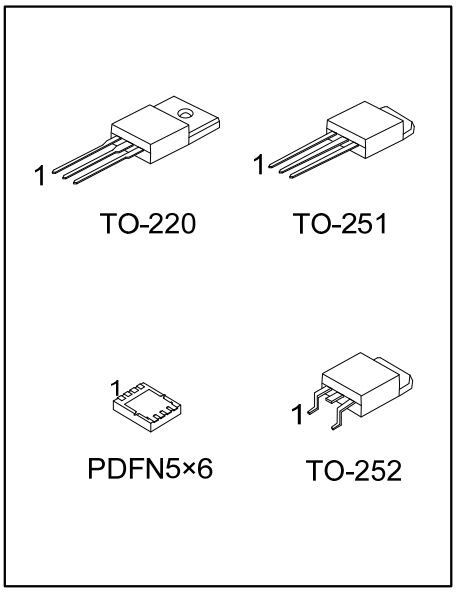
UT70N03

Power MOSFET

N-CHANNEL ENHANCEMENT MODE



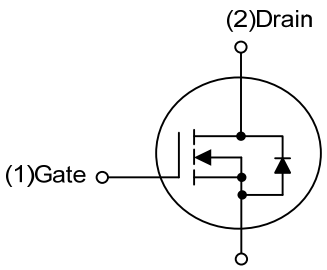
■ DESCRIPTION

The **UT70N03** 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.

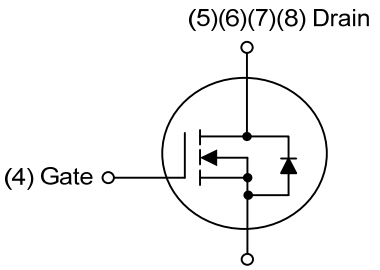
■ FEATURES

* $R_{DS(ON)}$ ≤ 7.2 mΩ @ V_{GS}=10V, I_D=33A
* $R_{DS(ON)}$ ≤ 9.5 mΩ @ V_{GS}=4.5V, I_D=20A
* Low capacitance
* Low gate charge
* Fast switching capability
* Avalanche energy specified

■ SYMBOL



TO-220TO-251/TO-252

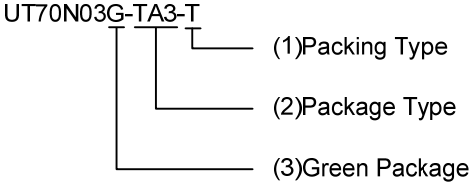


PDFN5×6

■ ORDERING INFORMATION

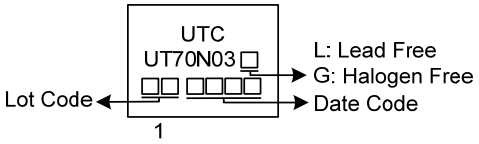
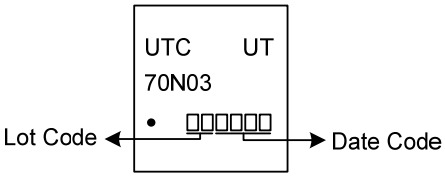
Ordering Number		Package	Pin Assignment								Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	
UT70N03L-TA3-T	UT70N03G-TA3-T	TO-220	G	D	S	-	-	-	-	-	Tube
UT70N03L-TM3-T	UT70N03G-TM3-T	TO-251	G	D	S	-	-	-	-	-	Tube
UT70N03L-TN3-R	UT70N03G-TN3-R	TO-252	G	D	S	-	-	-	-	-	Tape Reel
UT70N03L-P5060-R	UT70N03G-P5060-R	PDFN5×6	S	S	S	G	D	D	D	D	Tape Reel

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



(1) T: Tube, R: Tape Reel
(2) TA3: TO-220, TM3: TO-251, TN3: TO-252
P5060: PDFN5×6
(3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING

TO-220 / TO-251 / TO-252	PDFN5×6
	

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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	30	V
Gate-Source Voltage		V_{GSS}	±20	V
Continuous Drain Current		I_D	70	A
Pulsed Drain Current		I_{DM}	140	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	68	mJ
Power Dissipation	TO-220	P_D	65	W
	TO-251/TO-252		48	W
	PDFN5×6		35	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 =0.1mH, I_{AS} = 37A, V_{DD} = 30V, R_G = 25Ω, Starting T_J = 25°C

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220	θ_{JA}	62.5	°C/W
	TO-251/TO-252		50	°C/W
	PDFN5×6		65 (Note)	°C/W
Junction to Case	TO-220	θ_{JC}	1.92	°C/W
	TO-251/TO-252		2.6 (Note)	°C/W
	PDFN5×6		3.5 (Note)	°C/W

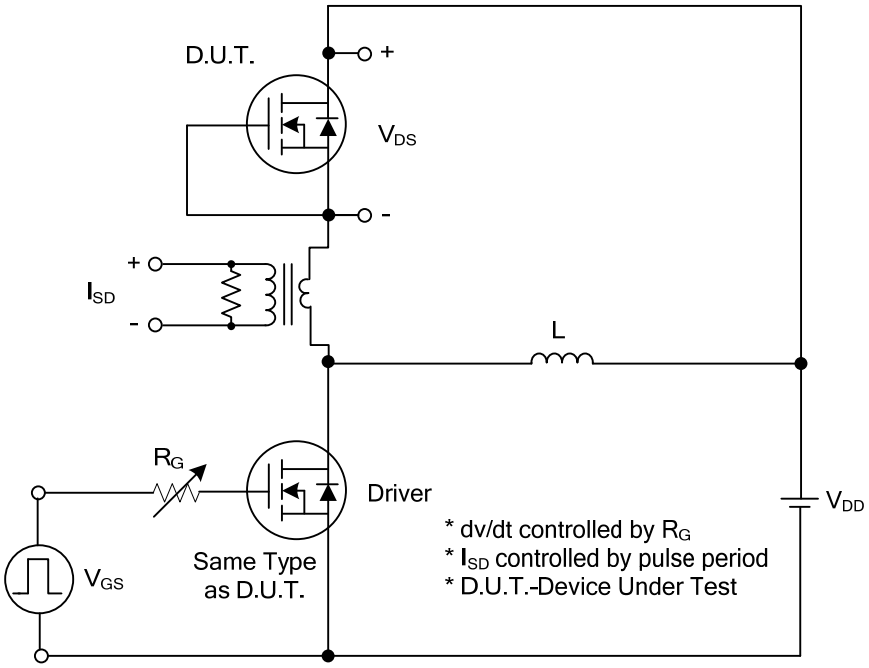
Note: Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.

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

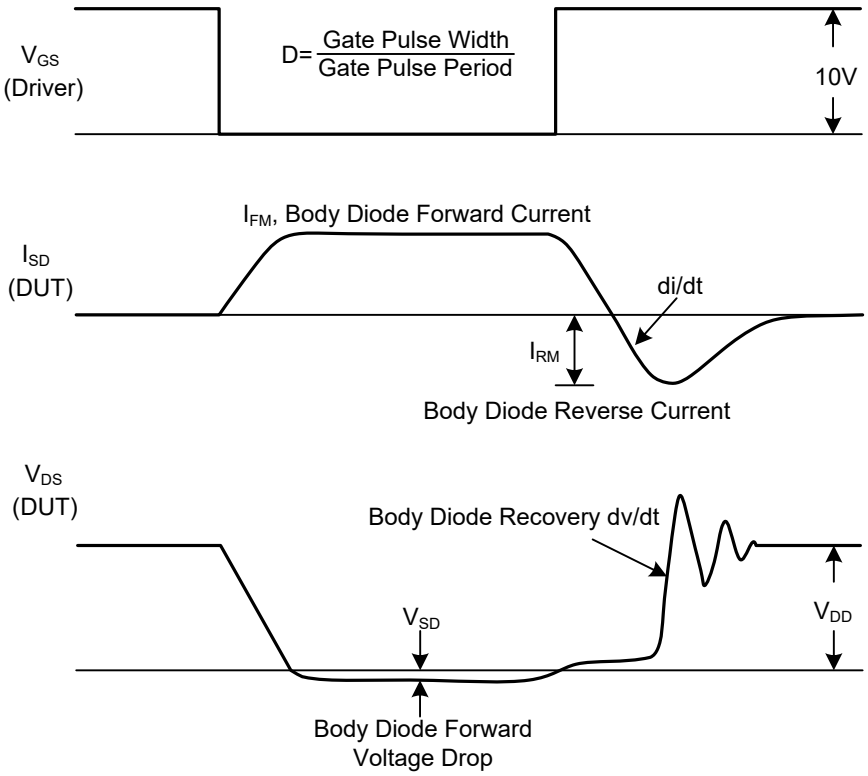
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V, I_D=250μA	30			V
Drain-Source Leakage Current	I_{DSS}	V_{DS}=30V, V_{GS}=0V			1	μA
Gate-Source Leakage Current	I_{GSS}	V_{GS}=±20V			±100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	V_{DS}=V_{GS}, I_D=250μA	1.0		3.0	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=33A			7.2	mΩ
		V_{GS}=4.5V, I_D =20A			9.5	mΩ
Forward Transconductance	g_{FS}	V_{DS}=10V, I_D=33A		35		S
DYNAMIC PARAMETERS						
Input Capacitance	C_{ISS}	V_{DS}=25V, V_{GS}=0V, f=1.0MHz		2190		pF
Output Capacitance	C_{OSS}			408		pF
Reverse Transfer Capacitance	C_{RSS}			340		pF
SWITCHING PARAMETERS						
Total Gate Charge	Q_G	V_{DS}=24V, V_{GS}=4.5V, I_D=70A		42		nC
Gate Source Charge	Q_{GS}			7		nC
Gate Drain Charge	Q_{GD}			26		nC
Turn-ON Delay Time	$t_{D(ON)}$	V_{GS}=10V, V_{DS}=15V, I_D=70A, R_G=3.3Ω		10		ns
Turn-ON Rise Time	t_R			18		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			43		ns
Turn-OFF Fall-Time	t_F			24		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Maximum Body-Diode Continuous Current	I_S				70	A
Pulsed Source Current (Body Diode)	I_{SM}				140	A
Diode Forward Voltage (Note 2)	V_{SD}	I_S=70A, V_{GS}=0V			1.3	V

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

■ TEST CIRCUITS AND WAVEFORMS

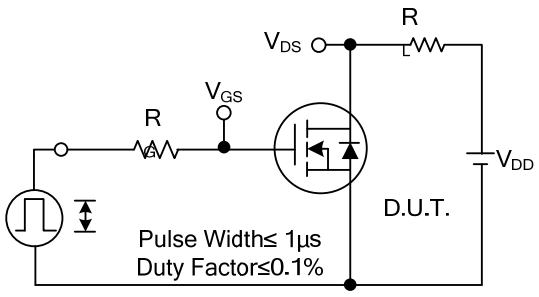


Peak Diode Recovery dv/dt Test Circuit

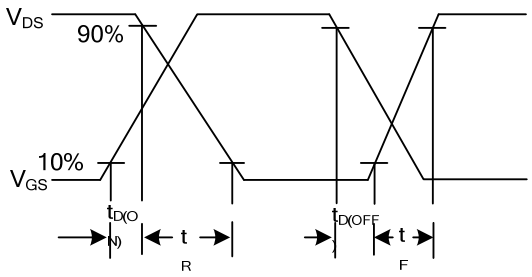


Peak Diode Recovery dv/dt Waveforms

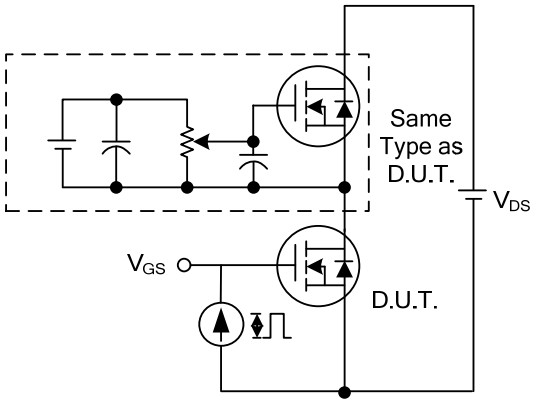
■ TEST CIRCUITS AND WAVEFORMS



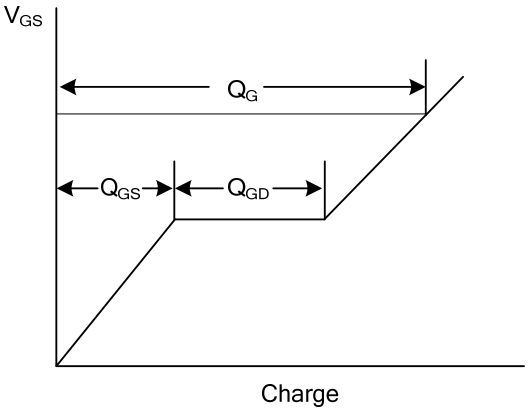
Switching Test Circuit



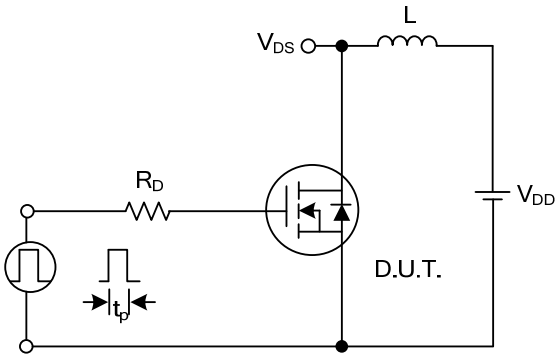
Switching Waveforms



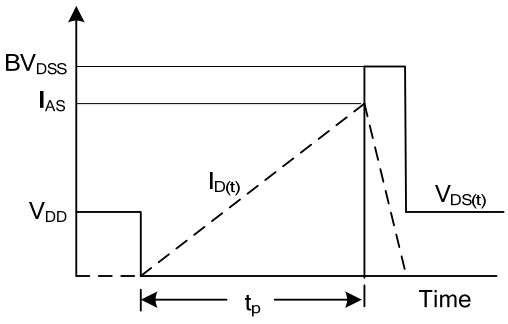
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms