

**90NM60SZ-U3**

Preliminary

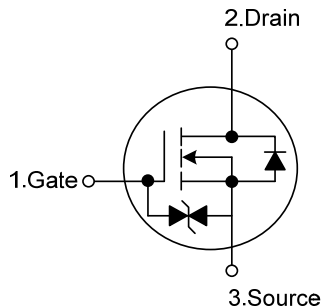
Power MOSFET

**90A, 600V N-CHANNEL
SUPER-JUNCTION MOSFET****DESCRIPTION**

The **UTC 90NM60SZ-U3** is a Super Junction MOSFET Structure and is designed to have better characteristics, such as fast switching time, low gate charge, low on-state resistance and a high rugged avalanche characteristics. This power MOSFET is usually used at AC-DC converters for power applications.

FEATURES

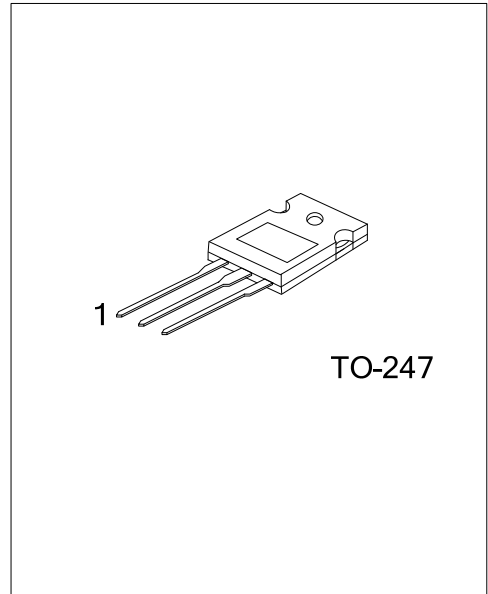
- * $R_{DS(ON)} \leq 35 \text{ m}\Omega$ @ $V_{GS}=10\text{V}$, $I_D=22.5\text{A}$
- * Fast switching capability
- * Avalanche energy tested
- * Improved dv/dt capability, high ruggedness
- * With ESD Protected

SYMBOL**ORDERING INFORMATION**

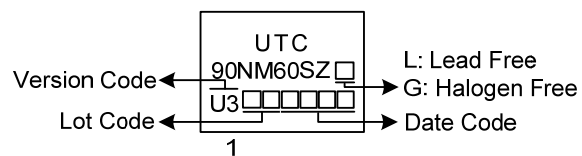
Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
90NM60SZL-U3-T47-T	90NM60SZG-U3-T47-T	TO-247	G	D	S	Tube

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

90NM60SZG-U3-T47-T		(1)Packing Type	(1) T: Tube
		(2)Package Type	(2) T47: TO-247
		(3)Version Code	(3) Version U3
		(4)Green Package	(4) G: Halogen Free and Lead Free, L: Lead Free



■ 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}	± 20	V
Drain Current	Continuous	I_D	90	A
	Pulsed (Note 2)	I_{DM}	270	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	1.01	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	0.265	V/ns
Power Dissipation		P_D	325	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. $L = 10\text{mH}$, $I_{AS} = 0.45\text{A}$, $V_{DD} = 50\text{V}$, $R_G = 25\Omega$ Starting $T_J = 25^\circ\text{C}$

4. $I_{SD} \leq 30.0\text{A}$, $di/dt \leq 200\text{A}/\mu\text{s}$, $V_{DD} \leq BV_{DSS}$, Starting $T_J = 25^\circ\text{C}$

■ **THERMAL DATA**

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	40	$^\circ\text{C}/\text{W}$
Junction to Case	θ_{JC}	0.3	$^\circ\text{C}/\text{W}$

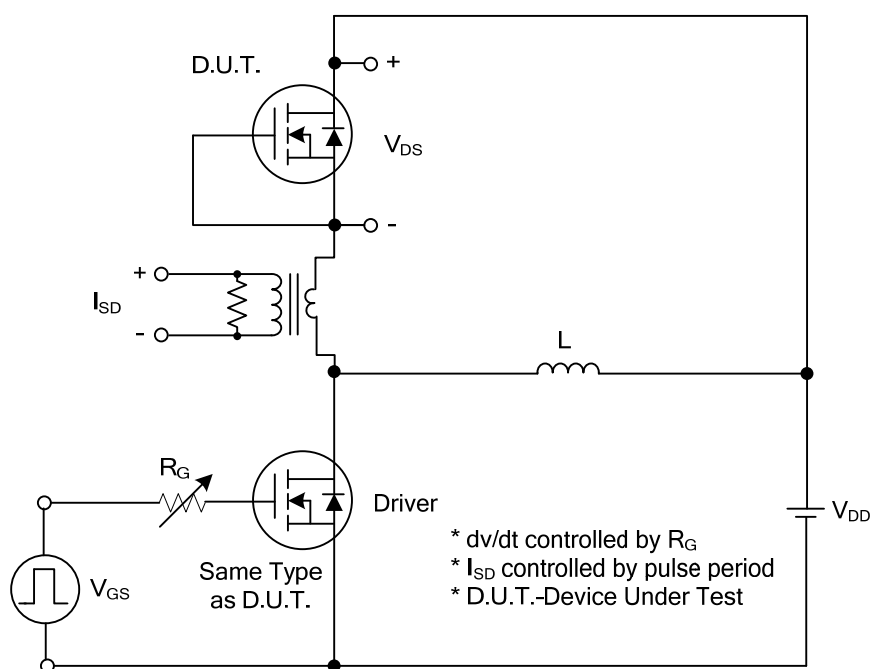
■ **ELECTRICAL CHARACTERISTICS** ($T_J = 25^\circ\text{C}$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =250μA	600			V
Drain-Source Leakage Current	I _{DSS}	V _{DS} =600V, V _{GS} =0V			10	μA
Gate-Source Leakage Current	I _{GSS}	V _{GS} =±20V, V _{DS} =0V			±10	μA
ON CHARACTERISTICS						
Gate Threshold Voltage	V _{GS(TH)}	V _{DS} =V _{GS} , I _D =250μA	2.5		4.5	V
Static Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =22.5A			35	mΩ
DYNAMIC CHARACTERISTICS						
Input Capacitance	C _{ISS}	V _{GS} =0V, V _{DS} =50V, f=1MHz		6439		pF
Output Capacitance	C _{OSS}			2113		pF
Reverse Transfer Capacitance	C _{RSS}			0.1		pF
SWITCHING CHARACTERISTICS						
Total Gate Charge (Note 1)	Q _G	V _{DS} =480V, V _{GS} =10V, I _D =90A (Note 1, 2)		140		nC
Gate-Source Charge	Q _{GS}			49		nC
Gate-Drain Charge	Q _{DD}			35		nC
Turn-On Delay Time (Note 1)	t _{D(ON)}	V _{DD} =100V, V _{GS} =10V, I _D =90A, R _G =25Ω (Note 1, 2)		94		ns
Turn-On Rise Time	t _{TR}			55		ns
Turn-Off Delay Time	t _{D(OFF)}			270		ns
Turn-Off Fall Time	t _F			39		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Maximum Continuous Drain-Source Diode Forward Current	I _S				90	A
Maximum Pulsed Drain-Source Diode Forward Current	I _{SM}				270	A
Drain-Source Diode Forward Voltage (Note 1)	V _{SD}	I _S =90A, V _{GS} =0V			1.4	V
Body Diode Reverse Recovery Time (Note 1)	t _{rr}	I _S =90A, V _{GS} =0V, dI _F /dt=100A/μs		516		nS
Body Diode Reverse Recovery Charge	Q _{rr}			10		μC

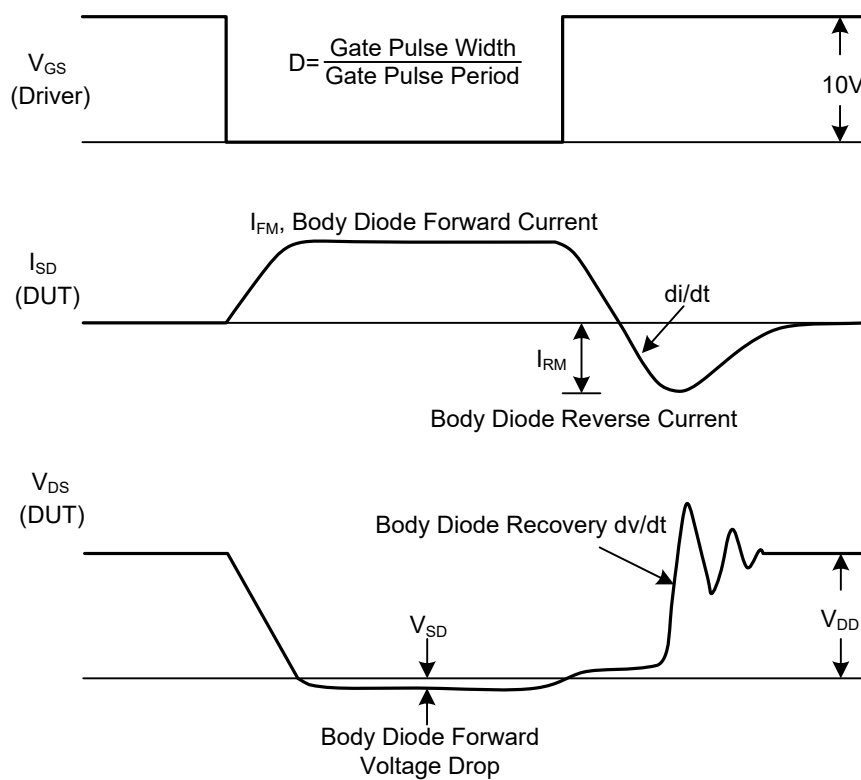
Notes: 1. Pulse Test: Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$.

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

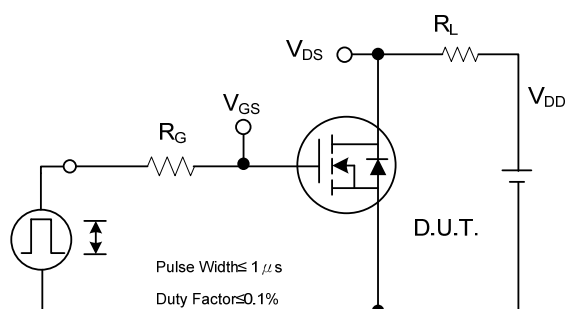


Peak Diode Recovery dv/dt Test Circuit

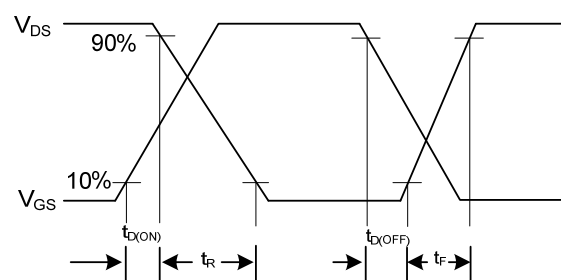


Peak Diode Recovery dv/dt Waveforms

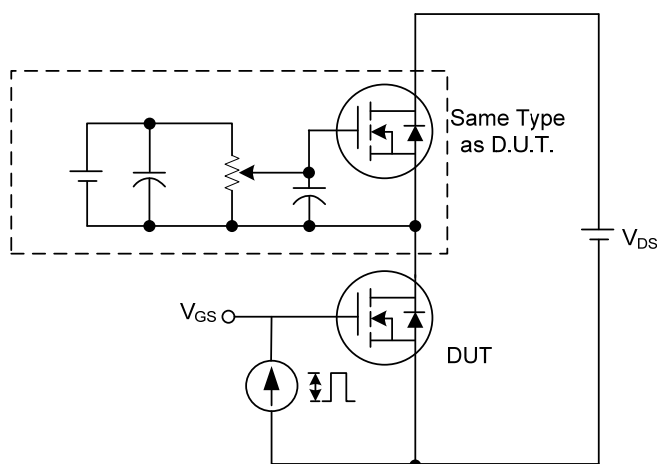
■ TEST CIRCUITS AND WAVEFORMS



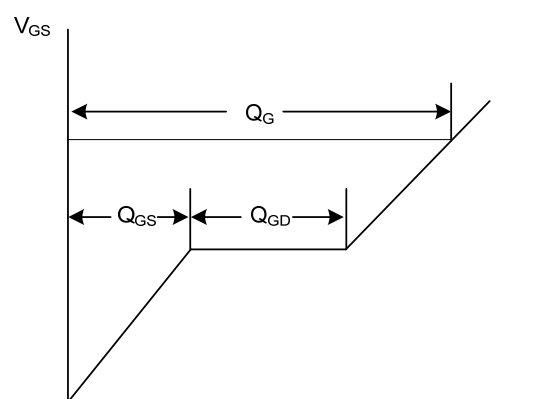
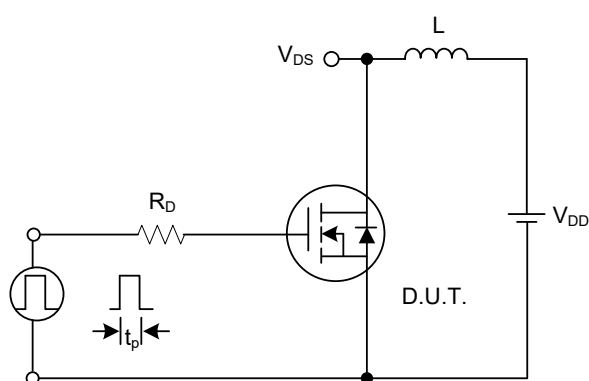
Switching Test Circuit



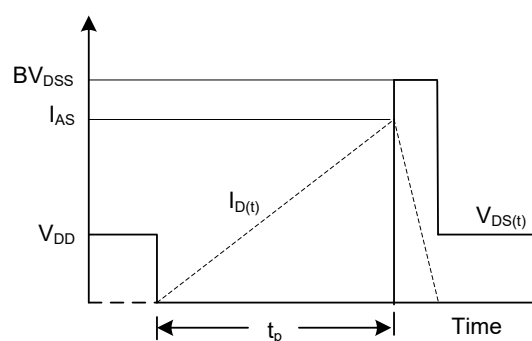
Switching Waveforms



Gate Charge Test Circuit

Charge
Gate Charge Waveform

Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

UTC assumes no responsibility for equipment failures that result from using products at values that exceed, even momentarily, rated values (such as maximum ratings, operating condition ranges, or other parameters) listed in products specifications of any and all UTC products described or contained herein. UTC products are not designed for use in life support appliances, devices or systems where malfunction of these products can be reasonably expected to result in personal injury. Reproduction in whole or in part is prohibited without the prior written consent of the copyright owner. UTC reserves the right to make changes to information published in this document, including without limitation specifications and product descriptions, at any time and without notice. This document supersedes and replaces all information supplied prior to the publication hereof.