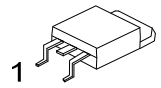
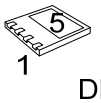
7.0A, 650V N-CHANNEL SUPER-JUNCTION MOSFET



TO-252



DFN8080-4

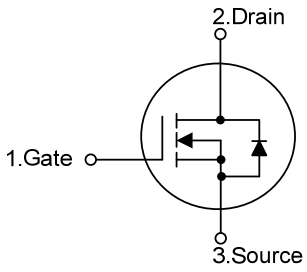
■ DESCRIPTION

The **UTC F7NM65** 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.

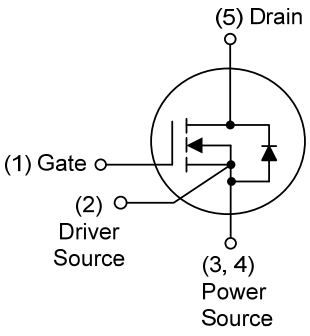
■ FEATURES

* $R_{DS(ON)} \leq 0.9\ \Omega$ @ V_{GS}=10V, I_D=3.5A
* High switching Speed
* 100% avalanche tested
* Improved dv/dt capability

■ SYMBOL



TO-252

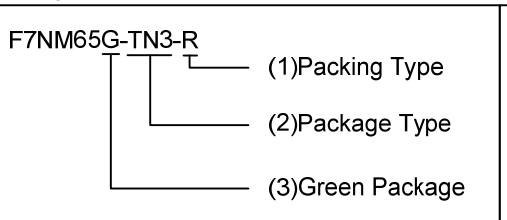


DFN8080-4

■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment					Packing
Lead Free	Halogen Free		1	2	3	4	5	
F7NM65L-TN3-R	F7NM65G-TN3-R	TO-252	G	D	S	-	-	Tape Reel
F7NM65L-K04-8080-R	F7NM65G-K04-8080-R	DFN8080-4	G	S	S	S	D	Tape Reel

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

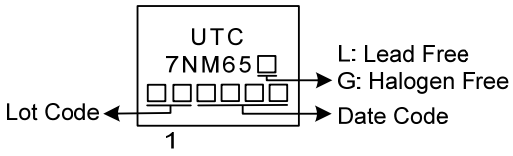
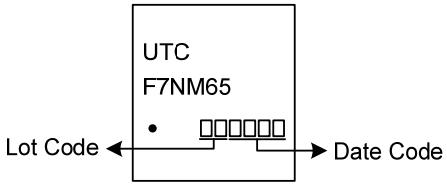


(1) R: Tape Reel

(2) TN3: TO-252, K04-8080: DFN8080-4

(3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING

TO-252	DFN8080-4
	

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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	650	V
Gate-Source Voltage		V_{GSS}	±30	V
Drain Current (T_C=25°C)	Continuous	I_D	7	A
	Pulsed (Note 2)	I_{DM}	14	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	128	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	4.75	V/ns
Power Dissipation	TO-252	P_D	42	W
	DFN8080-4		25	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=100mH, I_{AS}=1.6A, V_{DD}=50V, R_G=25Ω, Starting T_J=25°C.
4. I_{SD} ≤ 7.0A, di/dt ≤200A/μs, V_{DD} ≤ BV_{DSS}, Starting T_J=25°C.

■ THERMAL DATA

PARAMETER		SYMBOL	RATING	UNIT
Junction to Ambient	TO-252	θ_{JA}	110	°C/W
	DFN8080-4		35 (Note)	°C/W
Junction to Case	TO-252	θ_{JC}	2.97 (Note)	°C/W
	DFN8080-4		5 (Note)	°C/W

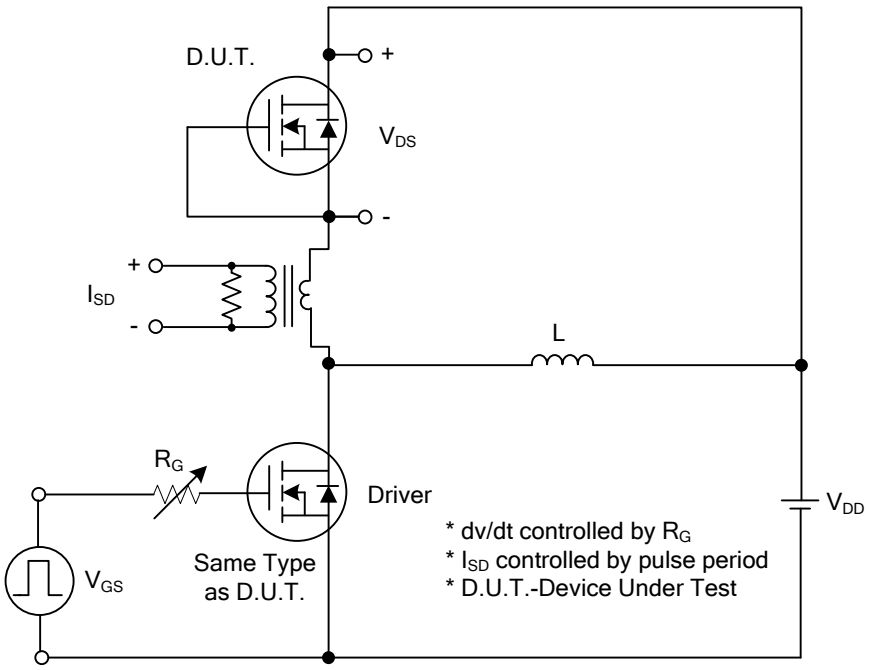
Note: The data tested by surface mounted on a 1 inch^2 FR-4 board with 2 OZ copper.

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

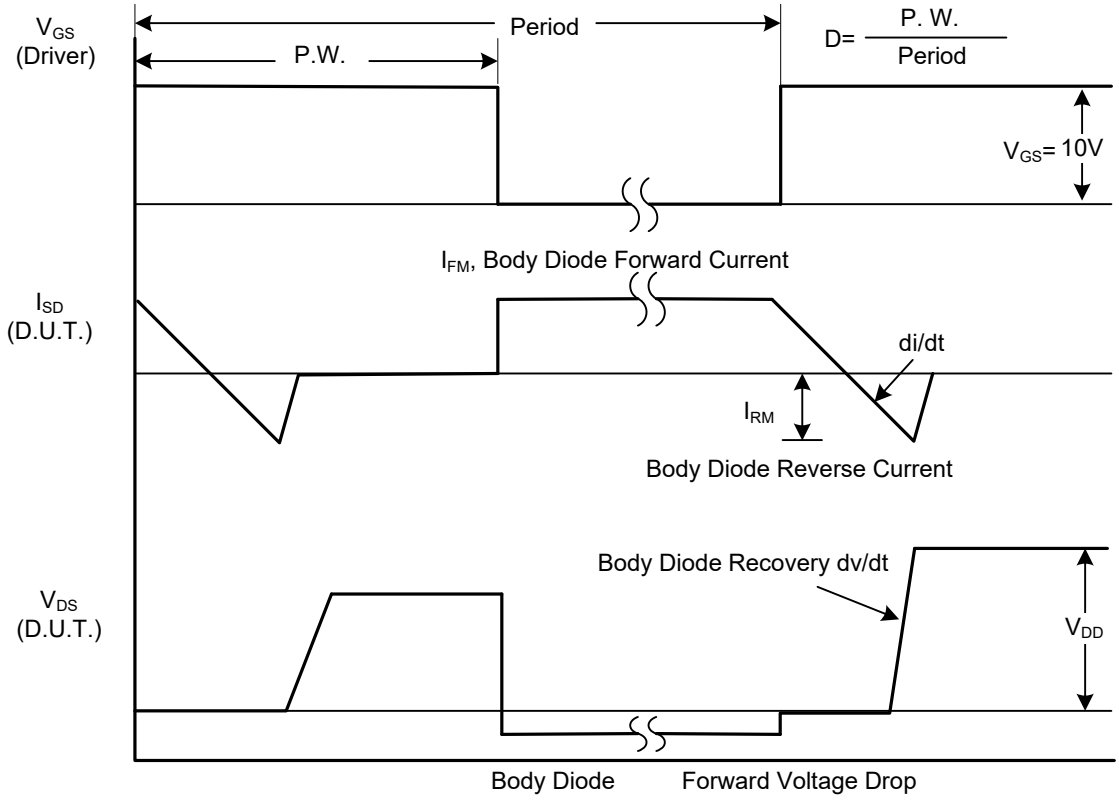
PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV_{DSS}	I_D=250μA, V_{GS}=0V	650			V
Drain-Source Leakage Current		I_{DSS}	V_{DS}=650V, V_{GS}=0V			10	μA
Gate- Source Leakage Current	Forward	I_{GSS}	V_{GS}=+30V			+100	nA
	Reverse		V_{GS}=-30V			-100	nA
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=3.5A			0.9	Ω
DYNAMIC PARAMETERS							
Input Capacitance		C_{ISS}	V_{GS}=0V, V_{DS}=50V, f=1.0MHz		410		pF
Output Capacitance		C_{OSS}			62		pF
Reverse Transfer Capacitance		C_{RSS}			4		pF
SWITCHING PARAMETERS							
Total Gate Charge (Note 2)		Q_G	V_{DS}=520V, V_{GS}=10V, I_D=7.0A (Note 1, 2)		27		nC
Gate to Source Charge		Q_{GS}			8		nC
Gate to Drain Charge		Q_{GD}			8.2		nC
Turn-ON Delay Time (Note 2)		$t_{D(ON)}$	V_{DD}=100V, V_{GS}=10V, I_D=7.0A, R_G=25Ω (Note 1, 2)		4		ns
Rise Time		t_R			18		ns
Turn-OFF Delay Time		$t_{D(OFF)}$			58		ns
Fall-Time		t_F			38		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Continuous Drain-Source Diode Forward Current		I_S				7	A
Maximum Pulsed Drain-Source Diode Forward Current (Note 1)		I_{SM}				14	A
Drain-Source Diode Forward Voltage (Note 2)		V_{SD}	I_S=7.0A, V_{GS}=0V			1.4	V
Reverse Recovery Time		t_{rr}	I_S=7.0A, V_{GS}=0V, dI_F/dt = 100 A/μs		120		ns
Reverse Recovery Charge (Note 1)		Q_{rr}			450		nC

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

■ TEST CIRCUITS AND WAVEFORMS

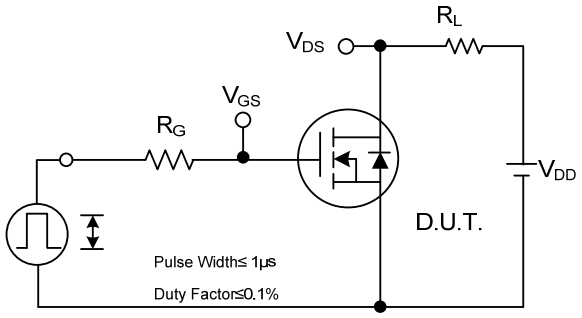


Peak Diode Recovery dv/dt Test Circuit

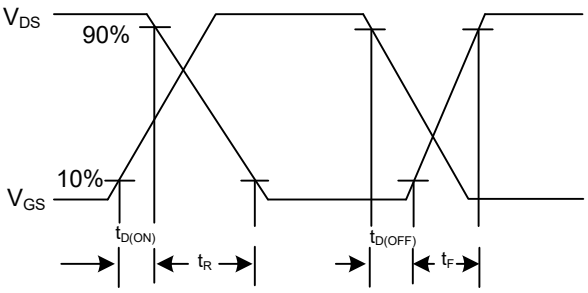


Peak Diode Recovery dv/dt Waveforms

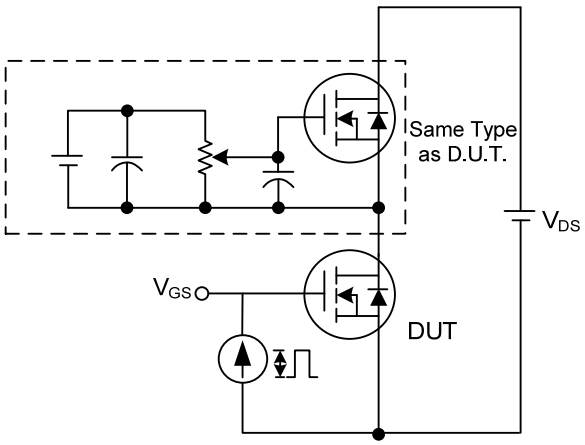
■ TEST CIRCUITS AND WAVEFORMS



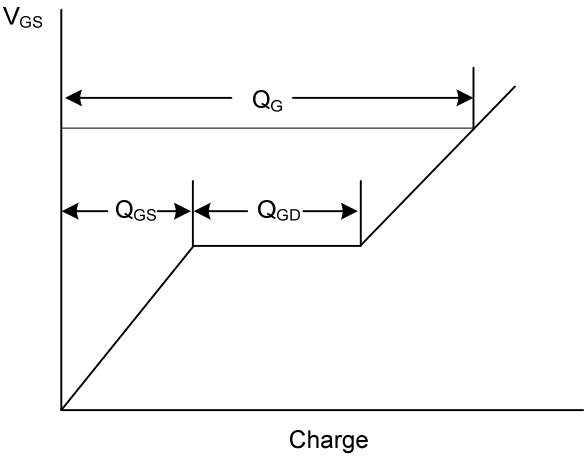
Switching Test Circuit



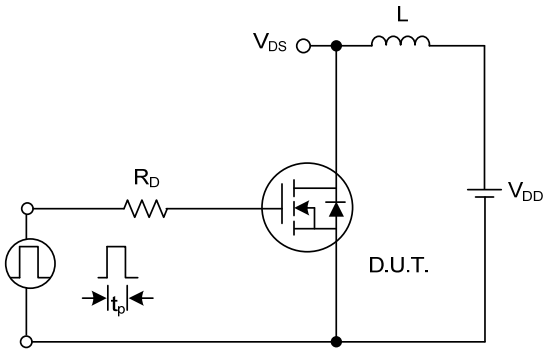
Switching Waveforms



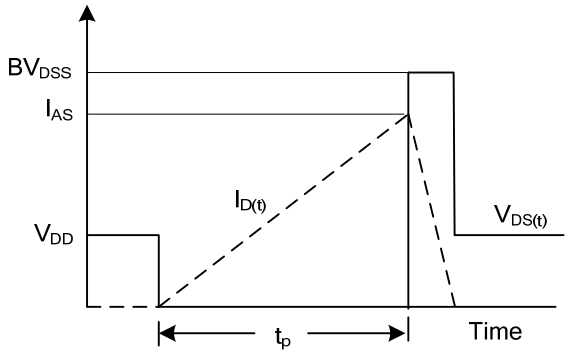
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms