



UT60N03M

Preliminary

Power MOSFET

**60A, 30V N-CHANNEL
POWER MOSFET**

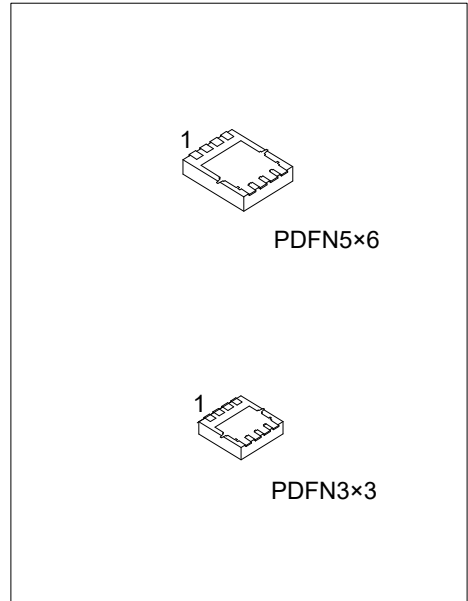
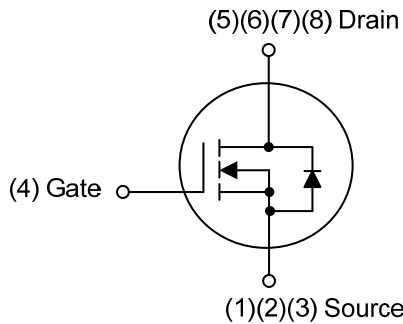
■ DESCRIPTION

The **UTC UT60N03M** uses advanced trench 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

- * $R_{DS(ON)} \leq 4.0 \text{ m}\Omega$ @ $V_{GS}=10\text{V}$, $I_D=30\text{A}$
- $R_{DS(ON)} \leq 5.8 \text{ m}\Omega$ @ $V_{GS}=4.5\text{V}$, $I_D=30\text{A}$
- * High Switching Speed

■ SYMBOL



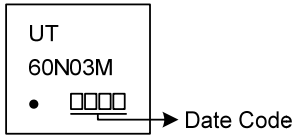
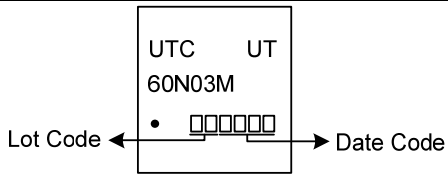
■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment								Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	
UT60N03ML-P3030-R	UT60N03MG-P3030-R	PDFN3x3	S	S	S	G	D	D	D	D	Tape Reel
UT60N03ML-P5060-R	UT60N03MG-P5060-R	PDFN5x6	S	S	S	G	D	D	D	D	Tape Reel

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

<p>UT60N03MG-P3030-R</p>	<p>(1) R: Tape Reel</p> <p>(2) P3030: PDFN3x3, P5060: PDFN5x6</p> <p>(3) G: Halogen Free and Lead Free, L: Lead Free</p>
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MARKING

PDFN3x3	PDFN5x6
 <p>UT 60N03M • □□□ → Date Code</p>	 <p>UTC UT 60N03M • □□□□□ → Date Code Lot Code ←</p>

■ ABSOLUTE MAXIMUM RATINGS ($T_C=25^\circ\text{C}$, unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	30	V
Gate-Source Voltage		V_{GSS}	± 20	V
Drain Current	Continuous	I_D	60	A
	Pulsed (Note 2)	I_{DM}	120	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	51	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	1.6	V/ns
Power Dissipation	PDFN3×3	P_D	30	W
	PDFN5×6		34	W
Junction Temperature		T_J	+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 maximum junction temperature.

3. $L = 0.1\text{mH}$, $I_{AS} = 32\text{A}$, $V_{DD} = 20\text{V}$, $R_G = 25\ \Omega$, Starting $T_J = 25^\circ\text{C}$

4. $I_{SD} \leq 30\text{A}$, $di/dt \leq 200\text{A}/\mu\text{s}$, $V_{DD} \leq BV_{DSS}$, Starting $T_J = 25^\circ\text{C}$

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction-to-Ambient	PDFN3×3	θ_{JA}	75	$^\circ\text{C}/\text{W}$
	PDFN5×6		65	$^\circ\text{C}/\text{W}$
Junction-to-Case	PDFN3×3	θ_{JC}	4.16	$^\circ\text{C}/\text{W}$
	PDFN5×6		3.67	$^\circ\text{C}/\text{W}$

Note: Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.

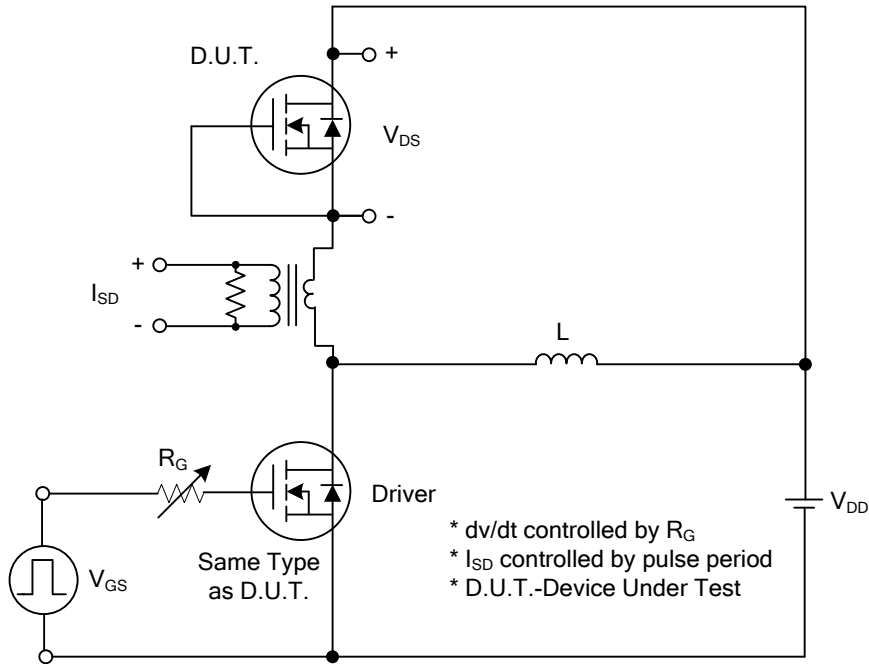
■ ELECTRICAL CHARACTERISTICS ($T_J=25^\circ\text{C}$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	30			V
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=30V, V_{GS}=0V$			1	μA
Gate-Source Leakage Current	Forward	I_{GSS}			100	nA
	Reverse					
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1.0		3.0	V
Static Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=30A$			4.0	m Ω
		$V_{GS}=4.5V, I_D=30A$			5.8	m Ω
DYNAMIC CHARACTERISTICS						
Input Capacitance	C_{ISS}	$V_{GS}=0V, V_{DS}=25V, f=1.0\text{ MHz}$		2390		pF
Output Capacitance	C_{OSS}			358		pF
Reverse Transfer Capacitance	C_{RSS}			308		pF
SWITCHING CHARACTERISTICS						
Total Gate Charge (Note 1)	Q_G	$V_{DS}=24V, V_{GS}=10V, I_D=60A$ (Note 1, 2)		90		nC
Gate-Source Charge	Q_{GS}			10		nC
Gate-Drain Charge	Q_{GD}			23		nC
Turn-on Delay Time (Note 1)	$t_{D(ON)}$	$V_{DS}=15V, V_{GS}=10V, I_D=60A,$ $R_G=3\Omega$ (Note 1, 2)		10		ns
Rise Time	t_R			18		ns
Turn-off Delay Time	$t_{D(OFF)}$			54		ns
Fall-Time	t_F			31		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Maximum Body-Diode Continuous Current	I_S				60	A
Maximum Body-Diode Pulsed Current	I_{SM}				120	A
Drain-Source Diode Forward Voltage (Note 1)	V_{SD}	$V_{GS}=0V, I_S=60A$			1.4	V
Reverse Recovery Time (Note 1)	t_{rr}	$V_{GS}=0V, I_S=30A,$ $dI_F/dt=100A/\mu s$ (Note1)		88		ns
Reverse Recovery Charge	Q_{rr}			70		nC

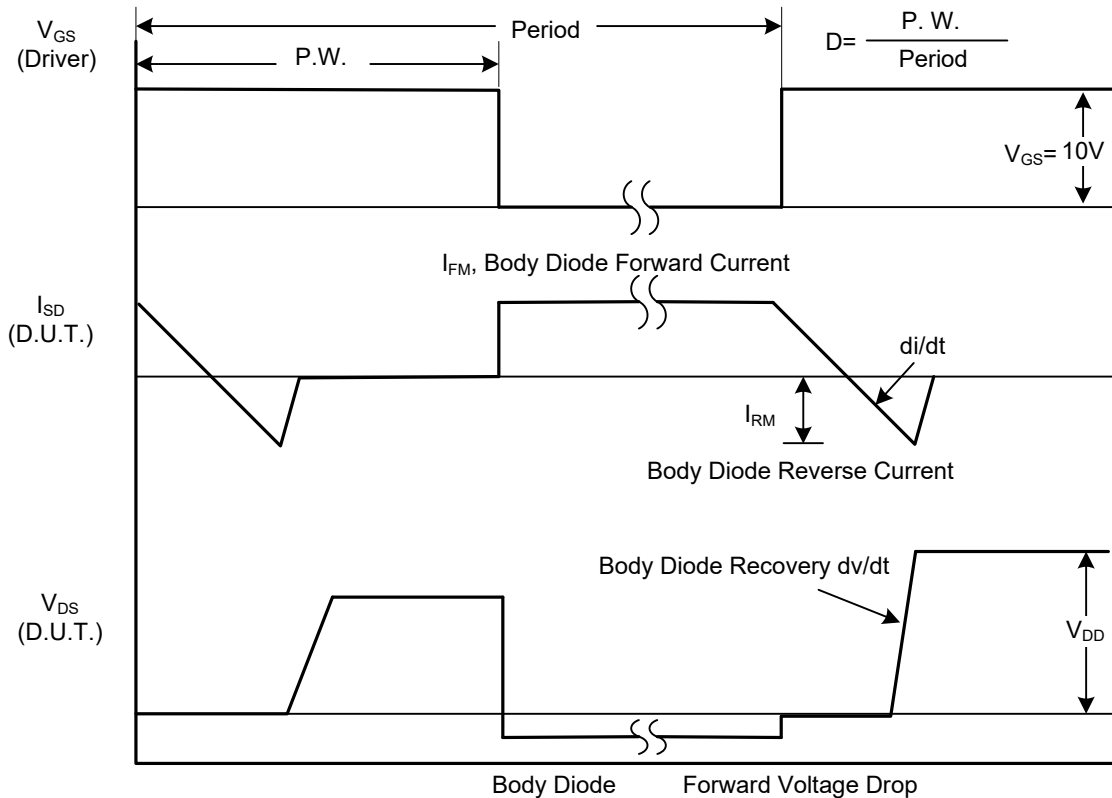
Notes: 1. Pulse Test : Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$.

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

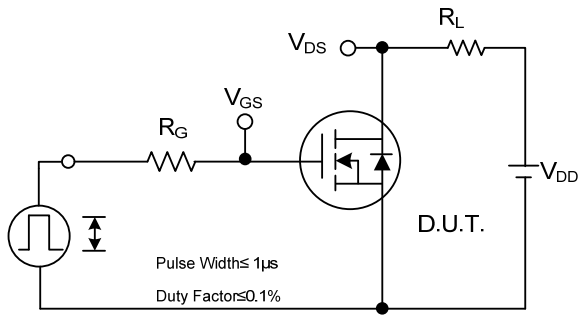


Peak Diode Recovery dv/dt Test Circuit

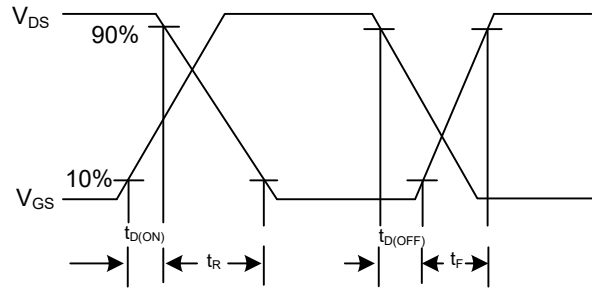


Peak Diode Recovery dv/dt Waveforms

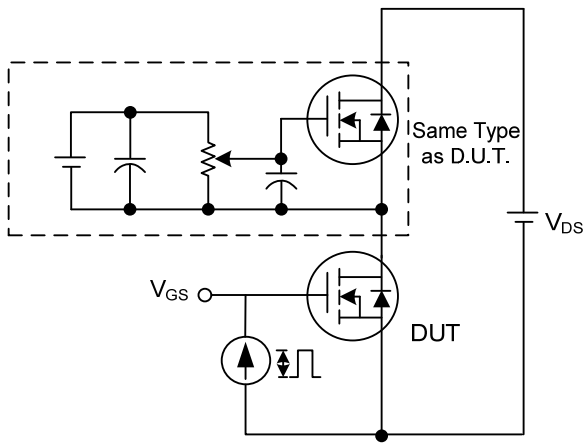
■ TEST CIRCUITS AND WAVEFORMS



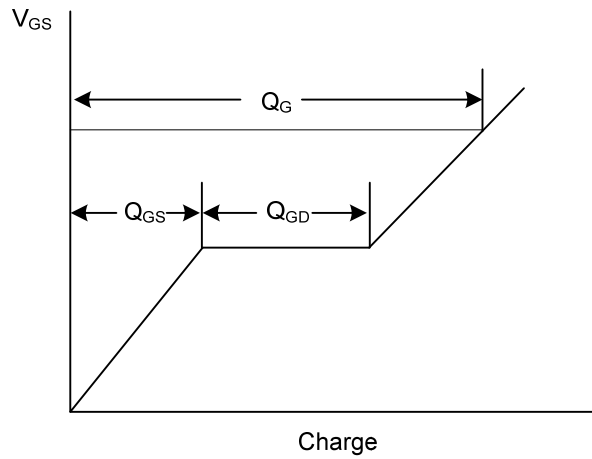
Switching Test Circuit



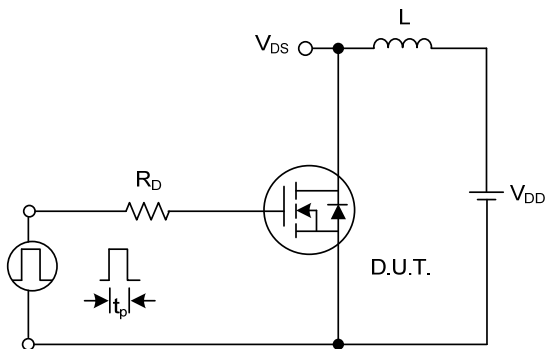
Switching Waveforms



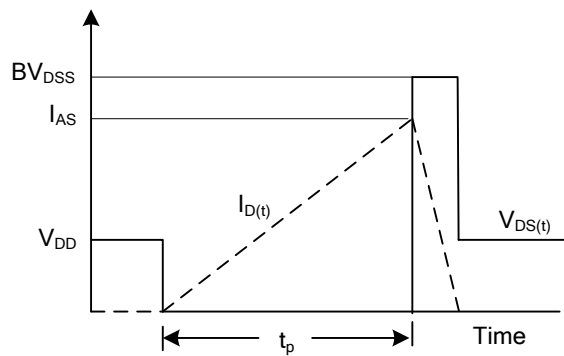
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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