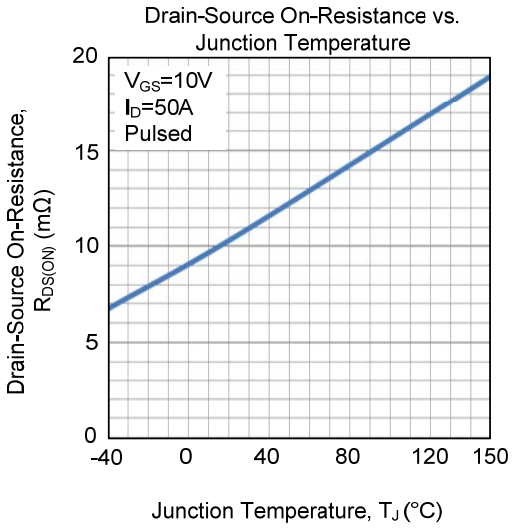
■ TYPICAL CHARACTERISTICS

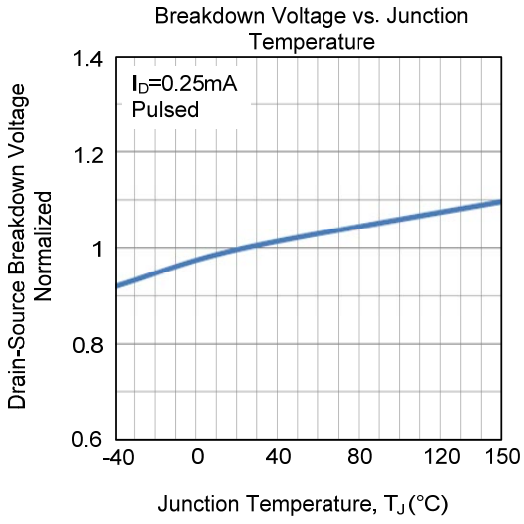






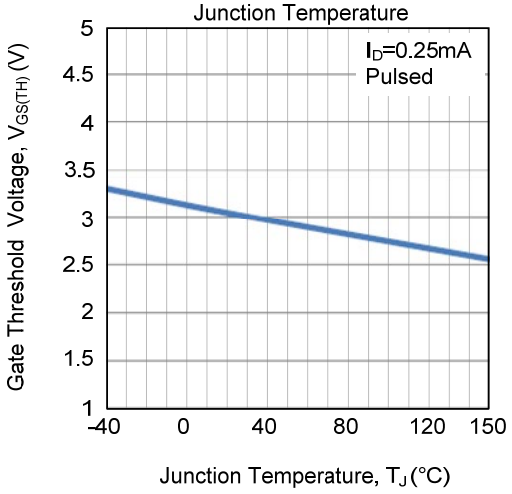




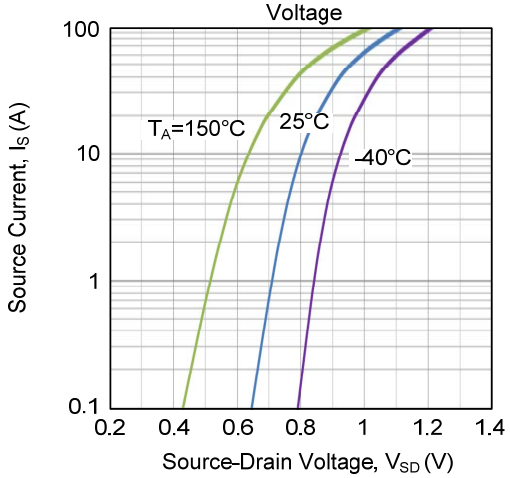


■ TYPICAL CHARACTERISTICS (Cont.)

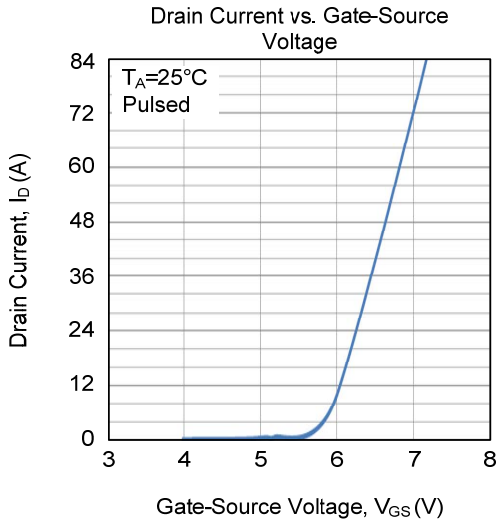
Gate Threshold Voltage vs. Junction Temperature



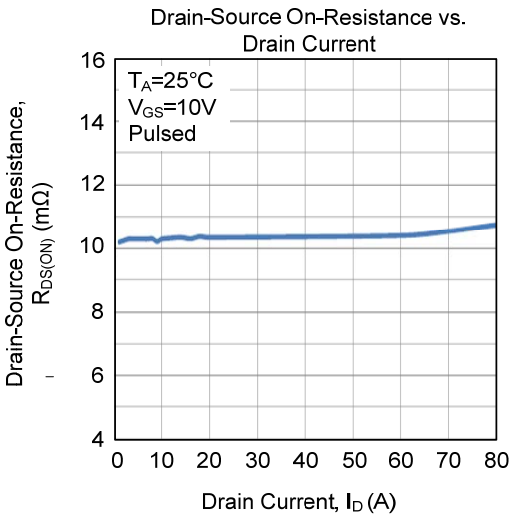
Source Current vs. Source-Drain Voltage



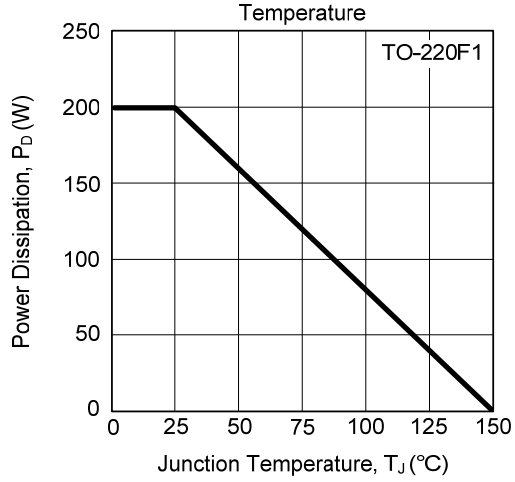
Drain Current vs. Gate-Source Voltage



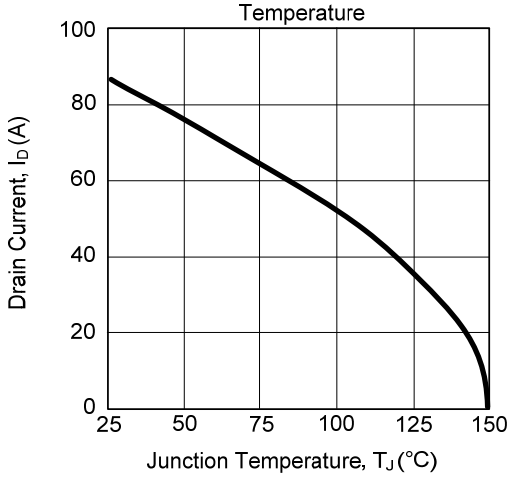
Drain-Source On-Resistance vs. Drain Current



Power Dissipation vs. Junction Temperature



Drain Current vs. Junction Temperature



■ TYPICAL CHARACTERISTICS (Cont.)