



8N60-E

Preliminary

Power MOSFET

8A, 600V N-CHANNEL POWER MOSFET

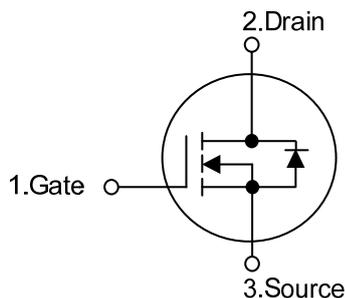
DESCRIPTION

The UTC **8N60-E** is a high voltage and high current power MOSFET, designed to have better characteristics, such as fast switching time, low gate charge, low on-state resistance and have a high rugged avalanche characteristics. This power MOSFET is usually used at high speed switching applications in power supplies, PWM motor controls, high efficient DC to DC converters and bridge circuits.

FEATURES

- * $R_{DS(ON)} < 1.4\Omega @ V_{GS} = 10V$
- * Fast switching capability
- * Avalanche energy specified
- * Improved dv/dt capability, high ruggedness

SYMBOL



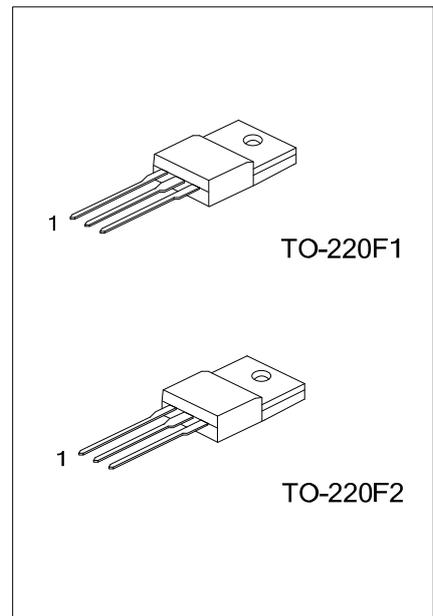
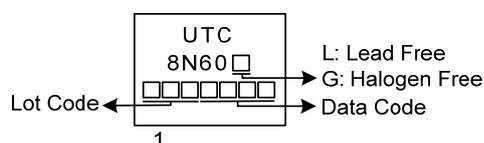
ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
8N60L-TF1-T	8N60G-TF1-T	TO-220F1	G	D	S	Tube
8N60L-TF2-T	8N60G-TF2-T	TO-220F2	G	D	S	Tube

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

	<p>(1) T: Tube</p> <p>(2) TF1: TO220-F1, TF2: TO-220F2</p> <p>(3) L: Lead Free, G: Halogen 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}	600	V
Gate-Source Voltage		V_{GSS}	± 30	V
Avalanche Current (Note 2)		I_{AR}	8	A
Drain Current	Continuous	I_D	8	A
	Pulsed (Note 2)	I_{DM}	32	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	160	mJ
	Repetitive (Note 2)	E_{AR}	14.7	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	4.5	V/ns
Power Dissipation	TO-220F1	P_D	48	W
	TO-220F2		50	
Junction Temperature		T_J	+150	$^\circ\text{C}$
Operating Temperature		T_{OPR}	-55 ~ +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 T_J

3. $L = 5\text{mH}$, $I_{AS} = 8\text{A}$, $V_{DD} = 50\text{V}$, $R_G = 25\ \Omega$, Starting $T_J = 25^\circ\text{C}$

4. $I_{SD} \leq 7.5\text{A}$, $di/dt \leq 200\text{A}/\mu\text{s}$, $V_{DD} \leq BV_{DSS}$, Starting $T_J = 25^\circ\text{C}$

■ THERMAL DATA

PARAMETER		SYMBOL	RATING	UNIT
Junction to Ambient		θ_{JA}	62.5	$^\circ\text{C}/\text{W}$
Junction to Case	TO-220F1	θ_{JC}	2.6	$^\circ\text{C}/\text{W}$
	TO-220F2		2.5	

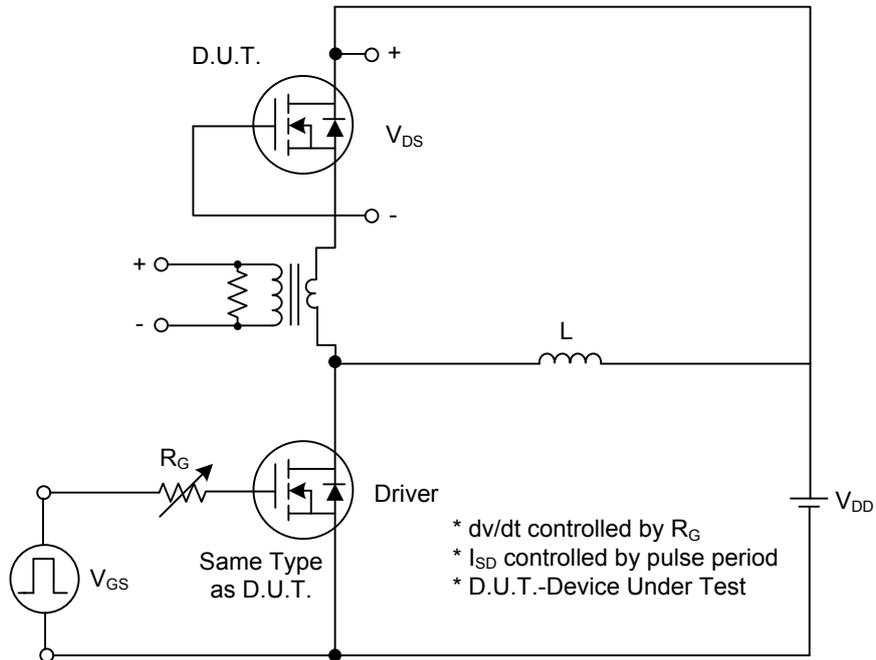
■ ELECTRICAL CHARACTERISTICS (T_C=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT	
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} = 0 V, I _D = 250 μA	600			V	
Drain-Source Leakage Current	I _{DSS}	V _{DS} = 600 V, V _{GS} = 0V			10	μA	
Gate-Source Leakage Current	Forward	I _{GSS}			100	nA	
	Reverse				-100	nA	
Breakdown Voltage Temperature Coefficient	ΔBV _{DSS} /ΔT _J	I _D =250μA, Referenced to 25°C		0.7		V/°C	
ON CHARACTERISTICS							
Gate Threshold Voltage	V _{GS(TH)}	V _{DS} = V _{GS} , I _D = 250μA	2.0		4.0	V	
Static Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} = 10V, I _D = 4A		1.1	1.4	Ω	
DYNAMIC CHARACTERISTICS							
Input Capacitance	C _{ISS}	V _{DS} = 25V, V _{GS} = 0V, f = 1MHz		830	1400	pF	
Output Capacitance	C _{OSS}				125	180	pF
Reverse Transfer Capacitance	C _{RSS}				10	21	pF
SWITCHING CHARACTERISTICS							
Turn-On Delay Time	t _{D(ON)}	V _{DD} = 30V, I _D = 0.5A, R _G = 25Ω (Note 1, 2)		50	80	ns	
Turn-On Rise Time	t _R				80	170	ns
Turn-Off Delay Time	t _{D(OFF)}				125	140	ns
Turn-Off Fall Time	t _F				60	130	ns
Total Gate Charge	Q _G	V _{DS} = 50V, I _D =1.3A, V _{GS} = 10V (Note 1, 2)		26		nC	
Gate-Source Charge	Q _{GS}				8		nC
Gate-Drain Charge	Q _{GD}				6.3		nC
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS							
Drain-Source Diode Forward Voltage	V _{SD}	V _{GS} = 0V, I _S = 8A			1.4	V	
Maximum Continuous Drain-Source Diode Forward Current	I _S				8	A	
Maximum Pulsed Drain-Source Diode Forward Current	I _{SM}				32	A	
Reverse Recovery Time	t _{rr}	V _{GS} = 0V, I _S = 8A, dI _F /dt = 100 A/μs (Note 2)		365		ns	
Reverse Recovery Charge	Q _{RR}				3.4		μC

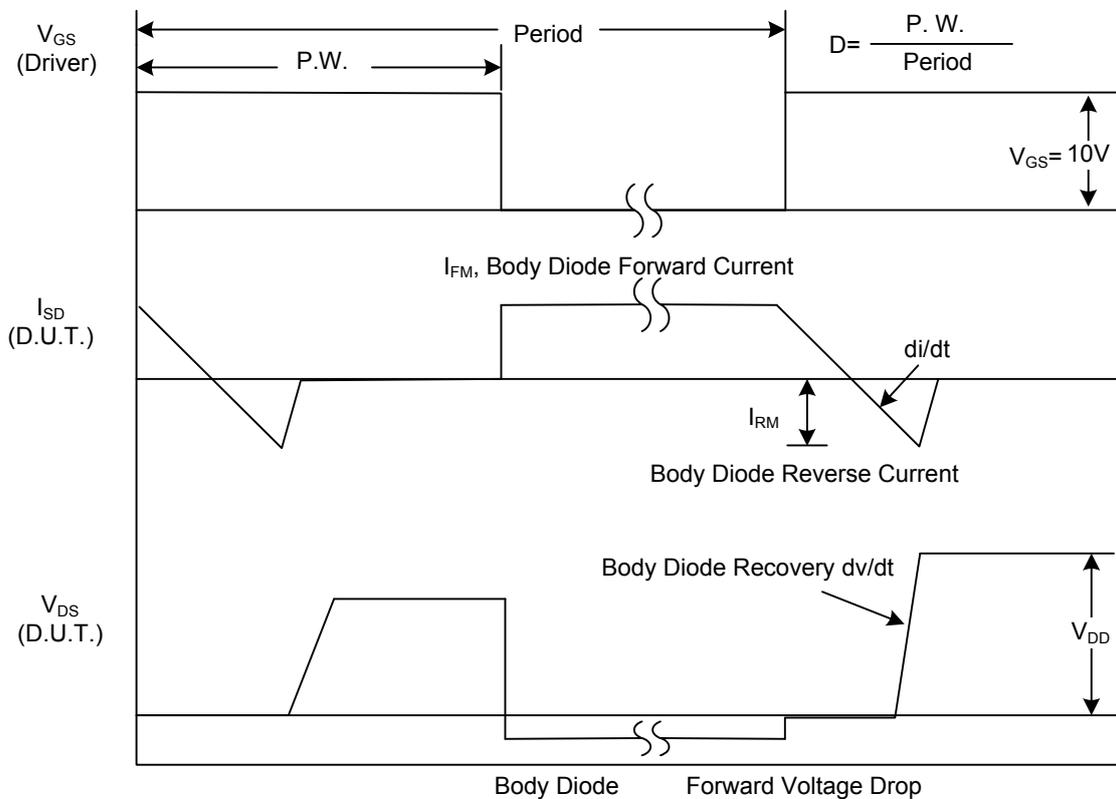
Notes: 1. Pulse Test: Pulse width ≤300μs, Duty cycle≤2%

2. Essentially independent of operating temperature

■ TEST CIRCUITS AND WAVEFORMS

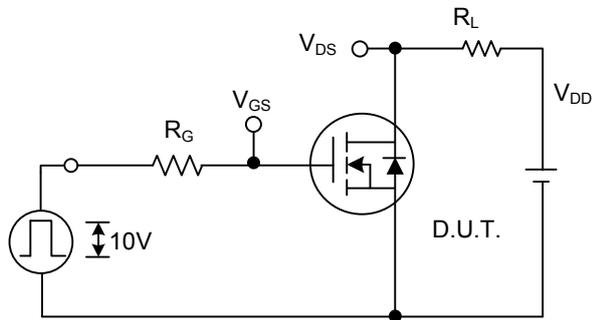


Peak Diode Recovery dv/dt Test Circuit

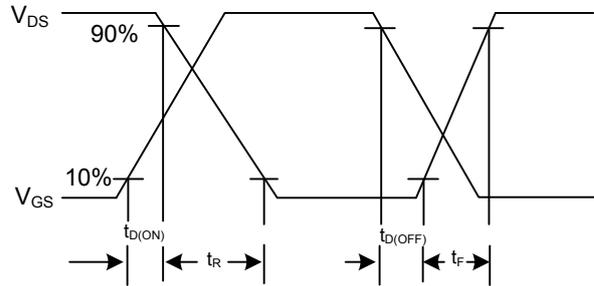


Peak Diode Recovery dv/dt Waveforms

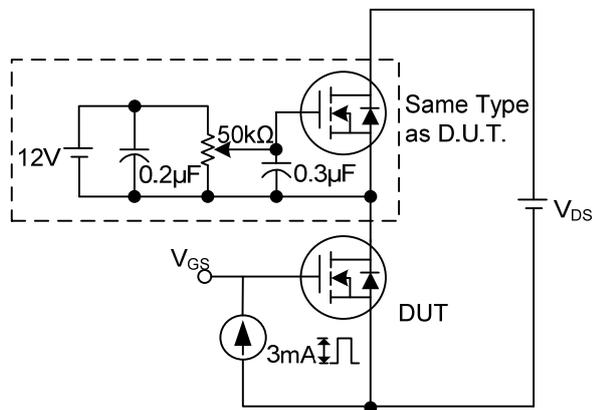
■ TEST CIRCUITS AND WAVEFORMS (Cont.)



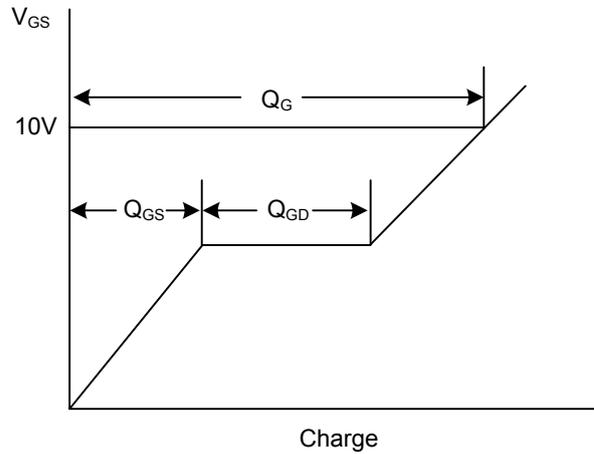
Switching Test Circuit



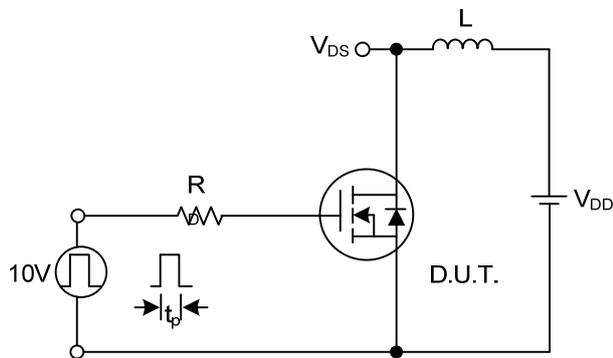
Switching Waveforms



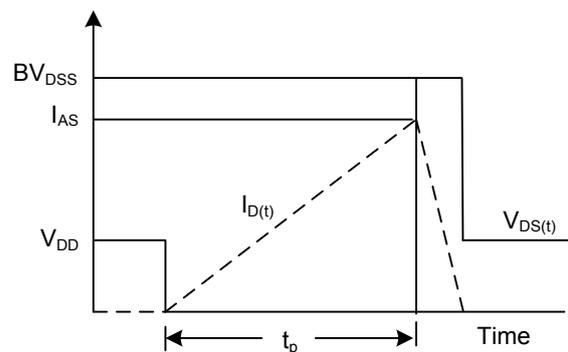
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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