



10NM120

Power MOSFET

10A, 1200V N-CHANNEL SUPER-JUNCTION MOSFET

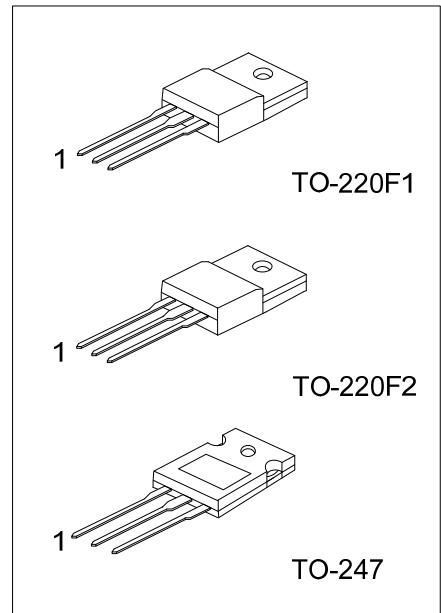
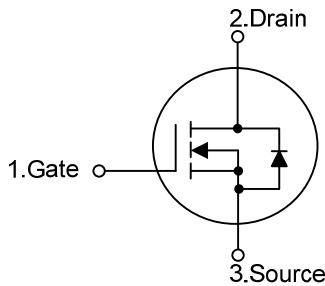
■ DESCRIPTION

The UTC **10NM120** is a Super Junction MOSFET Structure and is designed to have better characteristics, such as fast switching time, low gate charge, low on-state resistance and a high rugged avalanche characteristics. This power MOSFET is usually used at AC-DC converters for power applications.

■ FEATURES

- * $R_{DS(ON)} \leq 0.9 \Omega @ V_{GS}=10V, I_D=5.0A$
- * High Switching Speed

■ SYMBOL



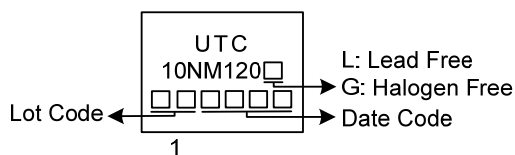
■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
10NM120L-TF1-T	10NM120G-TF1-T	TO-220F1	G	D	S	Tube
10NM120L-TF2-T	10NM120G-TF2-T	TO-220F2	G	D	S	Tube
10NM120L-T47-T	10NM120G-T47-T	TO-247	G	D	S	Tube

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

<p>10NM120G-TF1-T</p>	<p>(1) T: Tube (2) TF1: TO-220F1, TF2: TO-220F2, T47: TO-247 (3) G: Halogen Free and Lead Free, L: Lead Free</p>
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■ MARKING



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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V _{DSS}	1200	V
Gate-Source Voltage		V _{GSS}	±30	V
Continuous Drain Current	Continuous	I _D	10	A
	Pulsed	I _{DM}	20	A
Single Pulsed Avalanche Energy		E _{AS}	270	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	1.75	V/ns
Power Dissipation	TO-220F1/TO-220F2	P _D	30	W
	TO-247		100	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. L=150mH, I_{AS}=1.9A, V_{DD}=50V, R_G=25Ω, Starting T_J = 25°C
4. I_{SD} ≤ 10A, di/dt ≤ 200A/μs, V_{DD} ≤ BV_{DSS}, Starting T_J = 25°C

■ THERMAL DATA

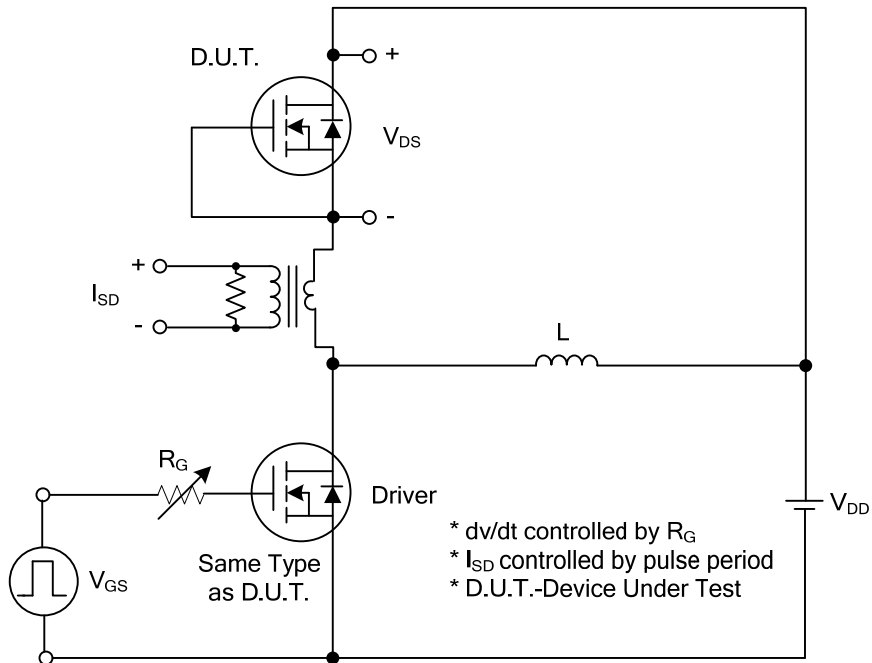
PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220F1/TO-220F2	θ _{JA}	62.5	°C/W
	TO-247		40	°C/W
Junction to Case	TO-220F1/TO-220F2	θ _{JC}	4.16	°C/W
	TO-247		1.25	°C/W

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

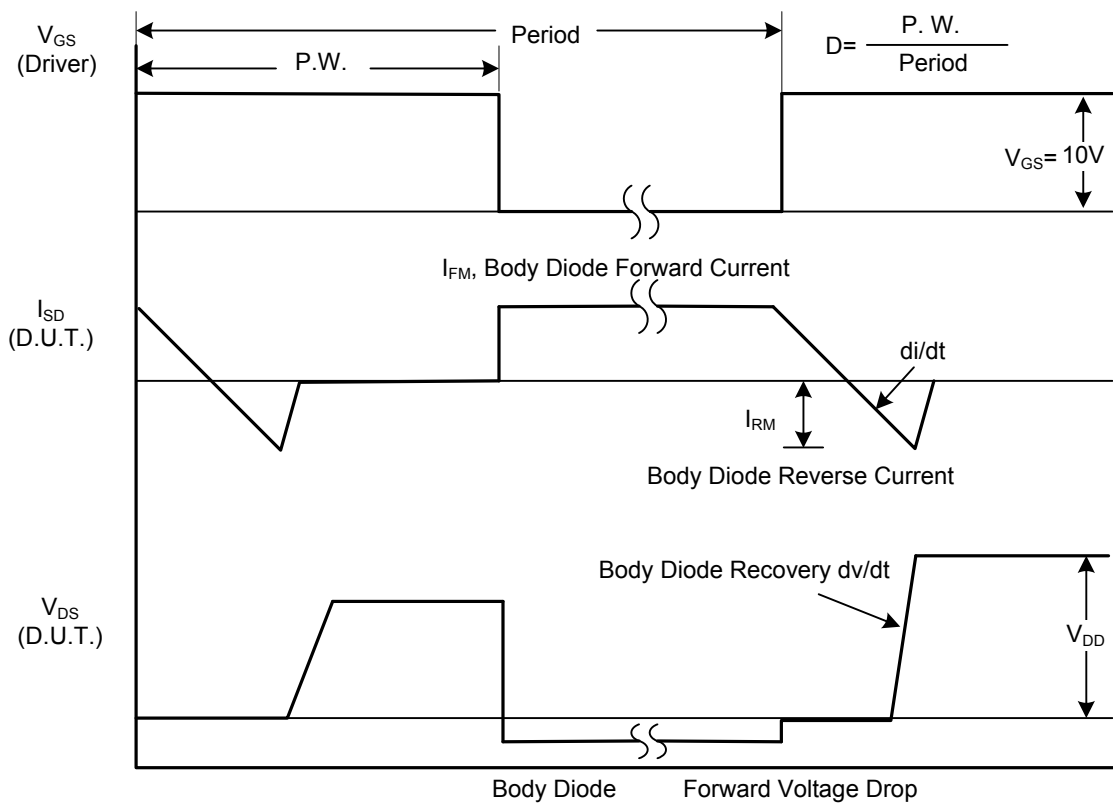
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	I _D =250μA, V _{GS} =0V	1200			V
Drain-Source Leakage Current	I _{DSS}	V _{DS} =1200V, V _{GS} =0V			10	μA
Gate-Source Leakage Current	Forward	I _{GSS} V _{GS} =+30V, V _{DS} =0V			+100	nA
	Reverse		V _{GS} =-30V, V _{DS} =0V			-100
ON CHARACTERISTICS						
Gate Threshold Voltage	V _{GS(TH)}	V _{DS} =V _{GS} , I _D =250μA	2.5		4.5	V
Static Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =5.0A			0.9	Ω
DYNAMIC PARAMETERS						
Input Capacitance	C _{ISS}	V _{GS} =0V, V _{DS} =50V, f=1.0MHz		1295		pF
Output Capacitance	C _{OSS}			66		pF
Reverse Transfer Capacitance	C _{RSS}			2.9		pF
SWITCHING PARAMETERS						
Total Gate Charge	Q _G	V _{DS} =960V, V _{GS} =10V, I _D =10A (Note 1, 2)		58		nC
Gate to Source Charge	Q _{GS}			15		nC
Gate to Drain Charge	Q _{GD}			20		nC
Turn-ON Delay Time	t _{D(ON)}	V _{DD} =100V, V _{GS} =10V, I _D =10A, R _G =25Ω (Note 1, 2)		15		ns
Rise Time	t _R			22		ns
Turn-OFF Delay Time	t _{D(OFF)}			152		ns
Fall-Time	t _F			38		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Maximum Body-Diode Continuous Current	I _S				10	A
Maximum Body-Diode Pulsed Current	I _{SM}				20	A
Drain-Source Diode Forward Voltage	V _{SD}	I _S =10A, V _{GS} =0V			1.4	V
Body Diode Reverse Recovery Time	t _{rr}	I _S =10A, V _{GS} =0V, dI _F /dt=100A/μs (Note 1)		640		ns
Reverse Recovery Charge	Q _{rr}				11.5	

Notes: 1. Pulse Test: Pulse width ≤ 1200μs, Duty cycle ≤ 2%.
 2. Essentially independent of operating temperature.

TEST CIRCUITS AND WAVEFORMS

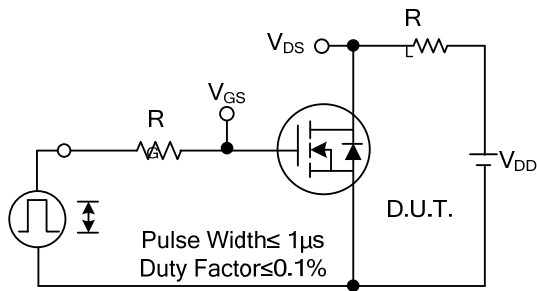


Peak Diode Recovery dv/dt Test Circuit

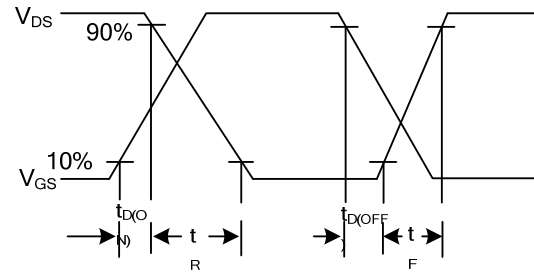


Peak Diode Recovery dv/dt Waveforms

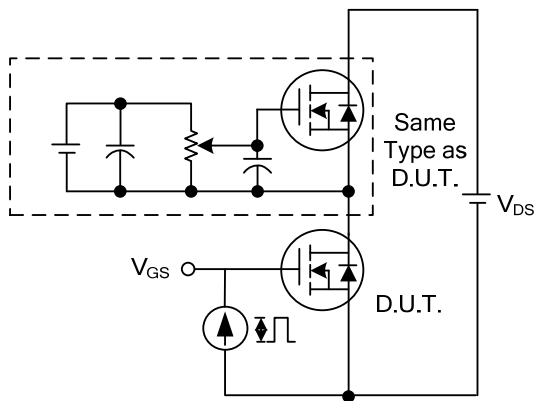
TEST CIRCUITS AND WAVEFORMS



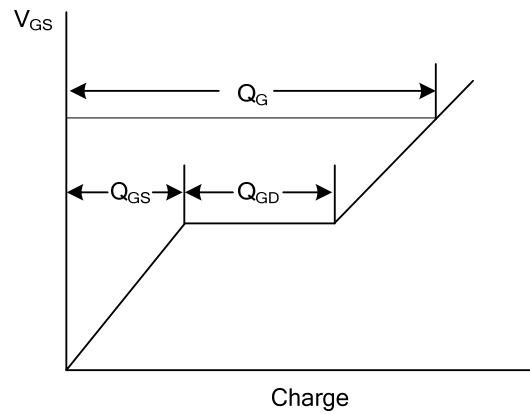
Switching Test Circuit



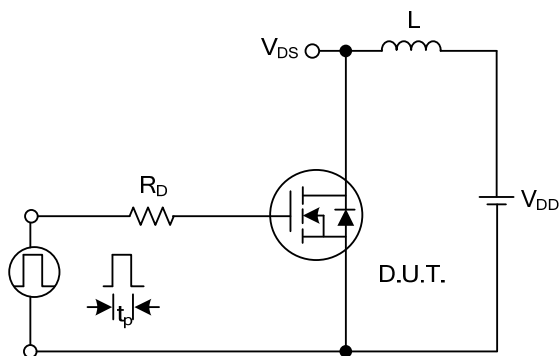
Switching Waveforms



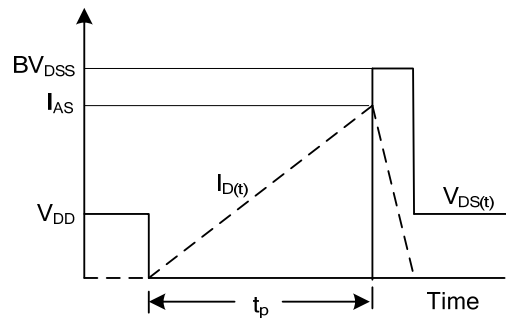
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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