



UT20N25M

Preliminary

POWER MOSFET

20A, 250V N-CHANNEL POWER MOSFET

DESCRIPTION

The UTC **UT20N25M** is a N-channel enhancement MOSFET using UTC's advanced technology to provide the customers with perfect $R_{DS(ON)}$ and high switching speed.

The UTC **UT20N25M** is suitable for all commercial-industrial applications at power dissipation levels to approximately 50 watts, etc.

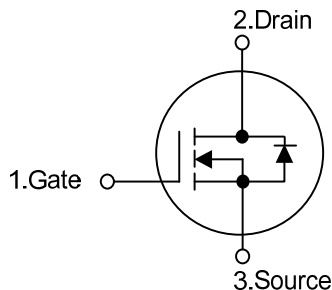
FEATURES

* $R_{DS(ON)} \leq 140 \text{ m}\Omega$ @ $V_{GS}=10\text{V}$, $I_D=10\text{A}$

$R_{DS(ON)} \leq 150 \text{ m}\Omega$ @ $V_{GS}=4.5\text{V}$, $I_D=8.0\text{A}$

* High Switching Speed

SYMBOL



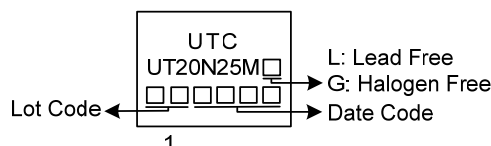
ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UT20N25ML-TN3-R	UT20N25MG-TN3-R	TO-252	G	D	S	Tape Reel

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

UT20N25MG-TN3-R (1) Packing Type (2) Package Type (3) Green Package		(1) R: Tape Reel (2) TN3: TO-252 (3) G: Halogen Free and Lead Free, L: Lead Free
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MARKING



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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V _{DSS}	250	V
Gate-Source Voltage		V _{GSS}	±20	V
Drain Current	Continuous	I _D	20	A
	Pulsed (Note 2)	I _{DM}	40	A
Avalanche Energy	Single Pulsed (Note 3)	E _{AS}	50	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	6.2	V/nS
Power Dissipation		P _D	57	W
Junction Temperature		T _J	+150	°C
Storage Temperature Range		T _{STG}	-20 ~ +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 = 0.1mH, I_{AS} = 31.5A, V_{DD}=50V, R_G = 25Ω, Starting T_J = 25°C

4. I_{SD} ≤ 20A, di/dt ≤ 200A/μs, V_{DD} ≤ BV_{DSS}, Starting T_J = 25°C

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ _{JA}	110	°C/W
Junction to Case	θ _{JC}	2.19 (Note)	°C/W

Note: The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.

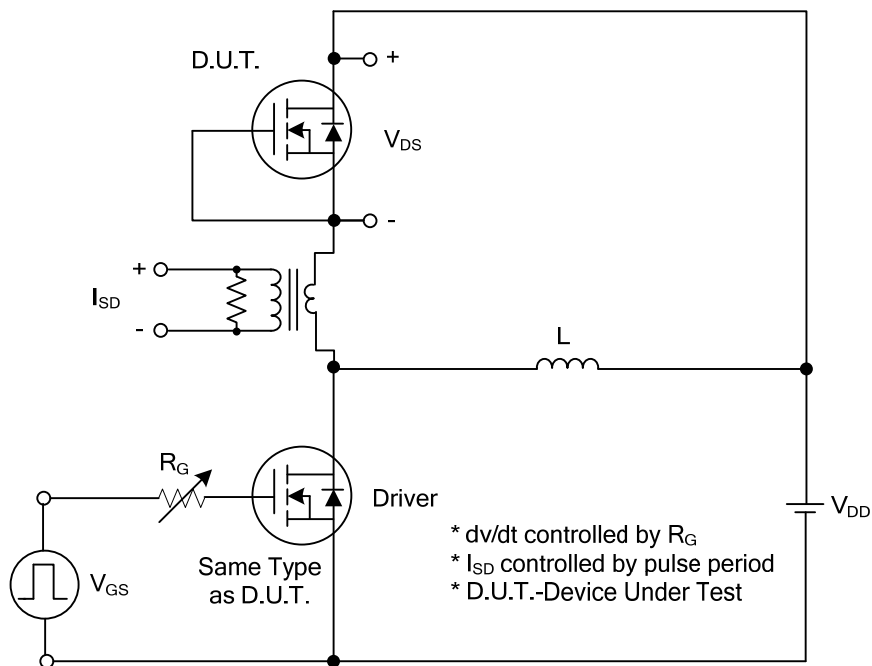
■ ELECTRICAL CHARACTERISTICS (T_J=25°C, unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV _{DSS}	I _D =250μA, V _{GS} =0V	250			V
Drain-Source Leakage Current		I _{DSS}	V _{DS} =250V, V _{GS} =0V			10	μA
Gate-Source Leakage Current	Forward	I _{GSS}	V _{GS} =+20V, V _{DS} =0V			+100	nA
	Reverse		V _{GS} =-20V, V _{DS} =0V			-100	nA
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 =10A			140	mΩ
			V _{GS} =4.5V, I _D =8.0A			150	mΩ
DYNAMIC PARAMETERS							
Input Capacitance		C _{ISS}	V _{GS} =0V, V _{DS} =25V, f=1.0MHz		3918		pF
Output Capacitance		C _{OSS}			151		pF
Reverse Transfer Capacitance		C _{RSS}			94		pF
SWITCHING PARAMETERS							
Total Gate Charge (Note 1)		Q _G	V _{DS} =200V, V _{GS} =10V, I _D =20A (Note 1, 2)		100		nC
Gate to Source Charge		Q _{GS}			19		nC
Gate to Drain Charge		Q _{GD}			9		nC
Turn-on Delay Time (Note 1)		t _{D(ON)}	V _{DS} =100V, V _{GS} =10V, I _D =20A, R _G =25Ω (Note 1, 2)		25		ns
Rise Time		t _R			29		ns
Turn-off Delay Time		t _{D(OFF)}			408		ns
Fall-Time		t _F			171		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Body-Diode Continuous Current		I _S				20	A
Maximum Body-Diode Pulsed Current		I _{SM}				40	A
Drain-Source Diode Forward Voltage (Note 1)		V _{SD}	I _S =20A, V _{GS} =0V			1.4	V
Reverse Recovery Time (Note 1)		t _{rr}	I _S =20A, V _{GS} =0V,		141		nS
Reverse Recovery Charge		Q _{rr}	di/dt=100A/μs		132		nC

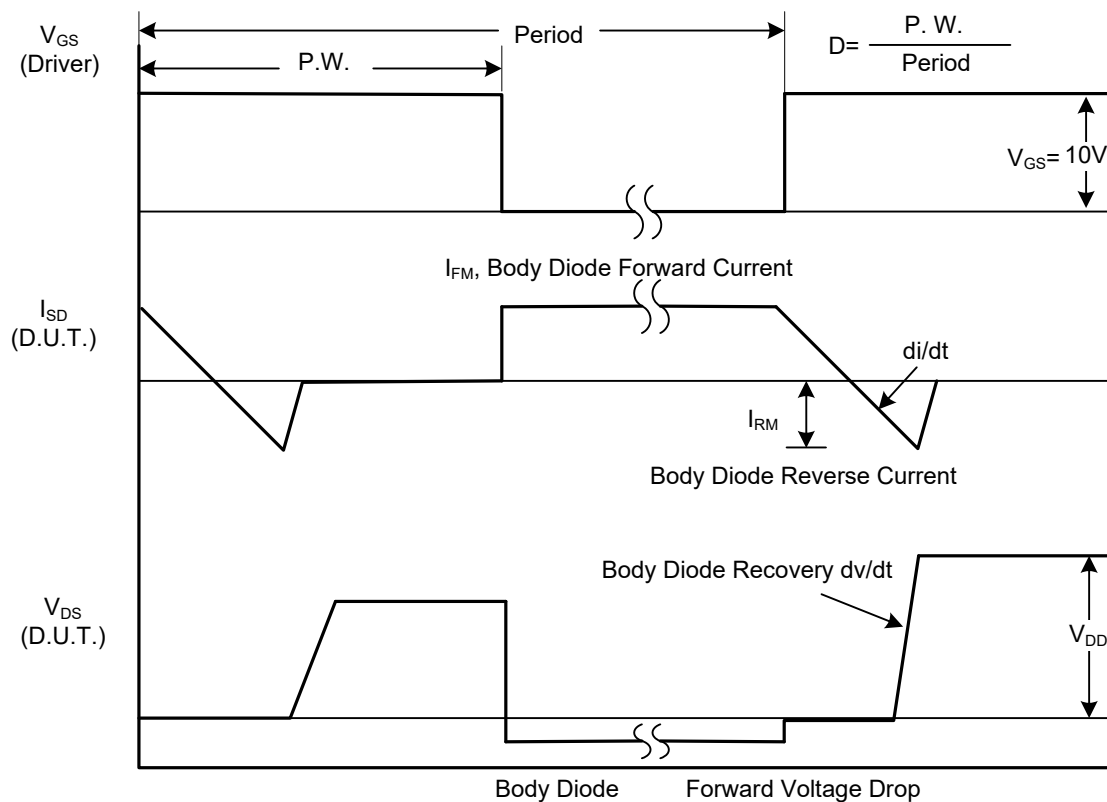
Notes: 1. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%.

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

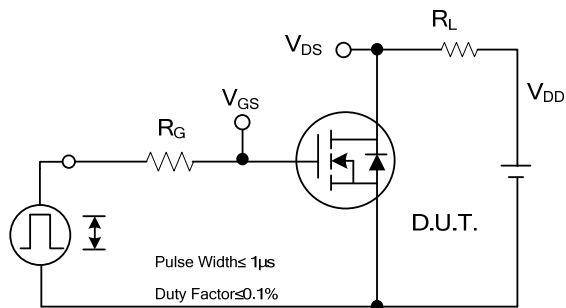


Peak Diode Recovery dv/dt Test Circuit

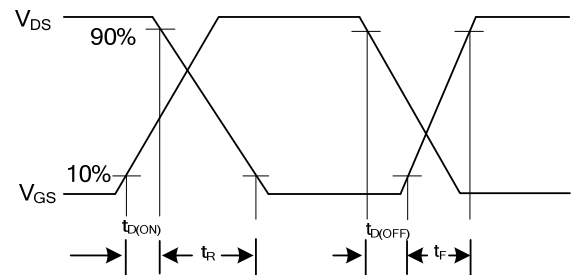


Peak Diode Recovery dv/dt Waveforms

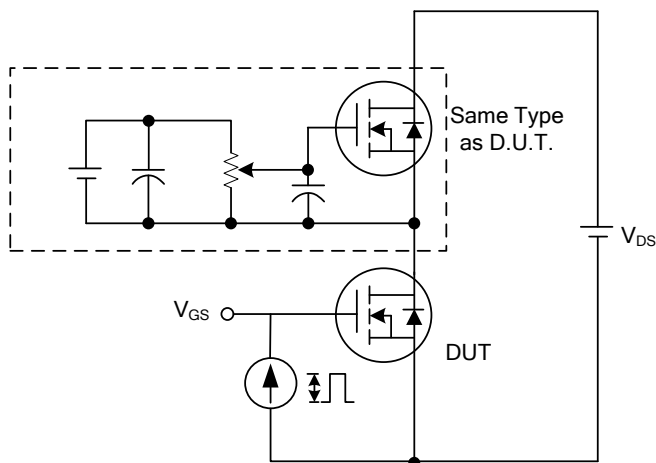
■ TEST CIRCUITS AND WAVEFORMS



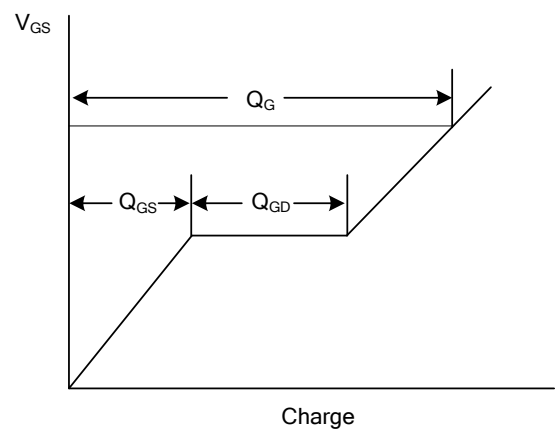
Switching Test Circuit



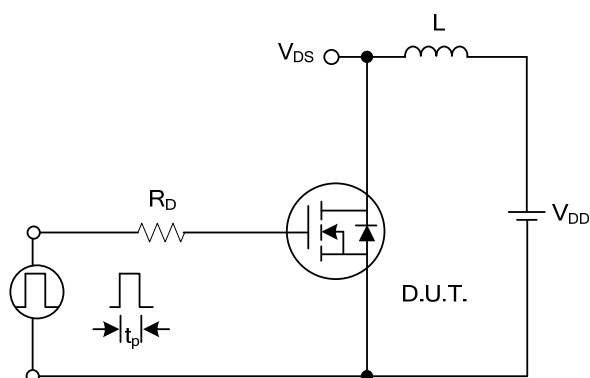
Switching Waveforms



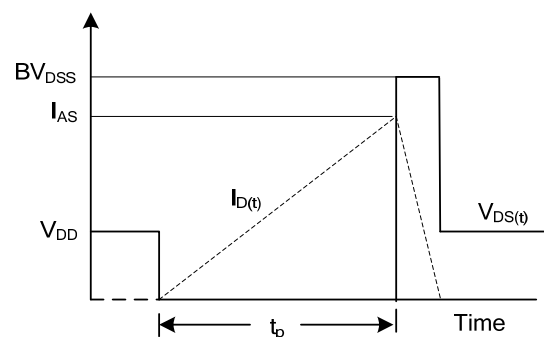
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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