



UT140N10M

Preliminary

Power MOSFET

140A, 100V N-CHANNEL POWER MOSFET

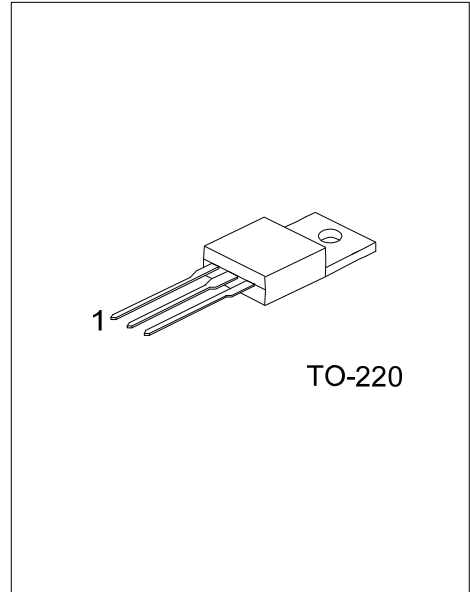
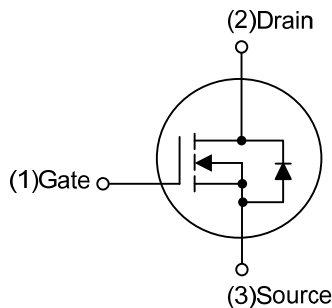
DESCRIPTION

The UTC **UT140N10M** is a N-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These devices are well suited for high efficiency fast switching applications.

FEATURES

- * $R_{DS(ON)} \leq 7.0 \text{ m}\Omega @ V_{GS}=10V, I_D=70A$
- $R_{DS(ON)} \leq 9.0 \text{ m}\Omega @ V_{GS}=4.5V, I_D=20A$
- * Improved dv/dt capability
- * High Switching Speed
- * Fast switching

SYMBOL



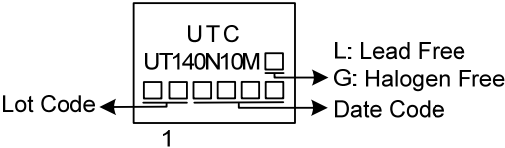
ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UT140N10ML-TA3-T	UT140N10MG-TA3-T	TO-220	G	D	S	Tube

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

<p>UT140N10MG-TA3-T</p>	<p>(1) T: Tube</p> <p>(2) TA3: TO-220</p> <p>(3) G: Halogen Free and Lead Free L: Lead Free</p>
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MARKING



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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	100	V
Gate-Source Voltage		V_{GSS}	± 20	V
Drain Current	Continuous ($V_{GS}=10\text{V}$)	I_D	140	A
	Pulsed (Note 2)	I_{DM}	280	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	635	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	4.86	V/ns
Power Dissipation		P_D	282	W
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. $L = 0.1\text{mH}$, $I_{AS} = 113\text{A}$, $V_{DD} = 50\text{V}$, $R_G = 25\Omega$, Starting $T_J = 25^\circ\text{C}$

4. $I_{SD} \leq 30\text{A}$, $di/dt \leq 200\text{A}/\mu\text{s}$, $V_{DD} \leq BV_{DSS}$, $T_J \leq T_{JMAX}$, $T_J = 25^\circ\text{C}$.

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	62.5	$^\circ\text{C}/\text{W}$
Junction to Case	θ_{JC}	0.44	$^\circ\text{C}/\text{W}$

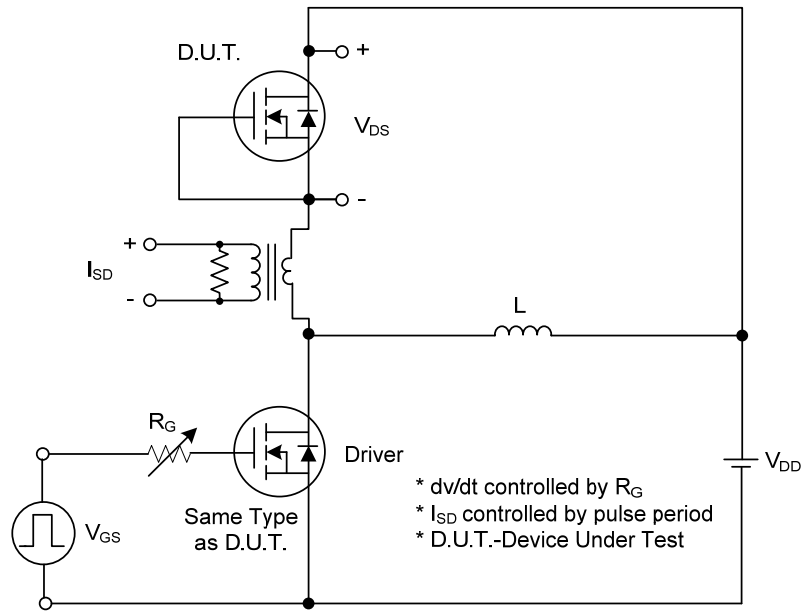
■ ELECTRICAL CHARACTERISTICS (T_J=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =250μA	100			V
Drain-Source Leakage Current	I _{DSS}	V _{DS} =100V, 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
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 =70A			7.0	mΩ
		V _{GS} =4.5V, I _D =20A			9.0	mΩ
DYNAMIC PARAMETERS						
Input Capacitance	C _{ISS}	V _{GS} =0V, V _{DS} =25V, f=1.0MHz		19		nF
Output Capacitance	C _{OSS}			974		pF
Reverse Transfer Capacitance	C _{RSS}			768		pF
SWITCHING PARAMETERS						
Total Gate Charge	Q _G	V _{DS} =80V, V _{GS} =10V, I _D =140A (Note 2)		515		nC
Gate to Source Charge	Q _{GS}			153		nC
Gate to Drain Charge	Q _{GD}			189		nC
Turn-ON Delay Time	t _{D(ON)}	V _{DD} =50V, V _{GS} =10V, I _D =140A, R _G =3Ω, (Note 2)		33		ns
Rise Time	t _R			30		ns
Turn-OFF Delay Time	t _{D(OFF)}			313		ns
Fall-Time	t _F			104		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Maximum Continuous Drain-Source Diode Forward Current	I _S				140	A
Maximum Pulsed Drain-Source Diode Forward Current	I _{SM}				280	A
Drain-Source Diode Forward Voltage	V _{SD}	I _S =140A, V _{GS} =0V			1.4	V
Body Diode Reverse Recovery Time	t _{rr}	I _S =30A, di/dt=100A/μs		120		ns
Body Diode Reverse Recovery Charge	Q _{rr}				490	

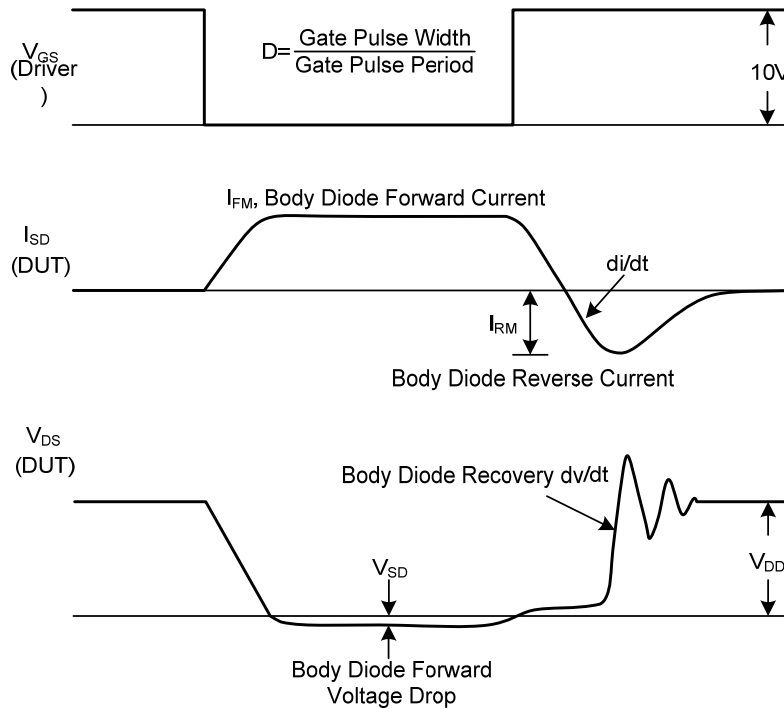
Notes: 1. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%.

2. Essentially independent of operating ambient temperature.

■ TEST CIRCUITS AND WAVEFORMS

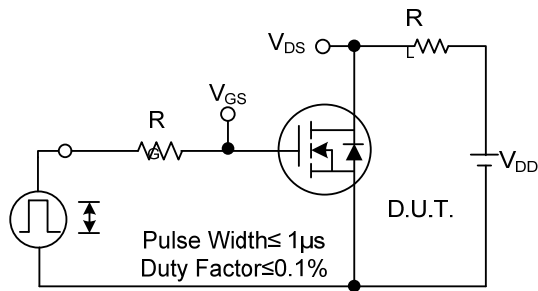


Peak Diode Recovery dv/dt Test Circuit

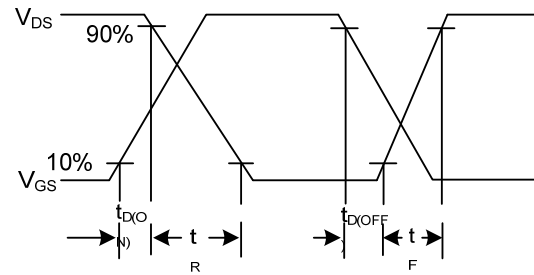


Peak Diode Recovery dv/dt Waveforms

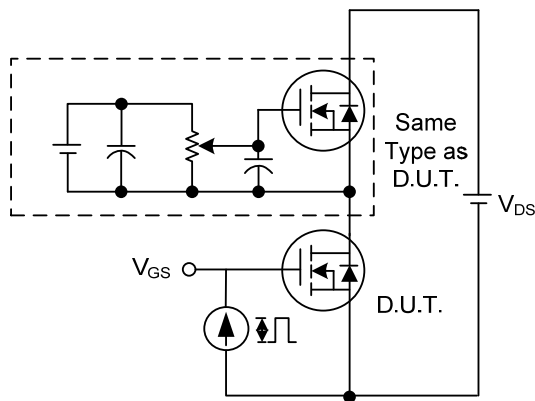
■ TEST CIRCUITS AND WAVEFORMS



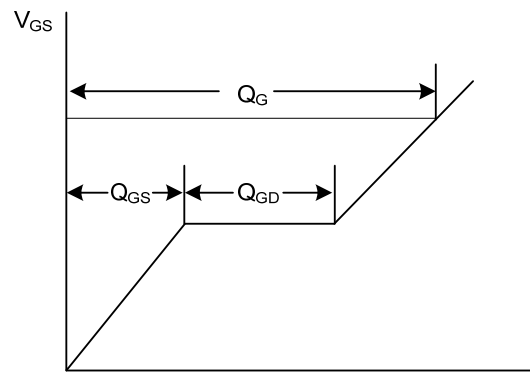
Switching Test Circuit



Switching Waveforms

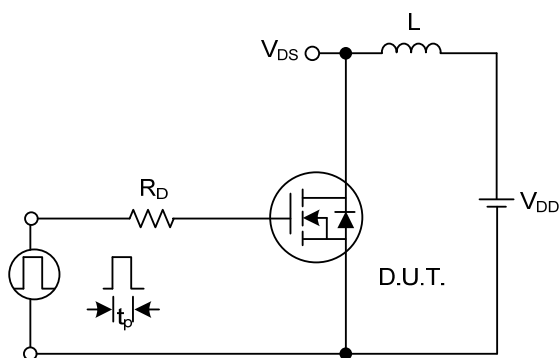


Gate Charge Test Circuit

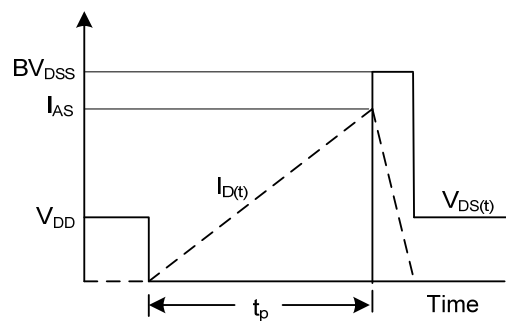


Charge

Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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