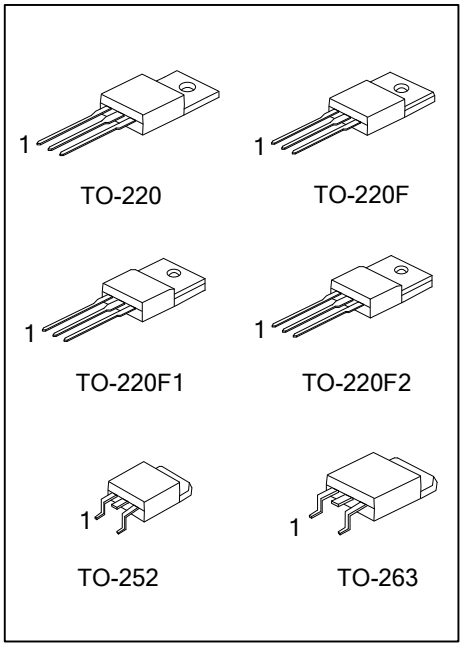
18NM60

Power MOSFET

18A, 600V N-CHANNEL POWER MOSFET



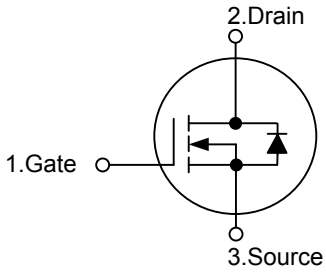
■ DESCRIPTION

The UTC **18NM60** uses UTC's advanced proprietary, planar stripe, DMOS technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with low gate voltages. This device is suitable for use as a load switch or in PWM applications.

■ FEATURES

* $R_{DS(ON)}$ < 0.3Ω @ V_{GS}=10V, I_D=9.0A
* 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	
18NM60L-TA3-T	18NM60G-TA3-T	TO-220	G	D	S	Tube
18NM60L-TF1-T	18NM60G-TF1-T	TO-220F1	G	D	S	Tube
18NM60L-TF2-T	18NM60G-TF2-T	TO-220F2	G	D	S	Tube
18NM60L-TF3-T	18NM60G-TF3-T	TO-220F	G	D	S	Tube
18NM60L-TN3-R	18NM60G-TN3-R	TO-252	G	D	S	Tape Reel
18NM60L-TQ2-T	18NM60G-TQ2-T	TO-263	G	D	S	Tube
18NM60L-TQ2-R	18NM60G-TQ2-R	TO-263	G	D	S	Tape Reel

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

18NM60L-TA3-T
(1) Packing Type
(2) Package Type
(3) Green Package

(1) T: Tube, R: Tape Reel
(2) TA3: TO-220, TF1: TO-220F1, TF2: TO-220F2, TF3: TO-220F, TN3: TO-252, TQ2: TO-263
(3) L: Lead Free, G: Halogen Free and Lead Free

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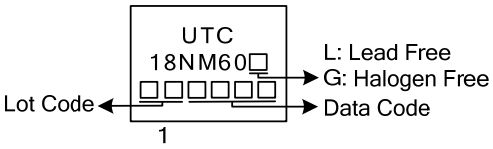
■ MARKING



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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	600	V
Gate-Source Voltage		V_{GSS}	±30	V
Drain Current	Continuous	I_D	18	A
	Pulsed (Note 2)	I_{DM}	72	A
Avalanche Current (Note 2)		I_{AR}	2.9	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	560	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	6.0	V/ns
Power Dissipation	TO-220/TO-263	P_D	235	W
	TO-220F/ TO-220F1 TO-220F2		390	W
	TO-252		357	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 = 133 mH, I_{AS} = 2.9A, V_{DD} = 50V, R_G = 25Ω, Starting T_J = 25°C
4. I_{SD} ≤18A, di/dt ≤ 200A/μs, V_{DD} ≤ BV_{DSS}, Starting T_J = 25°C

■ THERMAL DATA

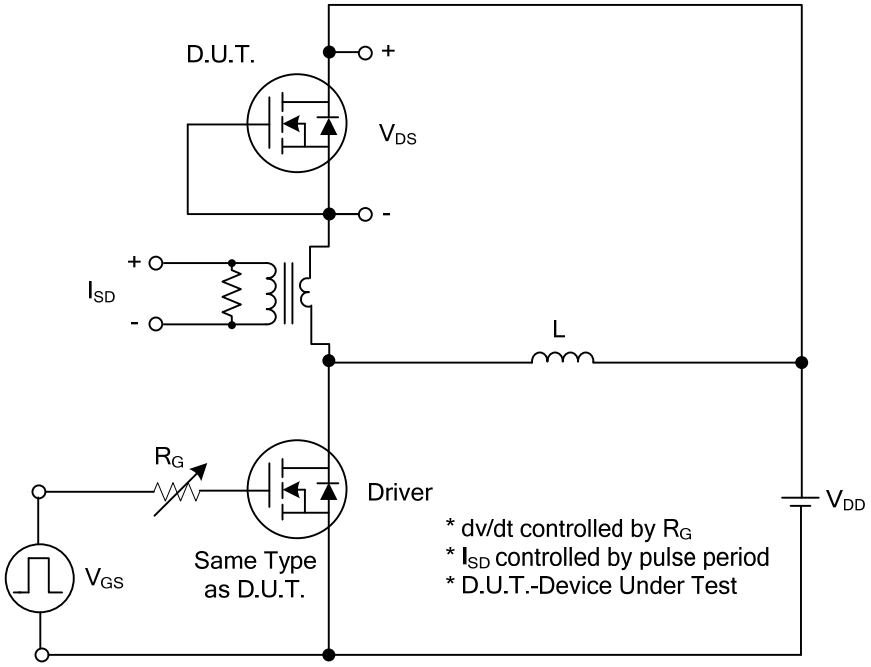
PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220/TO-220F TO-220F1/TO-220F2 TO-263	θ_{JA}	62.5	°C/W
	TO-252		110	°C/W
Junction to Case	TO-220/TO-263	θ_{JC}	0.53	°C/W
	TO-220F/TO-220F1 TO-220F2		5.0	°C/W
	TO-252		1.79	°C/W

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

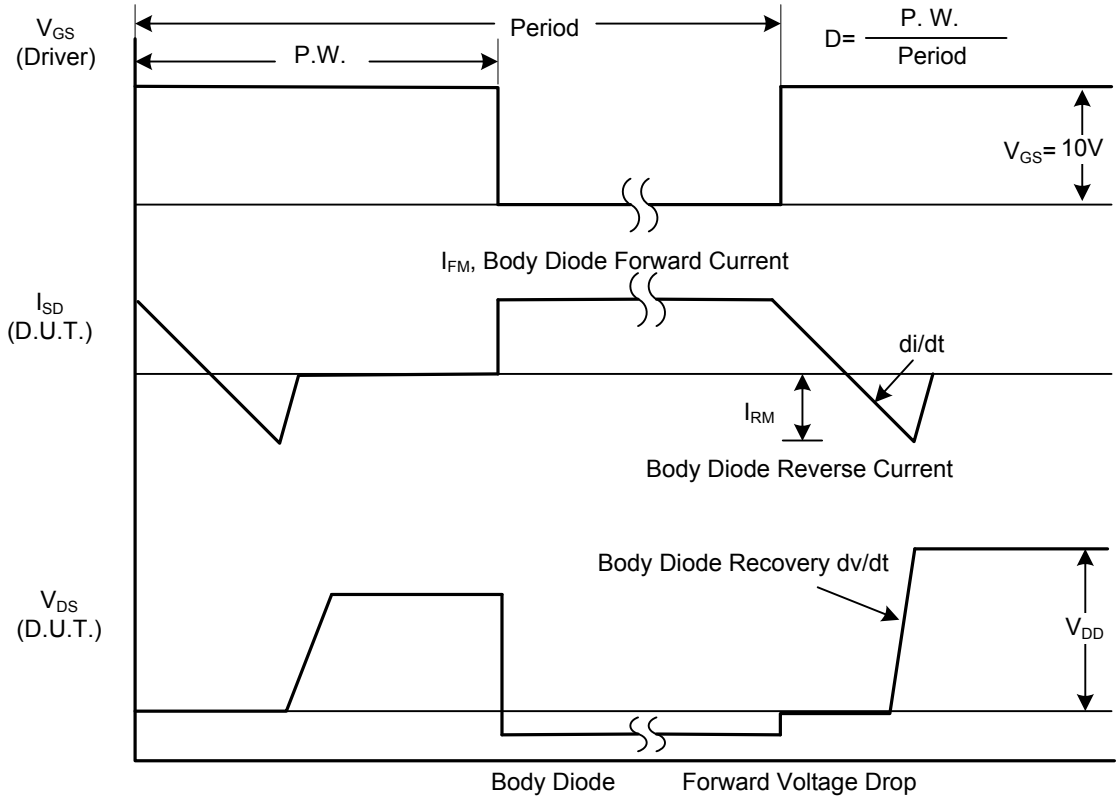
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V, I_D=250μA	600			V
Drain-Source Leakage Current	I_{DSS}	V_{DS}=600V, V_{GS}=0V			25	μA
Gate-Body Leakage Current	I_{GSS}	V_{DS}=0V, V_{GS}=±30V			±100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	V_{DS}=V_{GS}, I_D=250μA	2.5		4.5	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=9A (Note)			0.3	Ω
DYNAMIC PARAMETERS						
Input Capacitance	C_{ISS}	V_{GS}=0V, V_{DS}=25V, f=1MHz		1100		pF
Output Capacitance	C_{OSS}			750		pF
Reverse Transfer Capacitance	C_{RSS}			65		pF
SWITCHING PARAMETERS						
Total Gate Charge (Note 1)	Q_G	V_{DS}=50V, I_D=1.3A, V_{GS}=10V I_G=100μA (Note 1, 2)		190		nC
Gate to Source Charge	Q_{GS}			11		nC
Gate to Drain Charge	Q_{GD}			36		nC
Turn-ON Delay Time (Note 1)	$t_{D(ON)}$	V_{DD}=30V, V_{GS}=10V, I_D=0.5A, R_G=25Ω (Note 1, 2)		86		ns
Rise Time	t_R			190		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			250		ns
Fall-Time	t_F			185		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Maximum Body-Diode Continuous Current	I_S				18	A
Maximum Body-Diode Pulsed Current	I_{SM}				54	A
Drain-Source Diode Forward Voltage (Note 1)	V_{SD}	I_S=18A, V_{GS}=0V			1.5	V
Body Diode Reverse Recovery Time (Note 1)	t_{rr}	I_S=18A, V_{GS}=0V, dI_F/dt=100A/μs		420		ns
Body Diode Reverse Recovery Charge	Q_{rr}			7.0		μC

Notes: 1. Pulse Test : Pulse width ≤ 300μs, Duty cycle ≤ 2%.
2. Essentially independent of operating ambient temperature.

■ TEST CIRCUITS AND WAVEFORMS

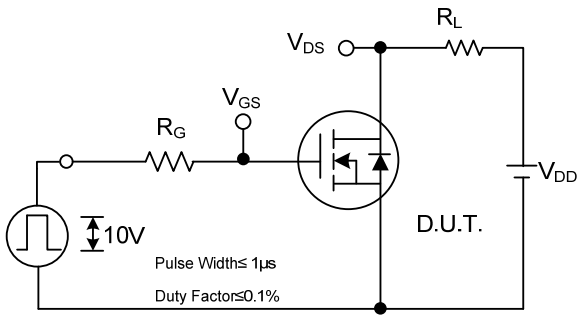


Peak Diode Recovery dv/dt Test Circuit

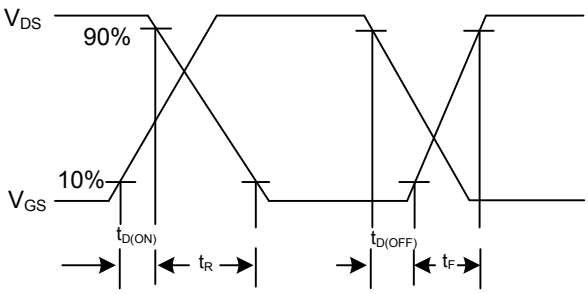


Peak Diode Recovery dv/dt Waveforms

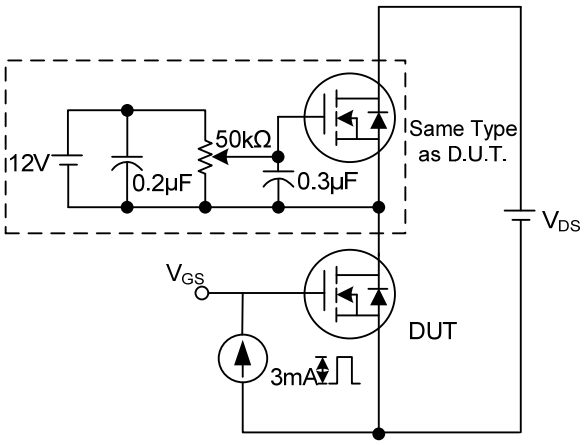
■ TEST CIRCUITS AND WAVEFORMS (Cont.)



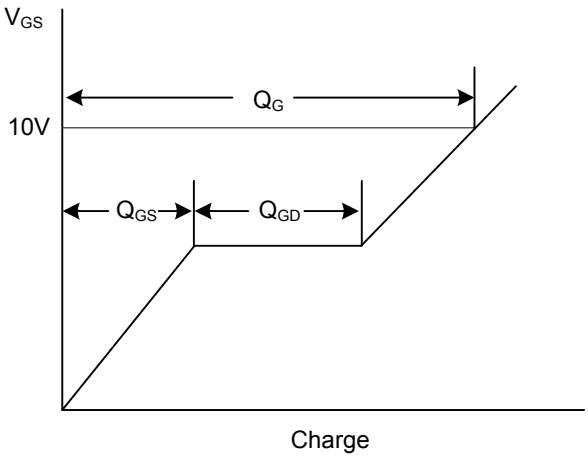
Switching Test Circuit



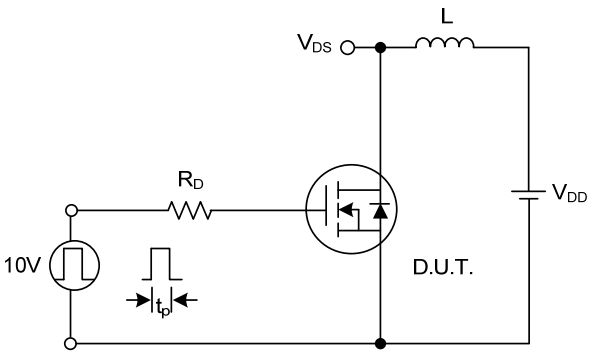
Switching Waveforms



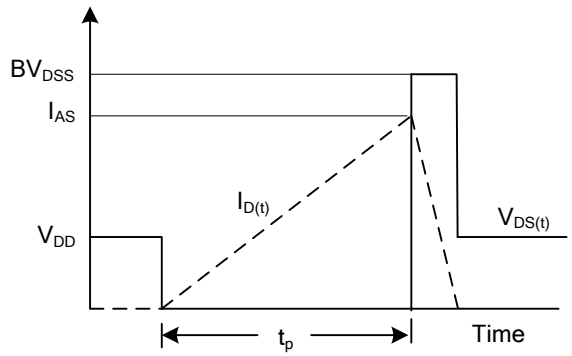
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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