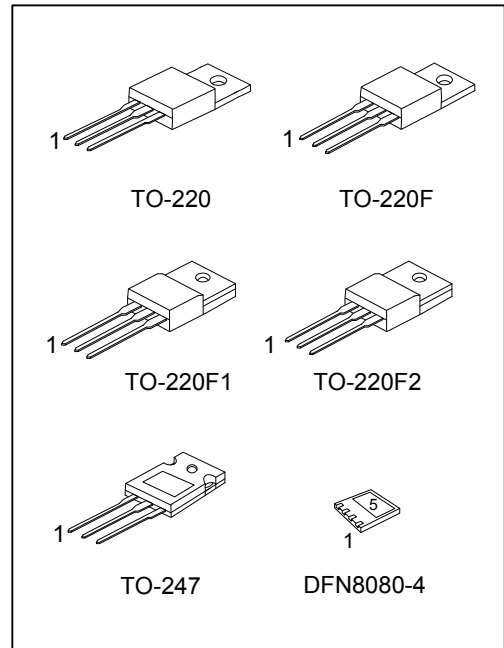
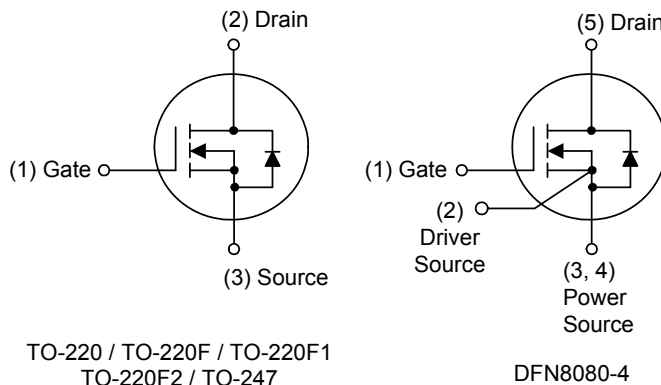


**30NM60****Power MOSFET****30A, 600V N-CHANNEL
SUPER-JUNCTION MOSFET****DESCRIPTION**

The **UTC 30NM60** 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

- * $R_{DS(ON)} \leq 0.13 \Omega$ @ $V_{GS}=10V$, $I_D=15A$
- * High Switching Speed
- * 100% Avalanche Tested

SYMBOL**ORDERING INFORMATION**

Ordering Number		Package	Pin Assignment					Packing
Lead Free	Halogen Free		1	2	3	4	5	
30NM60L-TA3-T	30NM60G-TA3-T	TO-220	G	D	S	-	-	Tube
30NM60L-TF1-T	30NM60G-TF1-T	TO-220F1	G	D	S	-	-	Tube
30NM60L-TF2-T	30NM60G-TF2-T	TO-220F2	G	D	S	-	-	Tube
30NM60L-TF3-T	30NM60G-TF3-T	TO-220F	G	D	S	-	-	Tube
30NM60L-T47-T	30NM60G-T47-T	TO-247	G	D	S	-	-	Tube
30NM60L-K04-8080-R	30NM60G-K04-8080-R	DFN8080-4	G	S	S	S	D	Tape Reel

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

30NM60G-TA3-T (1) Packing Type (2) Package Type (3) Green Package		(1) T: Tube, R: Tape Reel (2) TA3: TO-220, TF1: TO-220F1, TF2: TO-220F2, TF3: TO-220F, T47: TO-247, K04-8080: DFN8080-4 (3) G: Halogen Free and Lead Free, L: Lead Free
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MARKING

TO-220 / TO-220F / TO-220F1 / TO-220F2 / TO-247	DFN8080-4
UTC 30NM60 Lot Code ← [][][][][] → Date Code L: Lead Free G: Halogen Free 1	UTC 30NM60 Lot Code ← [] • [][][][] → Date Code

■ **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}	±30	V
Drain Current	Continuous	I_{D}	30	A
	Pulsed (Note 2)	I_{DM}	120	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	1064	mJ
Peak Diode Recovery dv/dt		dv/dt	23	V/ns
MOSFET dv/dt Ruggedness		dv/dt	50	V/ns
Power Dissipation	TO-220	P_{D}	180	W
	TO-220F/TO-220F1		40	W
	TO-220F2			
	TO-247		310	W
	DFN8080-4		74	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. $L=133\text{mH}$, $I_{\text{AS}}=4.0\text{A}$, $V_{\text{DD}}=50\text{V}$, $R_{\text{G}}=25\Omega$, Starting $T_{\text{J}}=25^{\circ}\text{C}$

4. $I_{\text{SD}}\leq 30\text{A}$, $di/dt\leq 200\text{A}/\mu\text{s}$, $V_{\text{DD}}\leq BV_{\text{DSS}}$, Starting $T_{\text{J}}=25^{\circ}\text{C}$

■ **THERMAL DATA**

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220/TO-220F	θ_{JA}	62.5	°C/W
	TO-220F1/TO-220F2			
	TO-247		40	°C/W
	DFN8080-4		35 (Note)	°C/W
Junction to Case	TO-220	θ_{JC}	0.69	°C/W
	TO-220F/TO-220F1		3.125	°C/W
	TO-220F2			
	TO-247		0.4	°C/W
	DFN8080-4		1.68 (Note)	°C/W

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

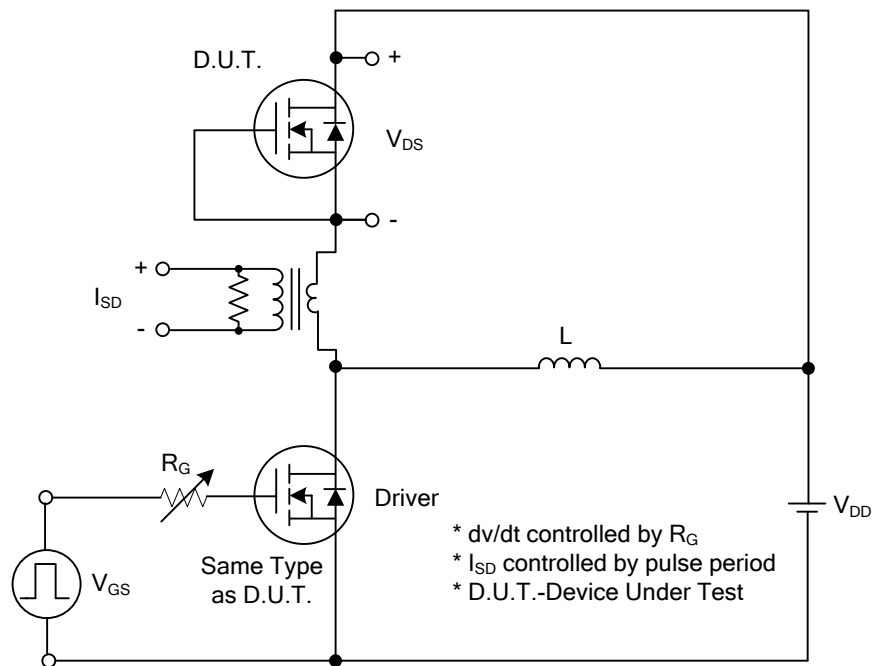
■ ELECTRICAL CHARACTERISTICS (T_J=25°C, unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV _{DSS}	I _D =250μA, V _{GS} =0V	600			V
Drain-Source Leakage Current		I _{DSS}	V _{DS} =600V, V _{GS} =0V			10	μA
Gate- Source Leakage Current	Forward	I _{GSS}	V _{GS} =+30V, V _{DS} =0V			+100	nA
	Reverse		V _{GS} =-30V, V _{DS} =0V			-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 =15A			0.13	Ω
DYNAMIC PARAMETERS							
Input Capacitance		C _{ISS}	V _{GS} =0V, V _{DS} =25V, f=1.0MHz		2520		pF
Output Capacitance		C _{OSS}			1580		pF
Reverse Transfer Capacitance		C _{RSS}			103		pF
SWITCHING PARAMETERS							
Total Gate Charge		Q _G	V _{DS} =100V, V _{GS} =10V, I _D =30A I _G = 1mA (Note1, 2)		85		nC
Gate to Source Charge		Q _{GS}			12		nC
Gate to Drain Charge		Q _{GD}			30		nC
Turn-ON Delay Time		t _{D(ON)}	V _{DS} =100V, V _{GS} =10V, I _D =30A, R _G =25Ω (Note1, 2)		36		ns
Rise Time		t _R			34		ns
Turn-OFF Delay Time		t _{D(OFF)}			270		ns
Fall-Time		t _F			100		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Continuous Drain-Source Diode Forward Current		I _S				30	A
Maximum Pulsed Drain-Source Diode Forward Current		I _{SM}				120	A
Drain-Source Diode Forward Voltage		V _{SD}	I _S =30A, V _{GS} =0V			1.4	V
Body Diode Reverse Recovery Time		t _{rr}	I _S =15A, V _{GS} =0V,		465		ns
Body Diode Reverse Recovery Charge		Q _{rr}	dI _F /dt=100A/μs (Note 1)		8.7		μC

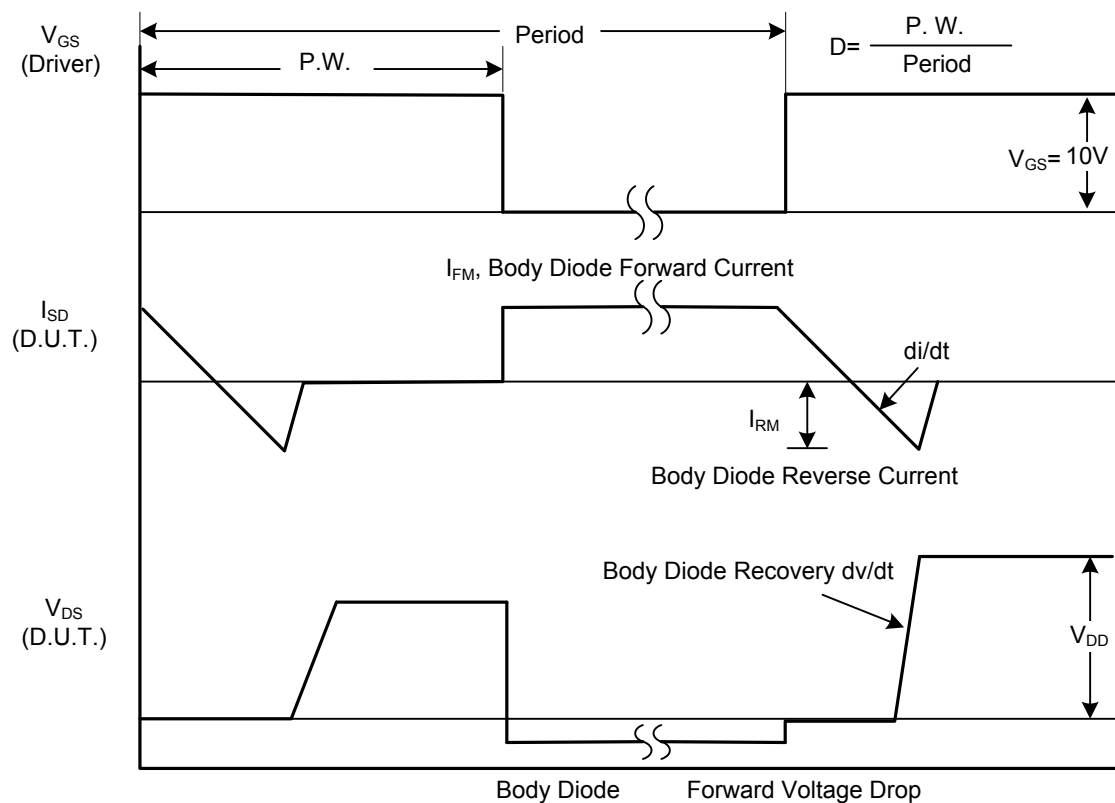
Notes: 1. Pulse Test : Pulse width ≤ 300μs, Duty cycle ≤ 2%.

2. Essentially independent of operating ambient temperature.

■ TEST CIRCUITS AND WAVEFORMS



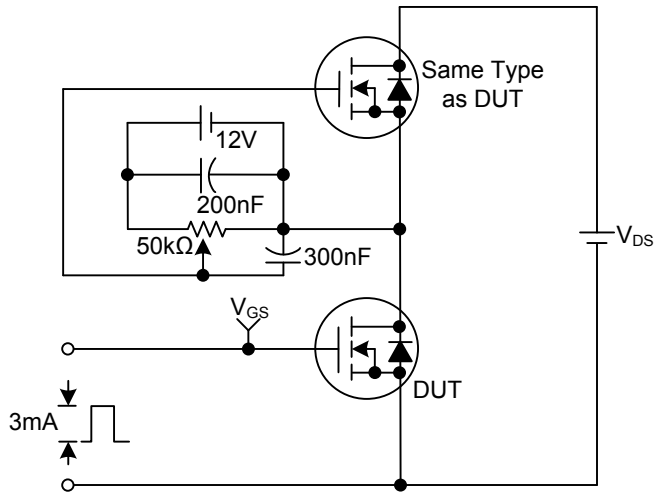
Peak Diode Recovery dv/dt Test Circuit



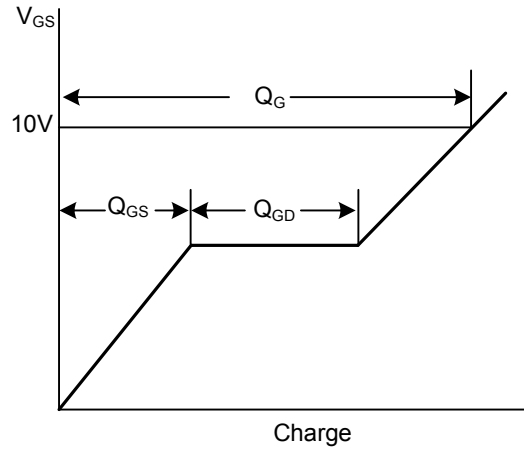
Peak Diode Recovery dv/dt Waveforms

■ TEST CIRCUITS AND WAVEFORMS

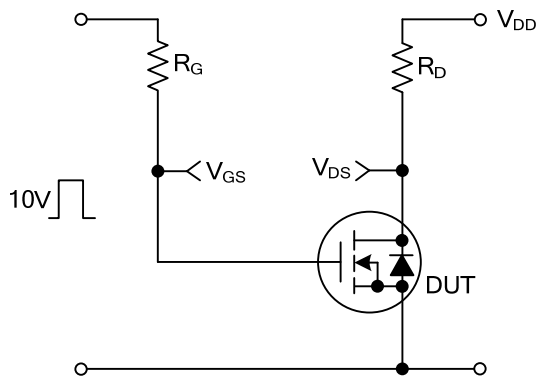
Gate Charge Test Circuit



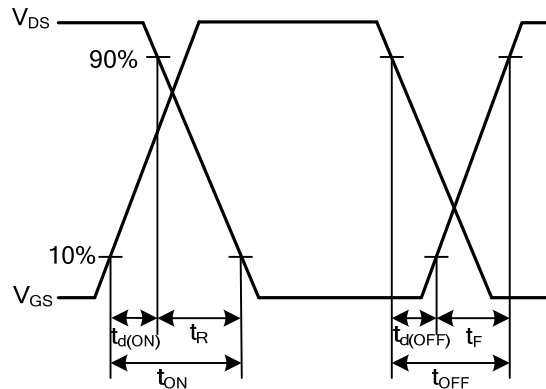
Gate Charge Waveforms



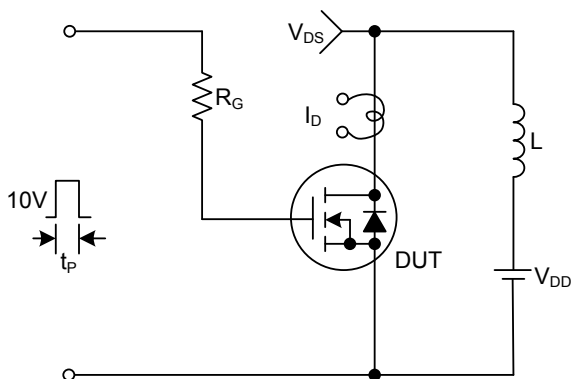
Resistive Switching Test Circuit



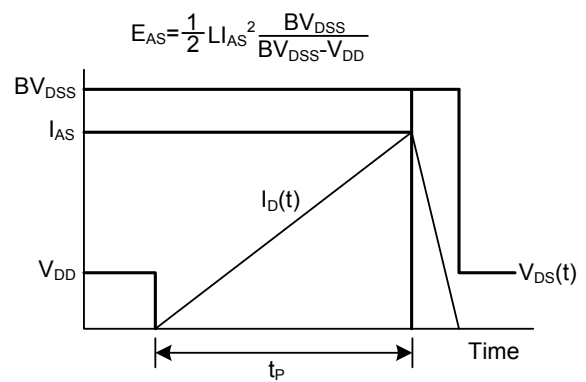
Resistive Switching Waveforms



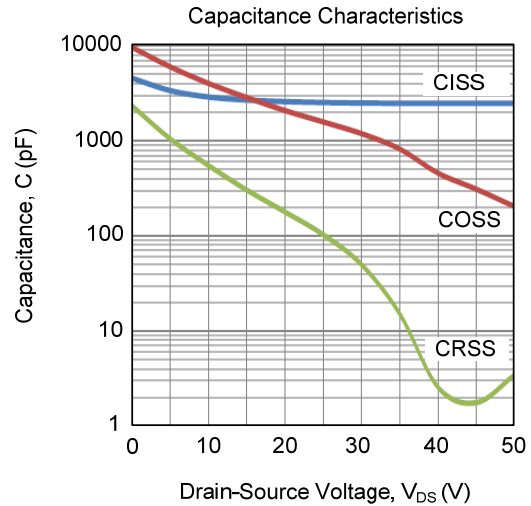
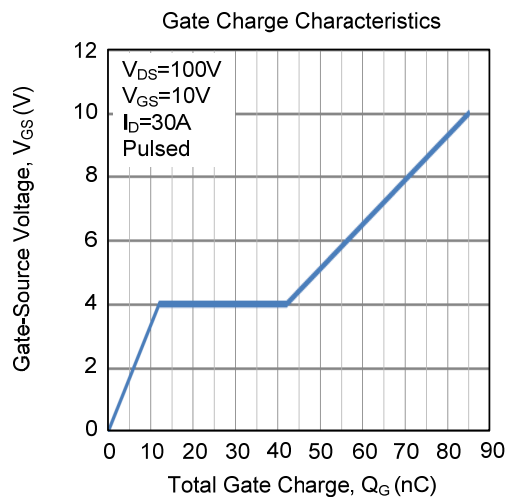
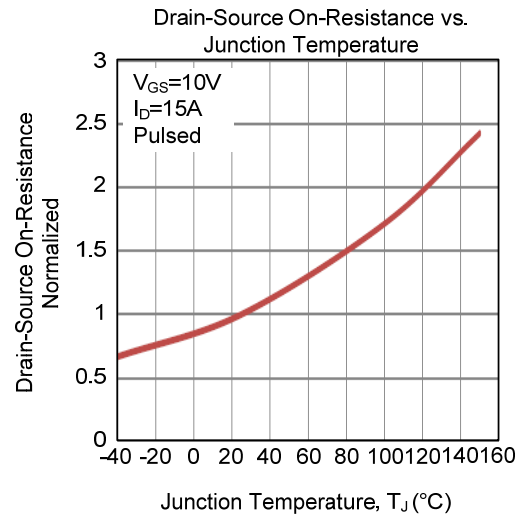
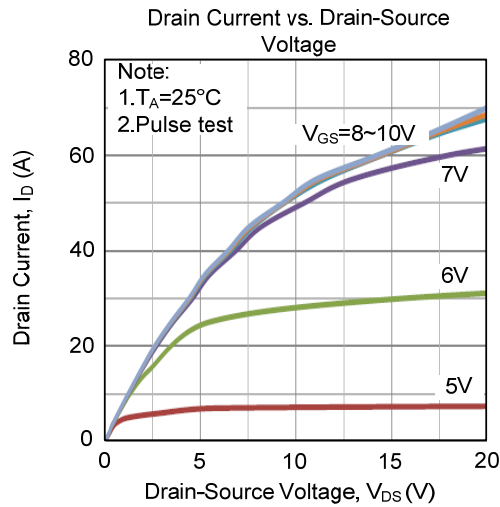
Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms



■ TYPICAL CHARACTERISTICS



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