



## 70N30-HC

Preliminary

Power MOSFET

### 70A, 300V N-CHANNEL POWER MOSFET

#### DESCRIPTION

The UTC **70N30-HC** is a N-channel enhancement MOSFET using UTC's advanced technology to provide the customers with perfect  $R_{DS(ON)}$ , high switching speed, high current capacity and low gate charge.

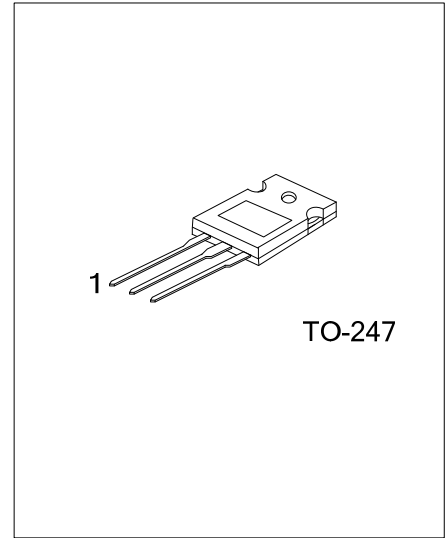
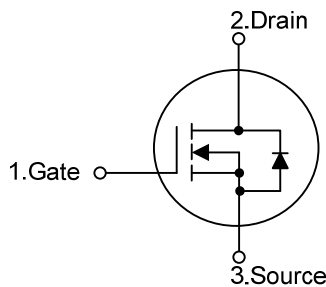
The UTC **70N30-HC** is universally applied in low voltage such as automotive, high efficiency switching for AC/DC converters and DC motor control, etc.

#### FEATURES

\*  $R_{DS(ON)} \leq 45 \text{ m}\Omega$  @  $V_{GS}=10\text{V}$ ,  $I_D=35\text{A}$

\* High Switching Speed

#### SYMBOL



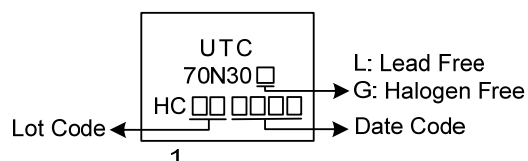
#### ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
70N30L-HC-T47-T	70N30G-HC-T47-T	TO-247	G	D	S	Tube

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

<b>70N30G-HC-T47-T</b>	
(1) Packing Type	(1) T: Tube
(2) Package Type	(2) T47: TO-247
(3) Version Code	(3) Version HC
(4) Green Package	(4) G: Halogen Free and Lead Free, L: Lead Free

#### MARKING



■ ABSOLUTE MAXIMUM RATINGS (unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
Drain-Source Voltage	$V_{DS}$	300	V
Gate-Source Voltage	$V_{GS}$	$\pm 30$	V
Continuous Drain Current	Continuous	$I_D$	70
	Pulsed	$I_{DM}$	140
Single Pulsed Avalanche Energy	$E_{AS}$	1654	mJ
Peak Diode Recovery dv/dt (Note 4)	dv/dt	16.5	V/ns
Power Dissipation	$P_D$	320	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.  $L = 30\text{mH}$ ,  $I_{AS} = 10.5\text{A}$ ,  $V_{DD} = 90\text{V}$ ,  $R_G = 25\Omega$ , 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	RATING	UNIT
Junction to Ambient	$\theta_{JA}$	50	°C/W
Junction to Case	$\theta_{JC}$	0.39	°C/W

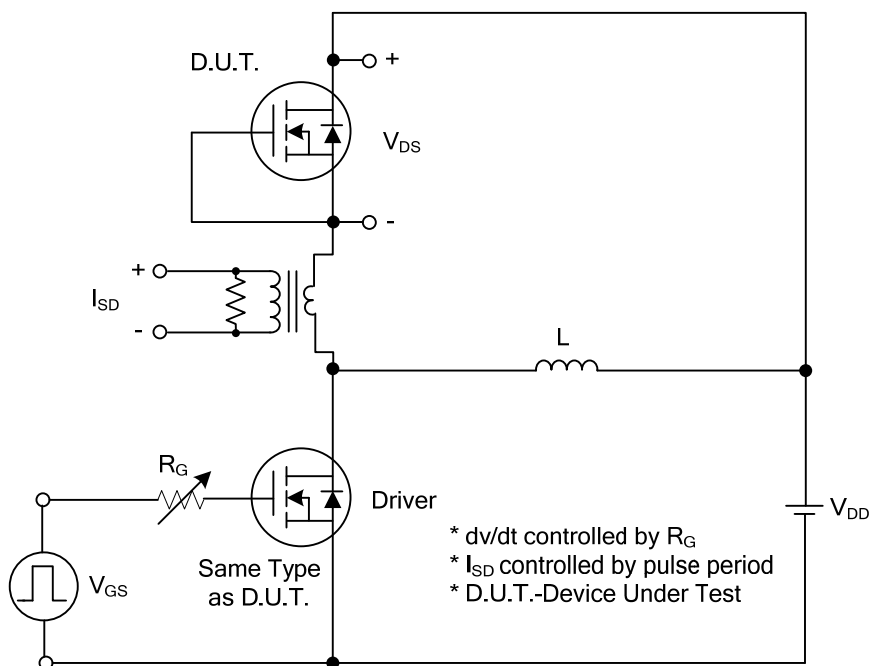
■ ELECTRICAL CHARACTERISTICS

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV <sub>DSS</sub>	I <sub>D</sub> =250μA, V <sub>GS</sub> =0V	300			V
Drain-Source Leakage Current		I <sub>DSS</sub>	V <sub>DS</sub> =300V, V <sub>GS</sub> =0V			10	μA
Gate-Source Leakage Current	Forward	I <sub>GSS</sub>	V <sub>GS</sub> =+30V, V <sub>DS</sub> =0V			+100	nA
	Reverse		V <sub>GS</sub> =-30V, V <sub>DS</sub> =0V			-100	nA
ON CHARACTERISTICS							
Gate Threshold Voltage		V <sub>GS(TH)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	2.0		4.0	V
Static Drain-Source On-State Resistance		R <sub>DS(ON)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =35A			45	mΩ
DYNAMIC PARAMETERS							
Input Capacitance		C <sub>ISS</sub>	V <sub>GS</sub> =0V, V <sub>DS</sub> =25V, f=1.0MHz		8086		pF
Output Capacitance		C <sub>OSS</sub>			980		pF
Reverse Transfer Capacitance		C <sub>RSS</sub>			28		pF
SWITCHING PARAMETERS							
Total Gate Charge		Q <sub>G</sub>	V <sub>DS</sub> =240V, V <sub>GS</sub> =10V, I <sub>D</sub> =70A (Note 1, 2)		185		nC
Gate to Source Charge		Q <sub>GS</sub>			55		nC
Gate to Drain Charge		Q <sub>GD</sub>			64		nC
Turn-ON Delay Time		t <sub>D(ON)</sub>	V <sub>DD</sub> =100V, V <sub>GS</sub> =10V, I <sub>D</sub> =70A, R <sub>G</sub> =25Ω (Note 1, 2)		112		ns
Rise Time		t <sub>R</sub>			89		ns
Turn-OFF Delay Time		t <sub>D(OFF)</sub>			280		ns
Fall-Time		t <sub>F</sub>			106		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Body-Diode Continuous Current		I <sub>S</sub>				70	A
Maximum Body-Diode Pulsed Current		I <sub>SM</sub>				140	A
Drain-Source Diode Forward Voltage		V <sub>SD</sub>	I <sub>S</sub> =70A, V <sub>GS</sub> =0V			1.4	V
Body Diode Reverse Recovery Time		t <sub>rr</sub>	I <sub>S</sub> =30A, V <sub>GS</sub> =0V, dI <sub>F</sub> /dt=100A/μs		316		ns
Reverse Recovery Charge		Q <sub>rr</sub>	(Note 1)		3.6		μC

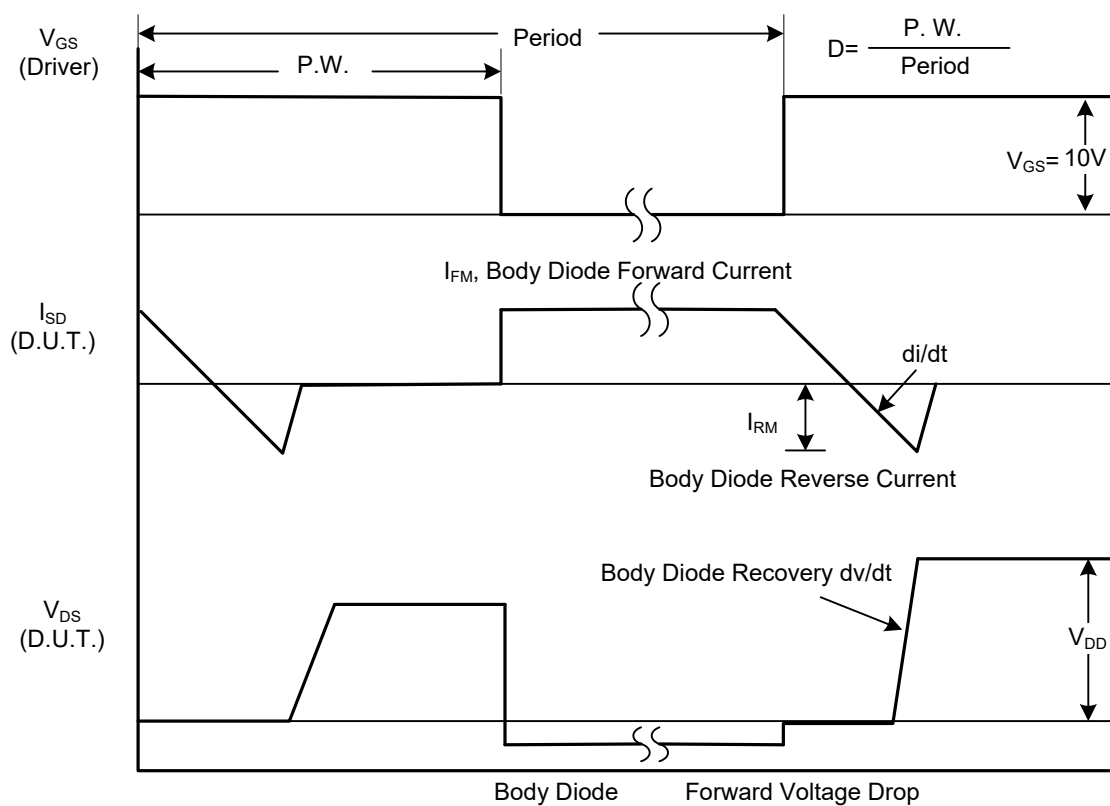
Notes: 1. Pulse Test: Pulse width  $\leq 300\mu\text{s}$ , Duty cycle  $\leq 2\%$ .

2. Essentially independent of operating temperature.

# ■ TEST CIRCUITS AND WAVEFORMS

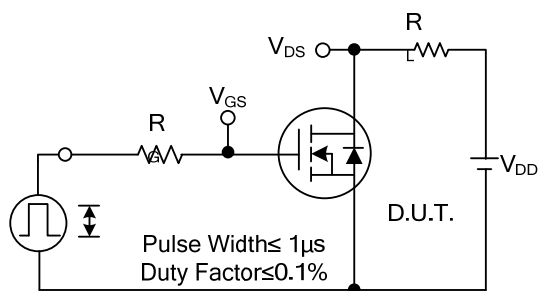


Peak Diode Recovery dv/dt Test Circuit

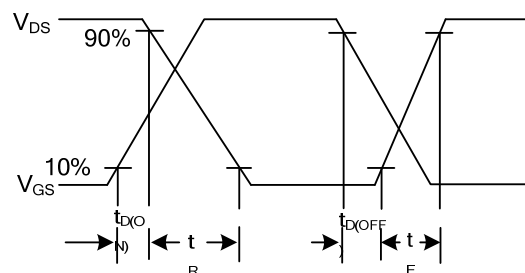


Peak Diode Recovery dv/dt Waveforms

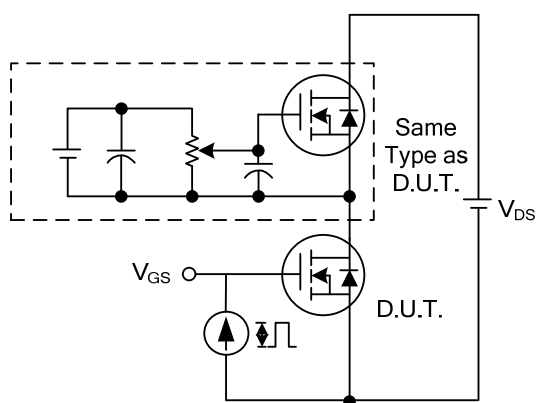
# ■ TEST CIRCUITS AND WAVEFORMS



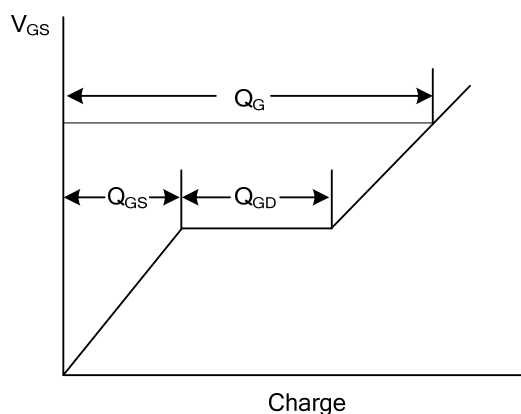
Switching Test Circuit



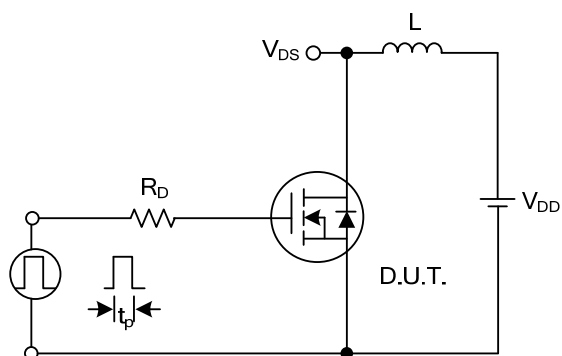
Switching Waveforms



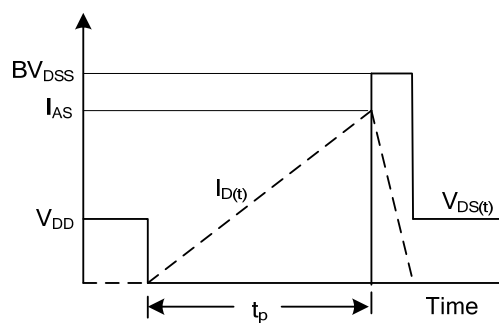
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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