



160A, 40V N-CHANNEL POWER MOSFET

DESCRIPTION

The UTC **UTF1404** is an N-channel enhancement MOSFET, it uses UTC's advanced technology to provide the customers with perfect $R_{DS(ON)}$ and high switching speed.

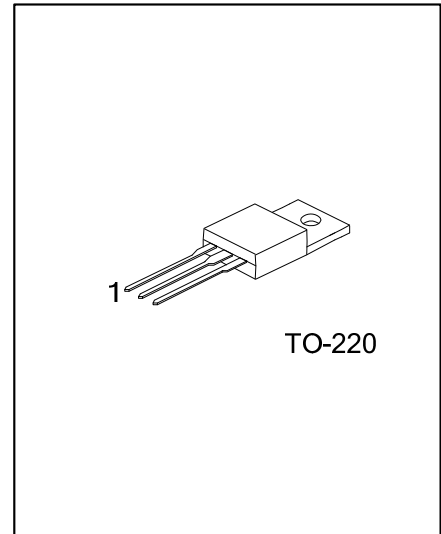
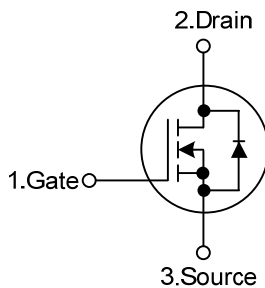
The UTC **UTF1404** is suitable for all commercial-industrial applications at power dissipation levels to approximately 50 watts, etc.

FEATURES

* $R_{DS(ON)}=3.5m\Omega$ @ $V_{GS}=10V, I_D=95A$

* High Switching Speed

SYMBOL



ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UTF1404L-TA3-T	UTF1404G-TA3-T	TO-220	G	D	S	Tube

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

UTF1404L-TA3-T		(1)Packing Type	(1) T: Tube
		(2)Package Type	(2) TA3: TO-220
		(3)Lead Free	(3) G: Halogen Free, L: Lead Free

■ ABSOLUTE MAXIMUM RATINGS

PARAMETER			SYMBOL	RATINGS	UNIT
Drain-Source Voltage			V _{DSS}	40	V
Gate-Source Voltage			V _{GSS}	±20	V
Drain Current	Continuous (V _{GS} =10V)	T _C =25°C	I _D	162 (Note 4)	A
		T _C =100°C		115 (Note 4)	A
	Pulsed (Note 2)		T _C =25°C	I _{DM}	650
Avalanche Current (Note 2)			I _{AR}	95	A
Avalanche Energy		Single Pulsed (Note 3)	E _{AS}	519	mJ
		Repetitive (Note 2)	E _{AR}	20	mJ
Power Dissipation (T _C =25°C)			P _D	166	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. Starting $T_J=25^{\circ}C$, $L=0.12mH$, $R_G=25\Omega$, $I_{AS}=95A$
4. Calculated continuous current based on maximum allowable junction temperature. Package limitation current is 75A

■ THERMAL DATA

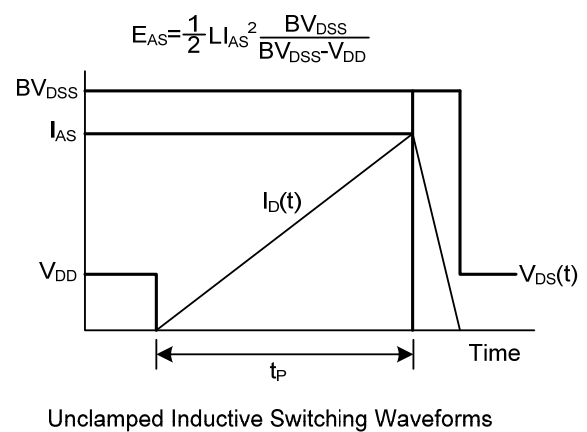
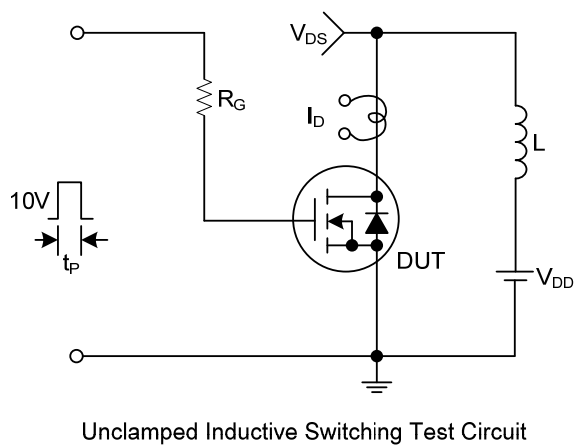
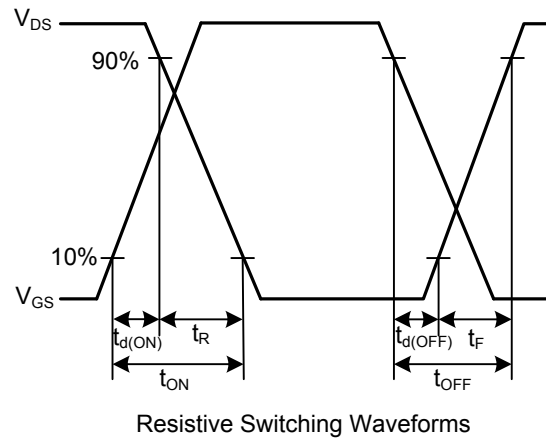
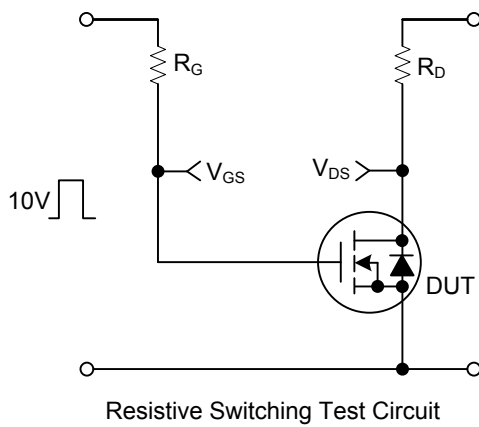
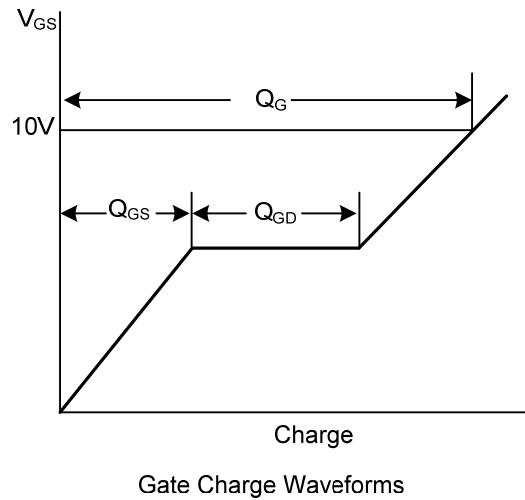
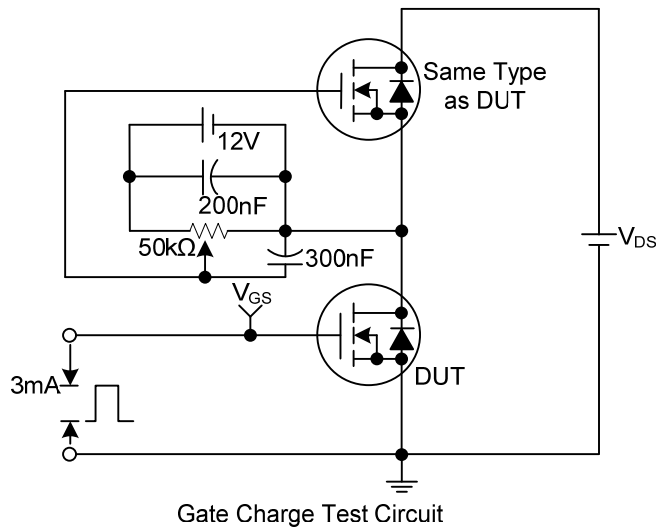
PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	62	$^{\circ}C/W$
Junction to Case	θ_{JC}	0.75	$^{\circ}C/W$

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

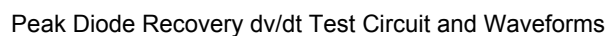
PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV _{DSS}	V _{GS} =0V, I _D =250μA	40			V
Drain-Source Leakage Current		I _{DSS}	V _{DS} =40V, V _{GS} =0V			20	μA
			V _{DS} =32V, V _{GS} =0V, T _J =150°C			250	μA
Gate- Source Leakage Current	Forward	I _{GSS}	V _{GS} =+20V			+200	nA
	Reverse		V _{GS} =-20V			-200	nA
ON CHARACTERISTICS							
Gate Threshold Voltage		V _{GS(TH)}	V _{DS} =V _{GS} , I _D =250μA	2.0		4.0	V
Static Drain-Source On-State Resistance		R _{DS(ON)}	V _{GS} =10V, I _D =95A (Note 2)		3.5	4	mΩ
DYNAMIC PARAMETERS							
Input Capacitance		C _{ISS}	V _{GS} =0V, V _{DS} =25V, f=1.0MHz		7360		pF
Output Capacitance		C _{OSS}			1680		pF
Reverse Transfer Capacitance		C _{RSS}			240		pF
SWITCHING PARAMETERS							
Total Gate Charge		Q _G	I _D =95A, V _{DS} =32V, V _{GS} =10V (Note 2)		160	200	nC
Gate to Source Charge		Q _{GS}			35		nC
Gate to Drain Charge		Q _{GD}			42	60	nC
Turn-ON Delay Time		t _{D(ON)}	V _{DD} =20V, I _D =95A, R _G =2.5Ω, R _D =0.21Ω (Note 2)		17		ns
Rise Time		t _R			140		ns
Turn-OFF Delay Time		t _{D(OFF)}			72		ns
Fall-Time		t _F			26		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Body-Diode Continuous Current		I _S	(Note 3)			162	A
Maximum Body-Diode Pulsed Current		I _{SM}	(Note 1)			650	A
Drain-Source Diode Forward Voltage		V _{SD}	I _S =95A, V _{GS} =0V, T _J =25°C (Note 2)			1.3	V

- Notes: 1. Repetitive rating: pulse width limited by maximum junction temperature
2. Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$
3. Calculated continuous current based on maximum allowable junction temperature. Package limitation current is 75A

■ TEST CIRCUITS AND WAVEFORMS



The diagram illustrates a switching transient test setup for a MOSFET DUT. A square-wave gate voltage V_{GS} is applied to the gate of the DUT through a gate resistor R_G . The DUT's drain is connected to a load inductor L in series with a DC supply V_{DD} . The source of the DUT is connected to the source of a driver MOSFET, which is also driven by V_{GS} . The driver is labeled "Same Type as DUT". The drain current of the DUT is I_{SD} , and its drain-source voltage is V_{DS} . The circuit is powered by a common ground. Text annotations specify: "dv/dt controlled by R_G " and " I_{SD} controlled by pulse period".



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