



UF540-HC

Preliminary

Power MOSFET

27A, 100V N-CHANNEL POWER MOSFET

DESCRIPTION

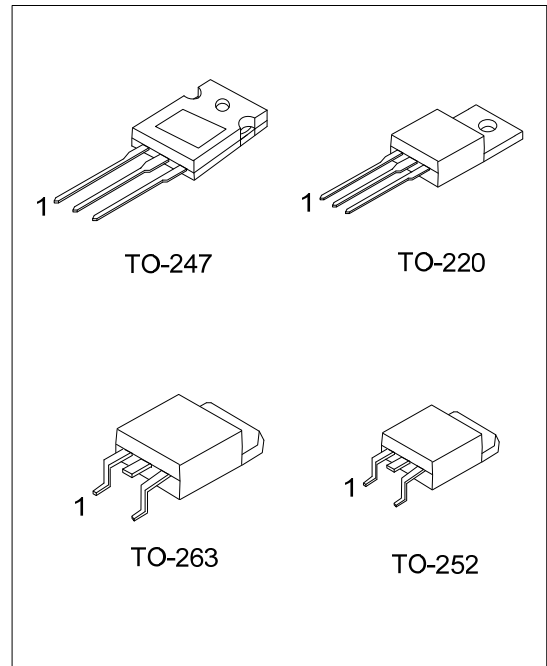
The UTC **UF540-HC** is a N-channel enhancement MOSFET using UTC's advanced technology to provide the customers with perfect $R_{DS(ON)}$, high switching speed, high current capacity and low gate charge.

The UTC **UF540-HC** is universally applied in low voltage such as automotive, high efficiency switching for AC/DC converters and DC motor control, etc.

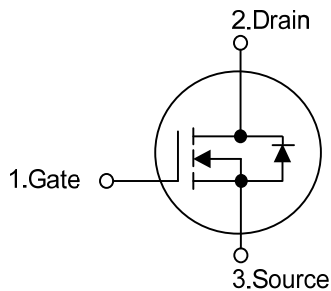
FEATURES

* $R_{DS(ON)} \leq 48 \text{ m}\Omega$ @ $V_{GS}=10\text{V}$, $I_D=15\text{A}$

* High Switching Speed



SYMBOL



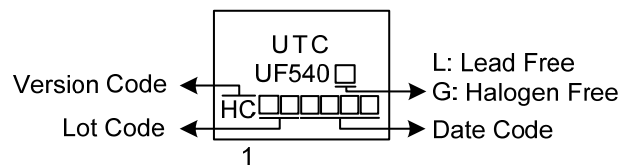
ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UF540L-HC-TA3-T	UF540G-HC-TA3-T	TO-220	G	D	S	Tube
UF540L-HC-T47-T	UF540G-HC-T47-T	TO-247	G	D	S	Tube
UF540L-HC-TN3-R	UF540G-HC-TN3-R	TO-252	G	D	S	Tape Reel
UF540L-HC-TQ2-T	UF540G-HC-TQ2-T	TO-263	G	D	S	Tube
UF540L-HC-TQ2-R	UF540G-HC-TQ2-R	TO-263	G	D	S	Tape Reel

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

UF540G-HC-TA3-T	(1) T: Tube, R: Tape Reel
(1)Packing Type	(2) TA3: TO-220, T47: TO-247, TN3: TO-252
(2)Package Type	TQ2: TO-263
(3)Version Code	(3) Version HC
(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_{DS}	100	V
Gate-Source Voltage		V_{GS}	± 20	V
Continuous Drain Current	Continuous	I_D	27	A
	Pulsed	I_{DM}	54	A
Single Pulsed Avalanche Current		I_{AS}	6.5	A
Single Pulsed Avalanche Energy		E_{AS}	633	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	5	V/ns
Power Dissipation	TO-220	P_D	125	W
	TO-263			
	TO-247		140	W
	TO-252		70	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. $L = 30\text{mH}$, $I_{AS} = 6.5\text{A}$, $V_{DD} = 50\text{V}$, $R_G = 25\Omega$, Starting $T_J = 25^{\circ}\text{C}$

4. $I_{SD} \leq 27\text{A}$, $di/dt \leq 100\text{A}/\mu\text{s}$, $V_{DD} \leq BV_{DSS}$, Starting $T_J = 25^{\circ}\text{C}$

■ **THERMAL DATA**

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220	θ_{JA}	62.5	$^{\circ}\text{C}/\text{W}$
	TO-263			
	TO-247		50	$^{\circ}\text{C}/\text{W}$
	TO-252		110	$^{\circ}\text{C}/\text{W}$
Junction to Case	TO-220	θ_{JC}	1	$^{\circ}\text{C}/\text{W}$
	TO-263			
	TO-247		0.89	$^{\circ}\text{C}/\text{W}$
	TO-252		1.78 (Note)	$^{\circ}\text{C}/\text{W}$

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

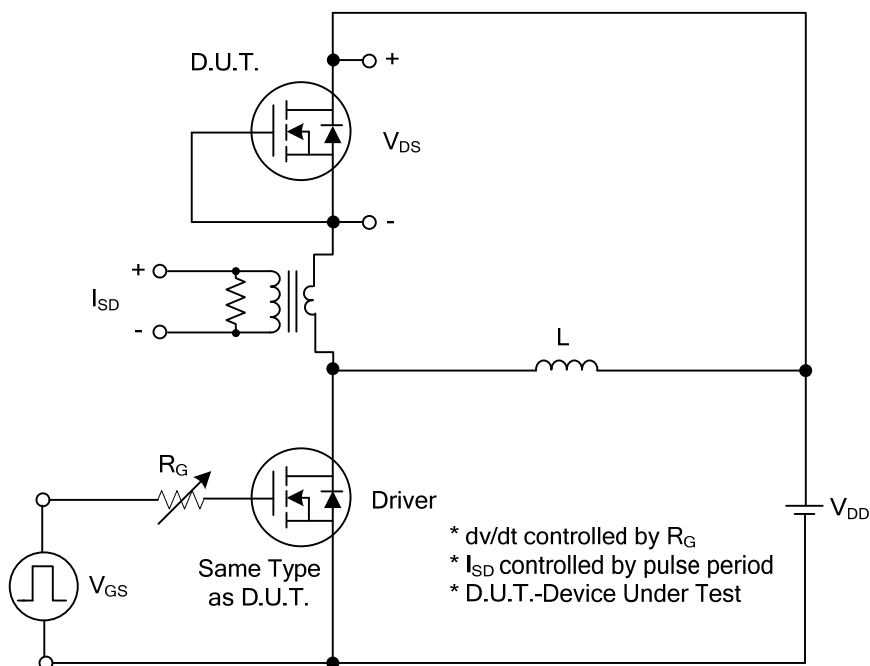
■ **ELECTRICAL CHARACTERISTICS** ($T_J=25^{\circ}\text{C}$, unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV _{DSS}	I _D =250μA, V _{GS} =0V	100			V
Drain-Source Leakage Current		I _{DSS}	V _{DS} =100V, V _{GS} =0V			1	μA
Gate-Source Leakage Current	Forward	I _{GSS}	V _{GS} =+20V, V _{DS} =0V			+100	nA
	Reverse		V _{GS} =-20V, V _{DS} =0V			-100	nA
ON CHARACTERISTICS							
Gate Threshold Voltage		V _{GS(TH)}	V _{DS} =V _{GS} , I _D =250μA	2.0		4.0	V
Static Drain-Source On-State Resistance		R _{DS(ON)}	V _{GS} =10V, I _D =15A		40	48	mΩ
DYNAMIC PARAMETERS							
Input Capacitance		C _{ISS}	V _{GS} =0V, V _{DS} =25V, f=1.0MHz		880		pF
Output Capacitance		C _{OSS}			360		pF
Reverse Transfer Capacitance		C _{RSS}			70		pF
SWITCHING PARAMETERS							
Total Gate Charge		Q _G	V _{DS} =80V, V _{GS} =10V, I _D =27A (Note 1, 2)		36		nC
Gate to Source Charge		Q _{GS}			10		nC
Gate to Drain Charge		Q _{GD}			13		nC
Turn-ON Delay Time		t _{D(ON)}	V _{DD} =100V, I _D =27A, R _G =25Ω (Note 1, 2)		10		ns
Rise Time		t _R			24		ns
Turn-OFF Delay Time		t _{D(OFF)}			58		ns
Fall-Time		t _F			28		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Continuous Drain-Source Diode Forward Current		I _S				33	A
Maximum Pulsed Drain-Source Diode Forward Current		I _{SM}				132	A
Drain-Source Diode Forward Voltage		V _{SD}	I _S =27A, V _{GS} =0V			1.4	V
Body Diode Reverse Recovery Time		t _{rr}	I _S =27A, V _{GS} =0V, dI _F /dt=100A/μs		66		ns
Reverse Recovery Charge		Q _{rr}	(Note 1)		165		nC

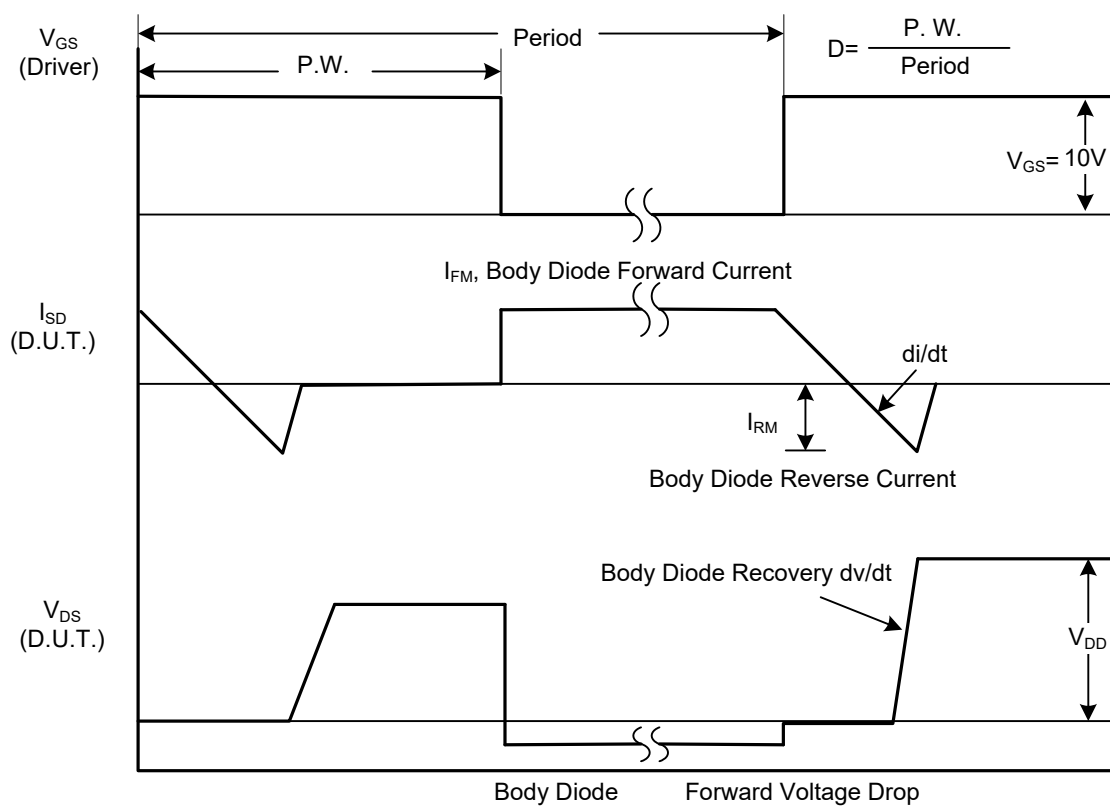
Notes: 1. Pulse Test: Pulse width $\leq 300\mu\text{s}$, Duty cycle $\leq 2\%$.

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

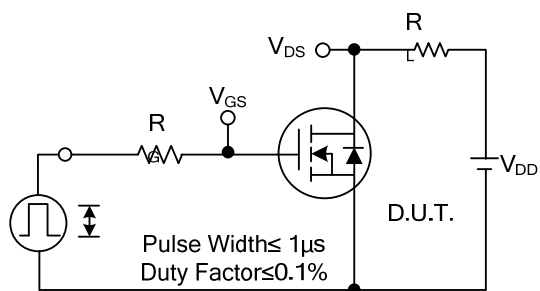


Peak Diode Recovery dv/dt Test Circuit

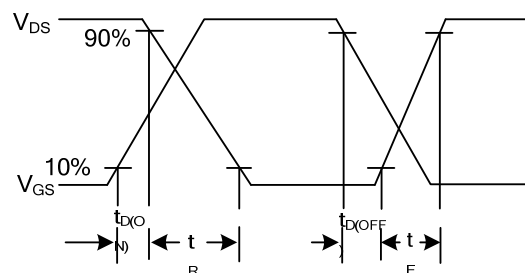


Peak Diode Recovery dv/dt Waveforms

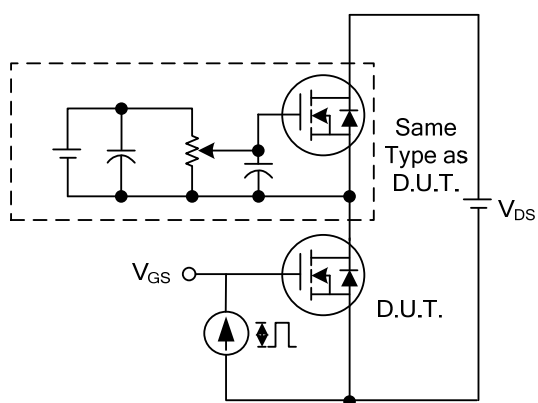
■ TEST CIRCUITS AND WAVEFORMS



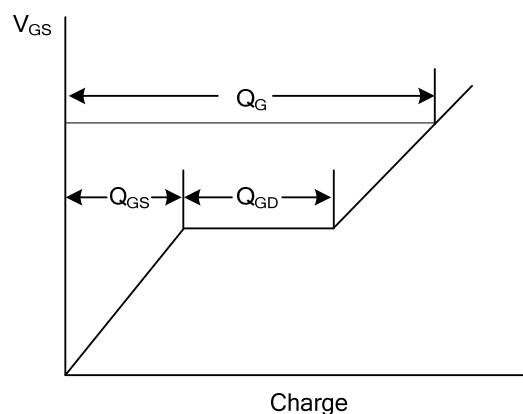
Switching Test Circuit



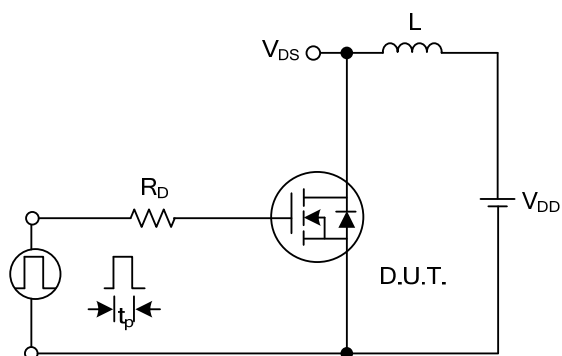
Switching Waveforms



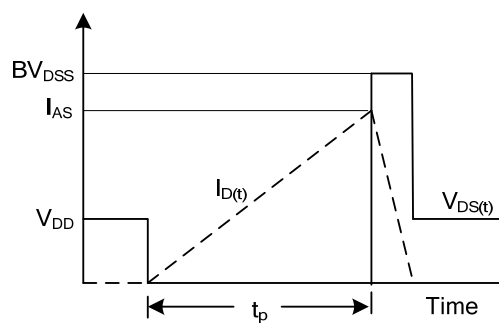
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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