



# 25N20

*Power MOSFET*

## 25A, 200V N-CHANNEL ENHANCEMENT MODE POWER MOSFET

■ DESCRIPTION

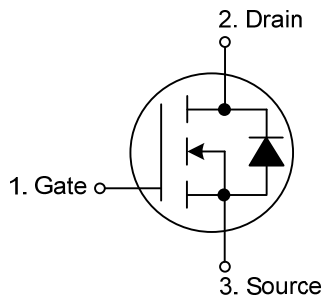
The UTC **25N20** is an N-channel enhancement mode power MOSFET and it uses UTC's perfect technology to provide designers with fast switching, ruggedized device design, low on-resistance and cost-effectiveness.

It is generally suitable for all commercial-industrial applications and DC/DC converters requiring low voltage.

■ FEATURES

- \*  $R_{DS(ON)} < 160 \text{ m}\Omega @ V_{GS} = 10\text{V}, I_D = 16\text{A}$
- \* Single Drive Requirement
- \* Low Gate Charge
- \* RoHS Compliant

■ SYMBOL



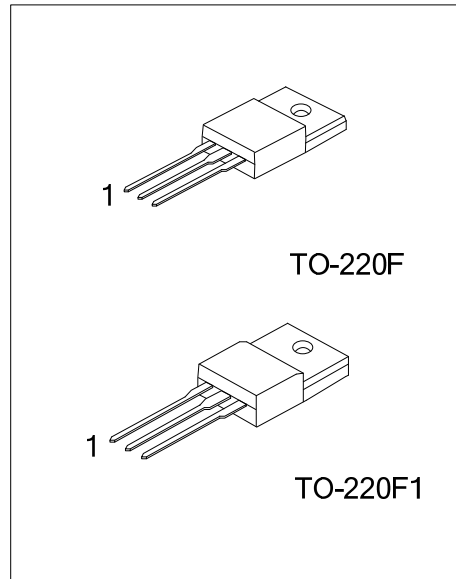
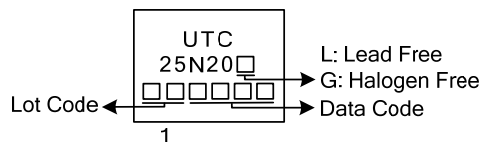
■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
25N20L-TF3-T	25N20G-TF3-T	TO-220F	G	D	S	Tube
25N20L-TF1-T	25N20G-TF1-T	TO-220F1	G	D	S	Tube

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

<p>25N20L-TF3-T</p> <p>(1) Packing Type</p> <p>(2) Package Type</p> <p>(3) Green Package</p>	<p>(1) T: Tube</p> <p>(2) TF3: TO-220F, TF1: TO-220F1</p> <p>(3) L: Lead Free, G: Halogen Free and Lead Free</p>
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■ MARKING



### ■ ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	RATINGS	UNIT
Drain Source Voltage	$V_{DSS}$	200	V
Gate Source Voltage	$V_{GSS}$	$\pm 20$	V
Continuous Drain Current ( $V_{GS}=10V$ )	$T_C=25^\circ C$	$I_D$	25
	$T_C=100^\circ C$	$I_D$	15.86
Pulsed Drain Current (Note 2)	$I_{DM}$	80	A
Total Power Dissipation ( $T_C=25^\circ C$ )	$P_D$	50	W
Operating Junction Temperature	$T_J$	-55 ~ +150	$^\circ C$
Storage Temperature	$T_{STG}$	-55 ~ +150	$^\circ C$

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. Pulse width limited by max. junction temperature.

### ■ THERMAL DATA

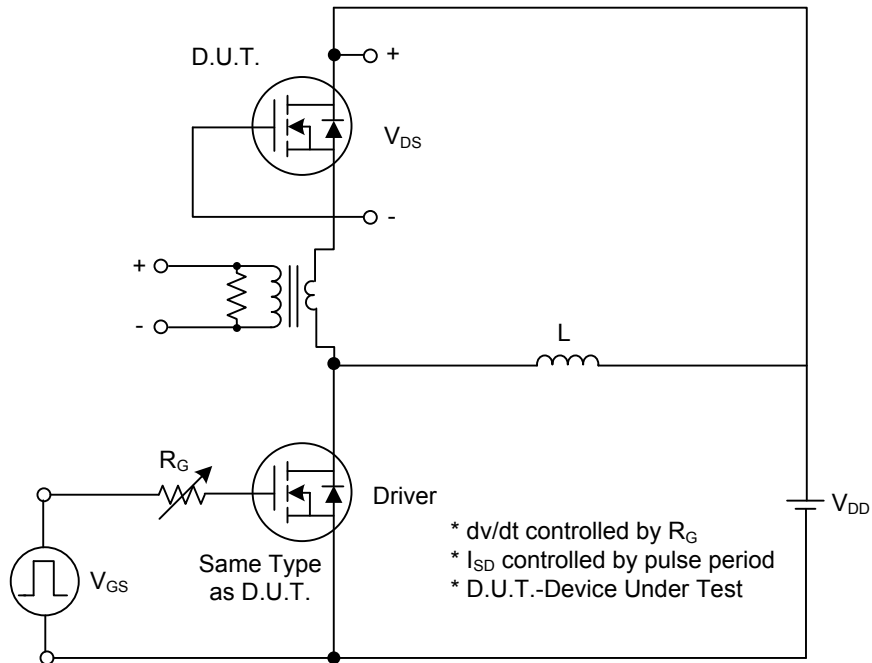
PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	$\theta_{JA}$	62.5	$^\circ C/W$
Junction to Case	$\theta_{JC}$	2.5	$^\circ C/W$

### ■ ELECTRICAL CHARACTERISTICS ( $T_J=25^\circ C$ , unless otherwise specified)

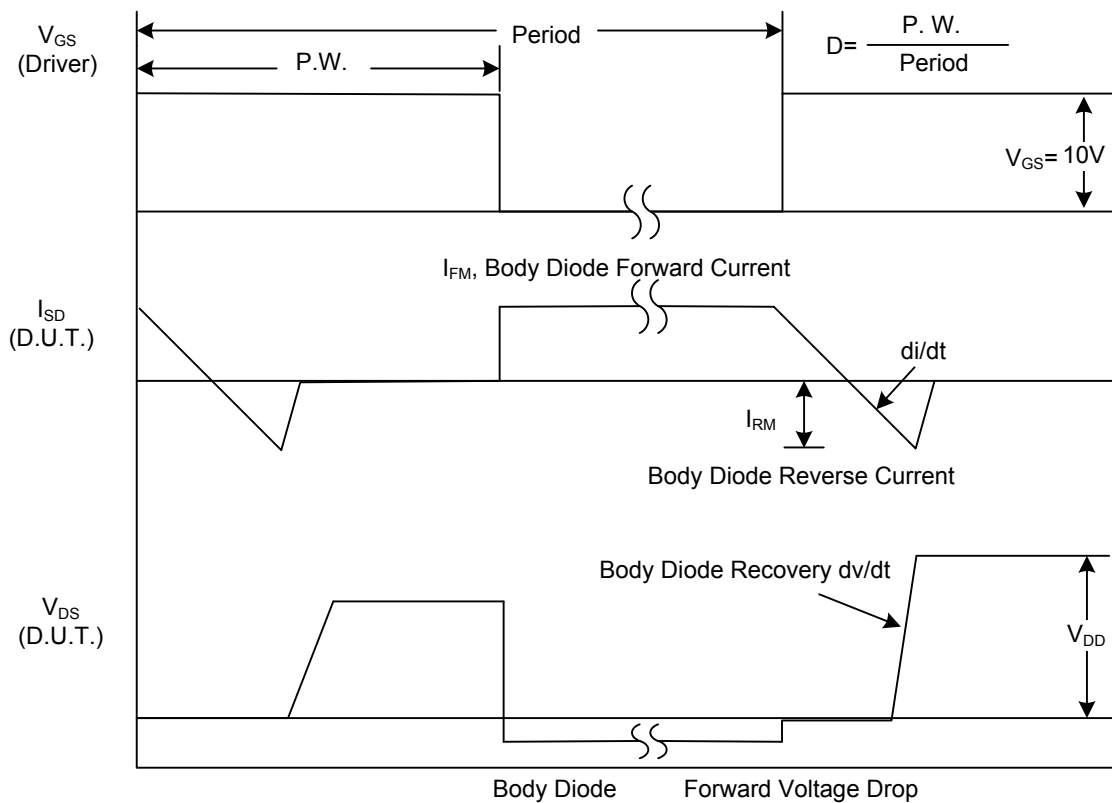
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=250\mu A$	200			V
Breakdown Voltage Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_J$	Reference to $25^\circ C, I_D=1mA$		0.14		$V/^\circ C$
Drain-Source Leakage Current	$I_{DSS}$	$V_{DS}=100V, V_{GS}=0V, T_J=25^\circ C$			1	$\mu A$
		$V_{DS}=80V, V_{GS}=0V, T_J=150^\circ C$			100	$\mu A$
Gate-Source Leakage Current	$I_{GSS}$	$V_{GS}=\pm 20V$			$\pm 100$	nA
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	2		4	V
Static Drain-Source On-Resistance (Note)	$R_{DS(ON)}$	$V_{GS}=10V, I_D=16A$		112	160	m $\Omega$
Forward Transconductance	$g_{FS}$	$V_{DS}=10V, I_D=16A$		14		S
<b>DYNAMIC PARAMETERS</b>						
Input Capacitance	$C_{ISS}$	$V_{DS}=25V, V_{GS}=0V, f=1.0MHz$		1000	1700	pF
Output Capacitance	$C_{OSS}$			240		pF
Reverse Transfer Capacitance	$C_{RSS}$			25		pF
<b>SWITCHING PARAMETERS</b>						
Turn-ON Delay Time <sup>1</sup>	$t_{D(ON)}$	$V_{DD}=30V, I_D=0.5A, R_G=25m\Omega, V_{GS}=10V, R_D=3.125\Omega$		56		ns
Turn-ON Rise Time	$t_R$			75		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			240		ns
Turn-OFF Fall-Time	$t_F$			100		ns
Total Gate Charge (Note)	$Q_G$	$V_{GS}=10V, V_{DS}=50V, I_D=1.3A$		35	40	nC
Gate Source Charge	$Q_{GS}$			8		nC
Gate Drain Charge	$Q_{GD}$			9.7		nC
<b>SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS</b>						
Drain-Source Diode Forward Voltage (Note)	$V_{SD}$	$I_S=25A, V_{GS}=0V$			1.3	V
Reverse Recovery Time	$t_{RR}$	$I_S=25A, V_{GS}=0V,$		90		ns
Reverse Recovery Charge	$Q_{RR}$	$di/dt=100A/\mu s$		380		nC

Note: Pulse Test : Pulse width  $\leq 300\mu s$ , Duty cycle  $\leq 2\%$ .

■ TEST CIRCUITS AND WAVEFORMS

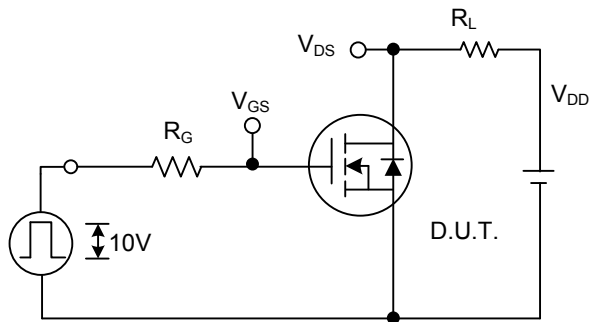


Peak Diode Recovery dv/dt Test Circuit

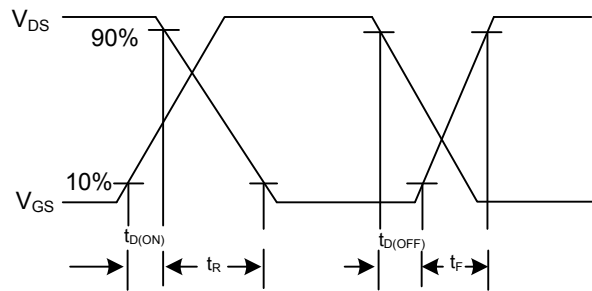


Peak Diode Recovery dv/dt Waveforms

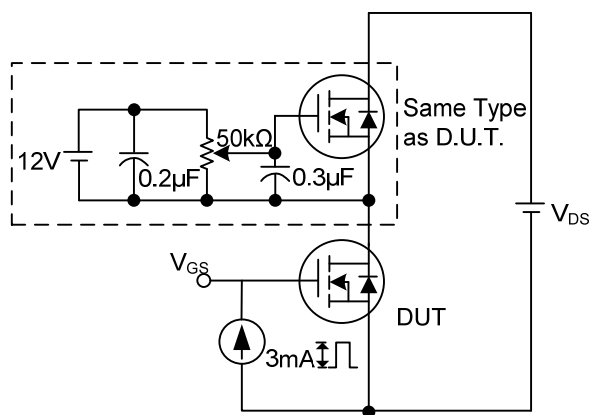
■ TEST CIRCUITS AND WAVEFORMS (Cont.)



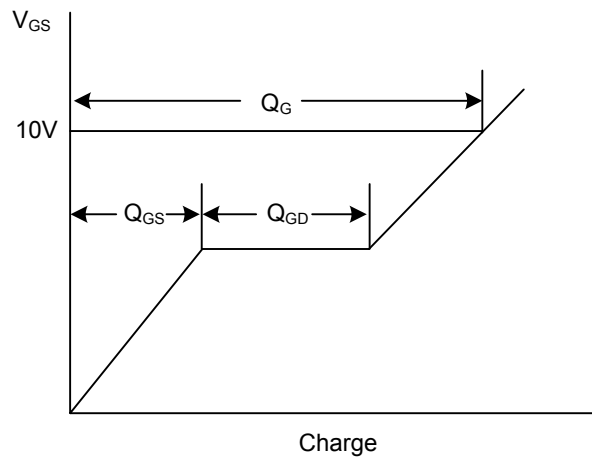
Switching Test Circuit



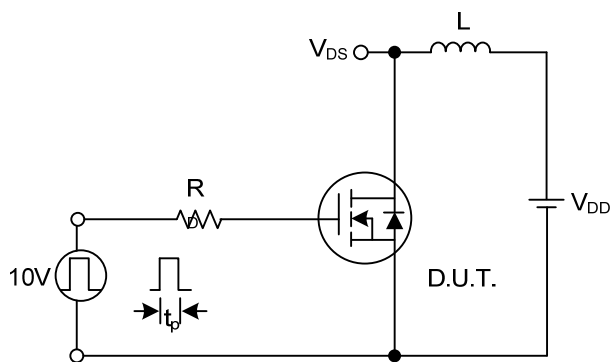
Switching Waveforms



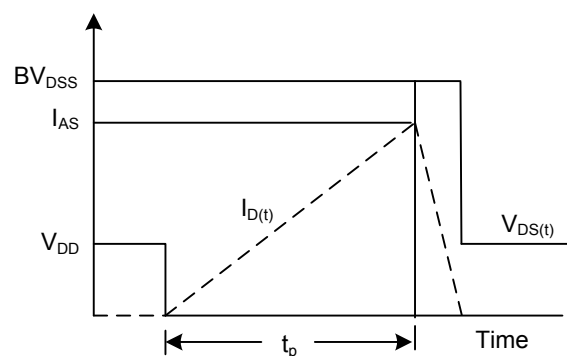
Gate Charge Test Circuit



Gate Charge Waveform

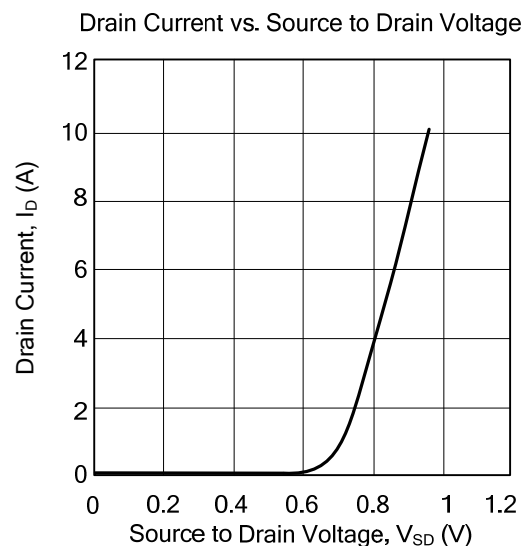
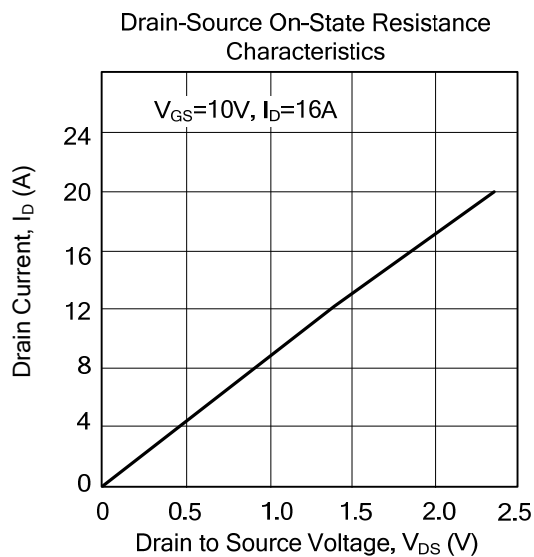
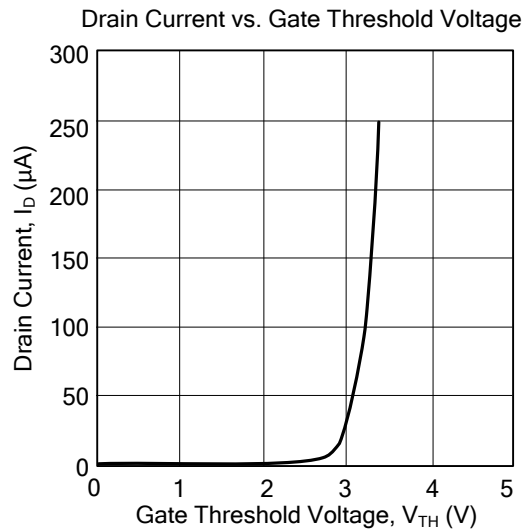
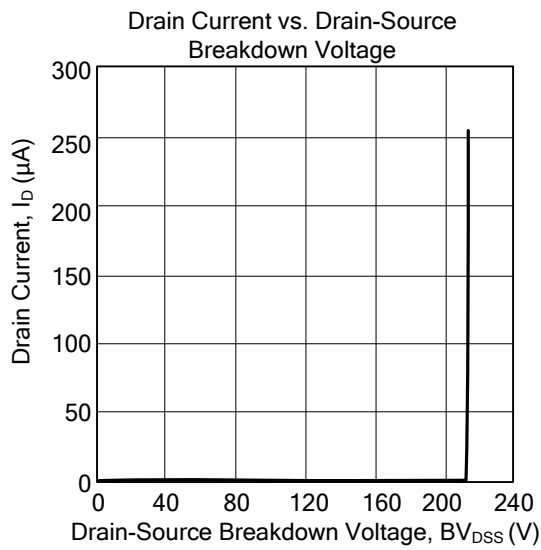


Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

## ■ TYPICAL CHARACTERISTICS



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