



## 75NM60

Preliminary

Power MOSFET

### 75A, 600V N-CHANNEL SUPER-JUNCTION MOSFET

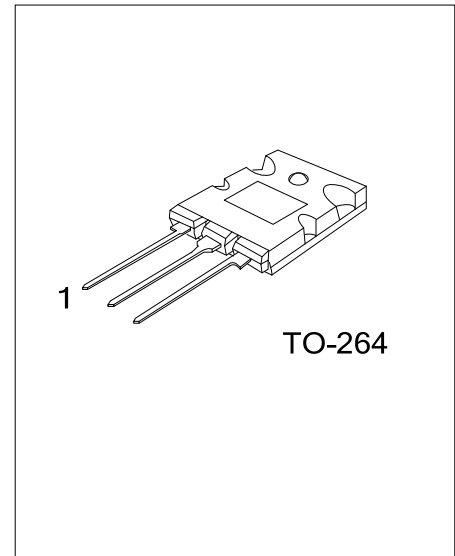
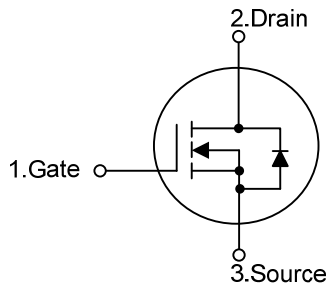
#### DESCRIPTION

The **UTC 75NM60** 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 DC-DC, AC-DC converters for power applications.

#### FEATURES

- \*  $R_{DS(ON)} < 55m\Omega$  @  $V_{GS} = 10V$ ,  $I_D = 37.5A$
- \* Fast switching capability
- \* Avalanche energy tested
- \* Improved dv/dt capability, high ruggedness

#### SYMBOL



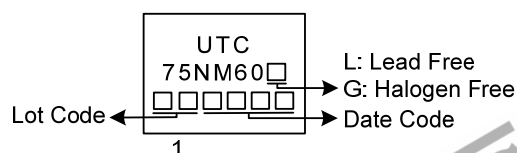
#### ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
75NM60L-T64-T	75NM60G-T64-T	TO-264	G	D	S	Tube

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

<p>75NM60G-T64-T</p> <p>(1)Packing Type</p> <p>(2)Package Type</p> <p>(3)Green Package</p>	<p>(1) T: Tube</p> <p>(2) T64: TO-264</p> <p>(3) G: Halogen Free and Lead Free, L: Lead Free</p>
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#### MARKING



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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		$V_{DS}$	600	V
Gate-Source Voltage		$V_{GS}$	$\pm 30$	V
Drain Current	Continuous	$I_D$	75	A
	Pulsed (Note 2)	$I_{DM}$	150	A
Avalanche Energy	Single Pulsed (Note 3)	$E_{AS}$	1188	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	15	V/ns
Power Dissipation		$P_D$	255	W
Junction Temperature		$T_J$	+150	$^\circ\text{C}$
Storage Temperature Range		$T_{STG}$	-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.  $L=5\text{mH}$ ,  $I_{AS}=21.8\text{A}$ ,  $V_{DD}=50\text{V}$ ,  $R_G=25\Omega$ , Starting  $T_J = 25^\circ\text{C}$ .  
 4.  $I_{SD} \leq 30\text{A}$ ,  $di/dt \leq 200\text{A}/\mu\text{s}$ ,  $V_{DD} \leq V_{(BR)DSS}$ ,  $T_J = 25^\circ\text{C}$ .

■ THERMAL DATA

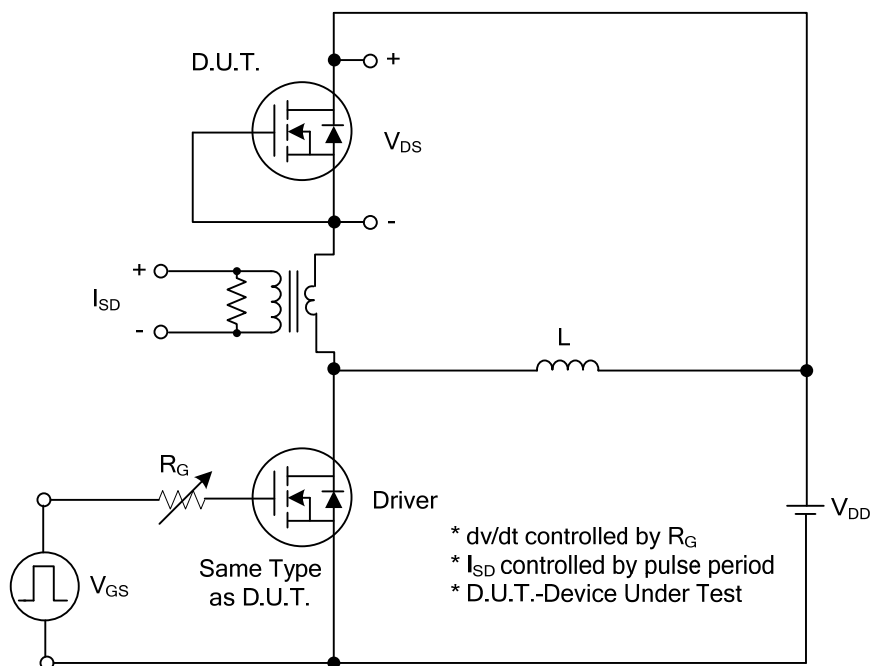
PARAMETER	SYMBOL	RATING	UNIT
Junction to Ambient	$\theta_{JA}$	40	$^\circ\text{C}/\text{W}$
Junction to Case	$\theta_{JC}$	0.4	$^\circ\text{C}/\text{W}$

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

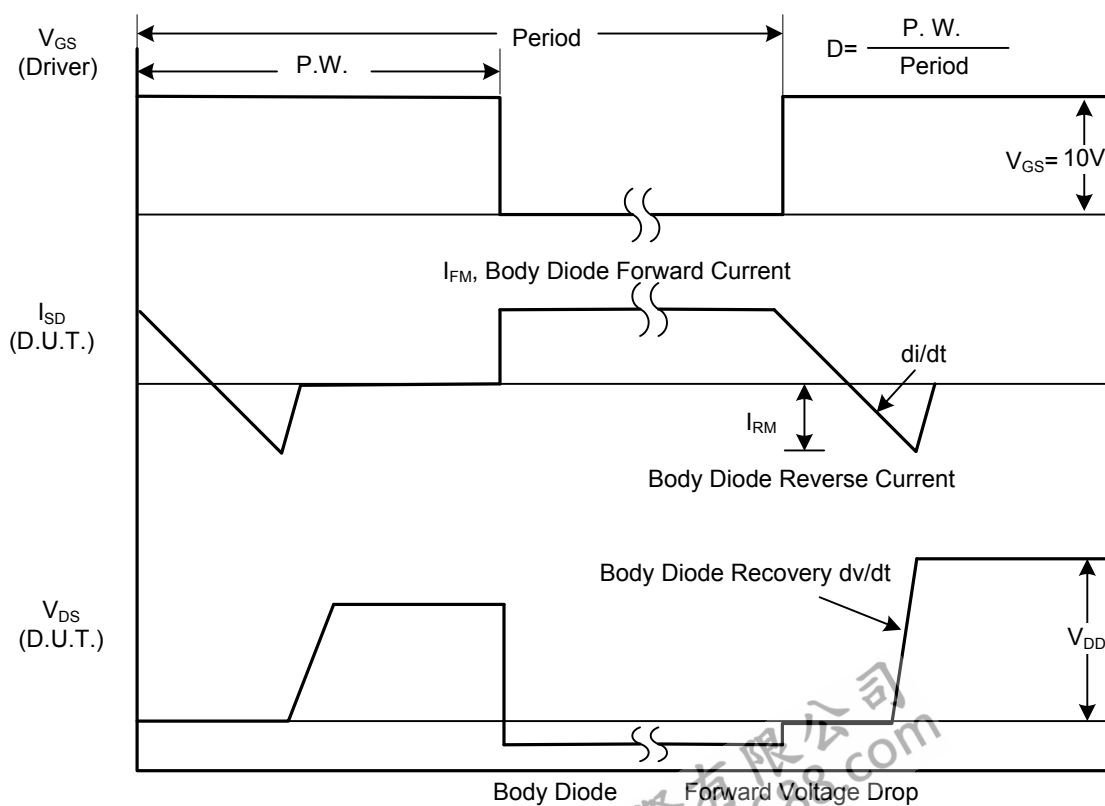
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	600			V
Drain-Source Leakage Current	I <sub>DSS</sub>	V <sub>DS</sub> =600V, V <sub>GS</sub> =0V			10	μA
Gate-Source Leakage Current	I <sub>GSS</sub>	V <sub>DS</sub> =0V, V <sub>GS</sub> =±30V			±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	2.5		4.5	V
Drain-Source On-State Resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> = 10V, I <sub>D</sub> = 37.5A			55	mΩ
DYNAMIC PARAMETERS						
Input Capacitance	C <sub>ISS</sub>	V <sub>GS</sub> =0V, V <sub>DS</sub> =25V, f=1.0MHz		4500		pF
Output Capacitance	C <sub>OSS</sub>			2050		pF
Reverse Transfer Capacitance	C <sub>RSS</sub>			3.7		pF
SWITCHING PARAMETERS						
Total Gate Charge (Note 1)	Q <sub>G</sub>	V <sub>DS</sub> =300V, V <sub>GS</sub> =10V, I <sub>D</sub> =75A, I <sub>G</sub> =1mA (Note 1, 2)		210		nC
Gate to Source Charge	Q <sub>GS</sub>			50		nC
Gate to Drain Charge	Q <sub>GD</sub>			92		nC
Turn-ON Delay Time (Note 1)	t <sub>D(ON)</sub>	V <sub>DD</sub> =300V, V <sub>GS</sub> =10V, I <sub>D</sub> =30A, R <sub>G</sub> =25Ω (Note 1, 2)		96		ns
Rise Time	t <sub>R</sub>			60		ns
Turn-OFF Delay Time	t <sub>D(OFF)</sub>			680		ns
Fall-Time	t <sub>F</sub>			224		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Maximum Body-Diode Continuous Current	I <sub>S</sub>				75	A
Maximum Body-Diode Pulsed Current	I <sub>SM</sub>				150	A
Drain-Source Diode Forward Voltage (Note 1)	V <sub>SD</sub>	I <sub>S</sub> =75A, V <sub>GS</sub> =0V			1.4	V
Body Diode Reverse Recovery Time (Note 1)	t <sub>rr</sub>	I <sub>S</sub> =30A, V <sub>GS</sub> =0V		720		ns
Body Diode Reverse Recovery Charge	Q <sub>rr</sub>	dI <sub>F</sub> /dt=100A/μs		17		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

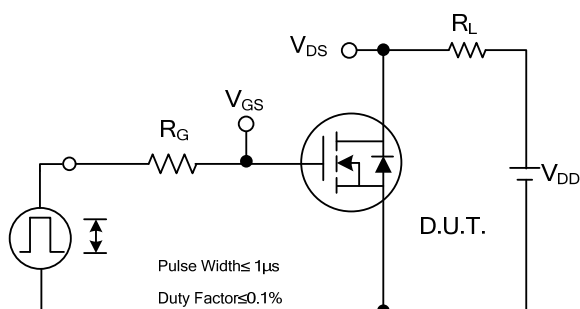


Peak Diode Recovery dv/dt Test Circuit

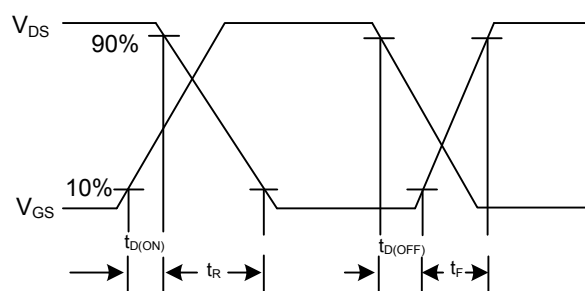


Peak Diode Recovery dv/dt Waveforms

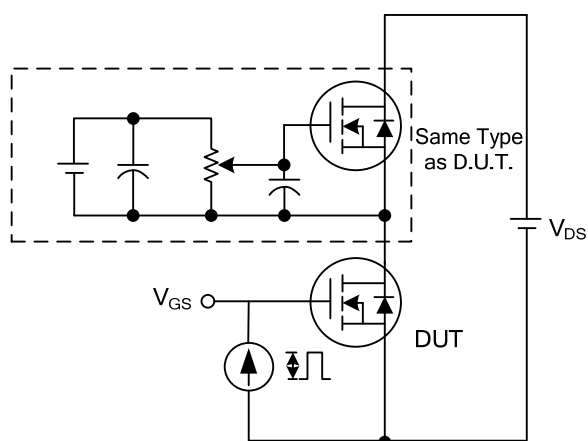
# ■ TEST CIRCUITS AND WAVEFORMS (Cont.)



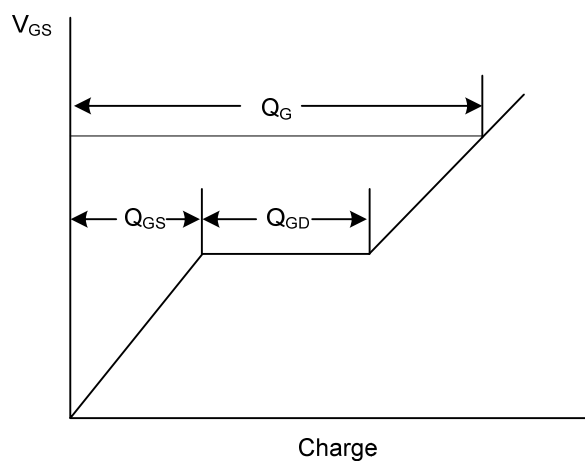
Switching Test Circuit



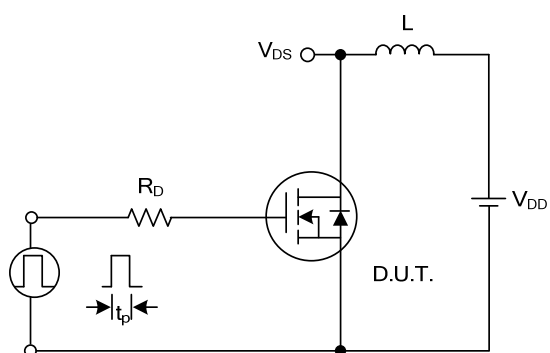
Switching Waveforms



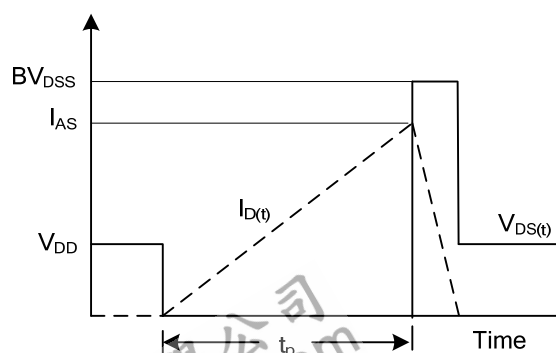
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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