

UNISONIC TECHNOLOGIES CO., LTD

1N50A Preliminary Power MOSFET

1.0A, 500V N-CHANNEL POWER MOSFET

■ DESCRIPTION

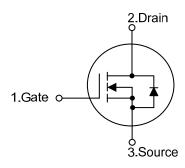
The UTC **1N50A** is an N-channel mode power MOSFET using UTC's advanced technology to provide customers with planar stripe and DMOS technology. This technology allows a minimum on-state resistance and superior switching performance. It also can withstand high energy pulse in the avalanche and commutation mode.

The UTC **1N50A** is generally applied in high efficiency switch mode power supplies, active power factor correction and electronic lamp ballasts based on half bridge topology.



- * $R_{DS(ON)}$ < 8.00 @ V_{GS} =10V, I_{D} =0.5A
- * High Switching Speed
- * 100% Avalanche Tested

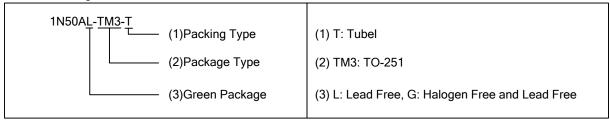
■ SYMBOL



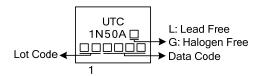
ORDERING INFORMATION

	Ordering	Dookowa	Pin Assignment			Da alaina		
	Lead Free	Halogen Free	Package	1	2	3	Packing	
	1N50AL-TM3-T	1N50AG-TM3-T	TO-251	G	D	S	Tube	

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



■ MARKING



TO-251

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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	500	V
Gate-Source Voltage		V_{GSS}	±30	V
Drain Current	Continuous (T _C =25°C)	I_{D}	1 (Note 2)	Α
Drain Current	Pulsed (Note 3)	I_{DM}	4 (Note 2)	Α
Avalanche Energy Single Pulsed (Note 4)		E _{AS}	40	mJ
Power Dissipation		C	25	W
Derate above 25°C		P_D	0.2	W/°C
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. Drain current limited by maximum junction temperature
- 3. Repetitive Rating: Pulse width limited by maximum junction temperature
- 4. L = 80mH, I_{AS} = 1A, V_{DD} = 50V, R_G = 27 Ω , Starting T_J = 25°C
- 5. $I_{SD} \le 1.5 A$, di/dt $\le 200 A/\mu s$, $V_{DD} \le BV_{DSS}$, Starting $T_J = 25 ^{\circ}C$

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT	
Junction to Ambient	θ_{JA}	9 _{JA} 110		
Junction to Case	θ_{JC}	5	°C/W	

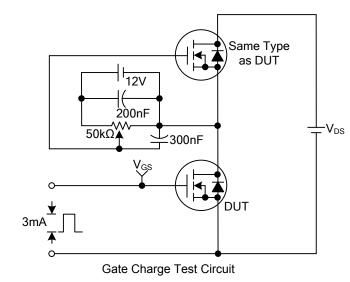
■ **ELECTRICAL CHARACTERISTICS** (T_C=25°C, unless otherwise specified)

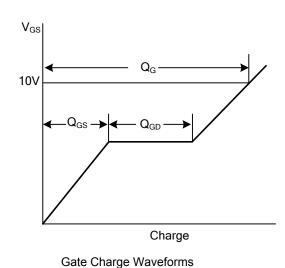
				1					
	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT			
OFF CHARACTERISTICS									
)	BV_{DSS}	$I_D=250\mu A, V_{GS}=0V$ 50				V			
Drain-Source Leakage Current		V _{DS} =500V, V _{GS} =0V			1	μΑ			
Forward	I _{GSS}	V_{GS} =+30V, V_{DS} =0V			+100	nΑ			
Reverse		V_{GS} =-30V, V_{DS} =0V			-100	nΑ			
ON CHARACTERISTICS									
Gate Threshold Voltage		$V_{DS}=V_{GS}, I_{D}=250\mu A$ 3			5.0	V			
Static Drain-Source On-State Resistance		V _{GS} =10V, I _D =0.5A			8.0	Ω			
DYNAMIC PARAMETERS									
	C_{ISS}			125	290	рF			
Input Capacitance Output Capacitance		V _{GS} =0V, V _{DS} =25V, f=1.0MHz		17	35	рF			
Reverse Transfer Capacitance				15	20	рF			
SWITCHING PARAMETERS									
Turn-ON Delay Time		V _{DD} =30V, I _D =0.5A, R _G =25Ω (Note 1, 2)		32	40	ns			
Rise Time				17	35	ns			
Turn-OFF Delay Time				54	70	ns			
Fall-Time				18	32	ns			
Total Gate Charge		\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \		9	15	nC			
Gate to Source Charge		(Note 1, 2)		3		nC			
Gate to Drain Charge				8.0		nC			
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS									
Maximum Body-Diode Continuous Current					1	Α			
Maximum Body-Diode Pulsed Current					4	Α			
Drain-Source Diode Forward Voltage		I _S =1A, V _{GS} =0V			1.15	V			
	Forward Reverse sistance GGS AND C s Current rrent	BV _{DSS} I _{GSS} I _{GSS} I _{GSS} I _{CSS} I _{CSS} I _{CSS} I _{COSS} I _{COSS}	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	BV _{DSS} I _D =250μA, V _{GS} =0V 500 I _{DSS} V _{DS} =500V, V _{GS} =0V Forward I _{GSS} V _{GS} =+30V, V _{DS} =0V Reverse V _{GS} =-30V, V _{DS} =0V V _{GS} =-30V, V _{DS} =0V Sistance R _{DS} (ON) V _{GS} =10V, I _D =0.5A C _{ISS} C _{OSS} V _{GS} =0V, V _{DS} =25V, f=1.0MHz C _{RSS} C _D =250μA 3.0 C _{ISS} C _D =0.5A C _D =0.5A C _D =0.5A C _D	BV _{DSS} I _D =250μA, V _{GS} =0V 500 I _{DSS} V _{DS} =500V, V _{GS} =0V Reverse I _{GSS} V _{GS} =30V, V _{DS} =0V V _{GS} =-30V, V _{DS} =250μA 3.0 Sistance R _{DS(ON)} V _{GS} =10V, I _D =0.5A 6.8 C _{ISS}	BV _{DSS} I _D =250µA, V _{GS} =0V 500 1			

Notes: 1. Pulse Test: Pulse width ≤ 300µs, Duty cycle ≤ 2%

2. Essentially independent of operating temperature

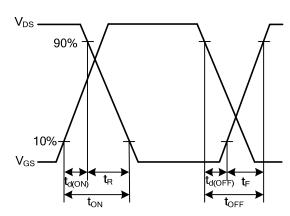
■ TEST CIRCUITS AND WAVEFORMS



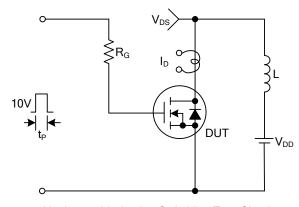


 R_{G} R_{D} V_{DD} V_{DS} V_{DS}

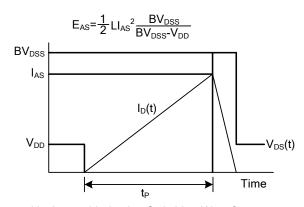
Resistive Switching Test Circuit



Resistive Switching Waveforms

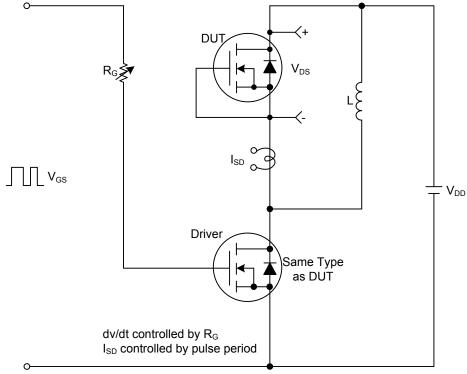


Unclamped Inductive Switching Test Circuit

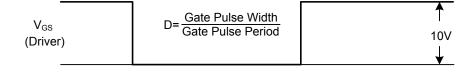


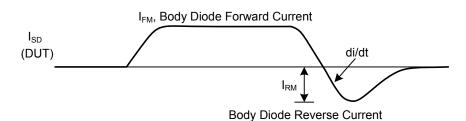
Unclamped Inductive Switching Waveforms

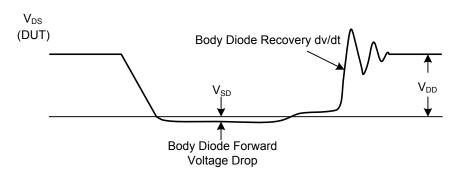
■ TEST CIRCUITS AND WAVEFORMS(Cont.)



Peak Diode Recovery dv/dt Test Circuit & Waveforms







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