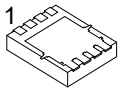
35A, 20V N-CHANNEL POWER MOSFET



PDFN5×6

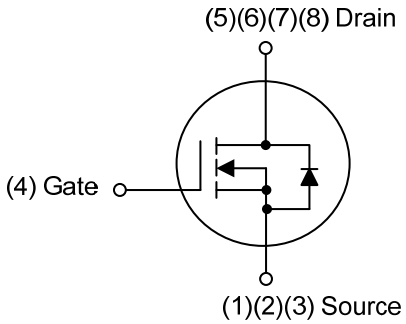
■ DESCRIPTION

The UTC **UT35N02** is a N-channel enhancement MOSFET using UTC's advanced technology to provide the customers with perfect $R_{DS(ON)}$ and high switching speed.

■ FEATURES

* $R_{DS(ON)} \leq 4.5\ m\Omega$ @ V_{GS}=10V, I_D=20A
  $R_{DS(ON)} \leq 5.0\ m\Omega$ @ V_{GS}=4.5V, I_D=10A
* High Switching Speed

■ SYMBOL



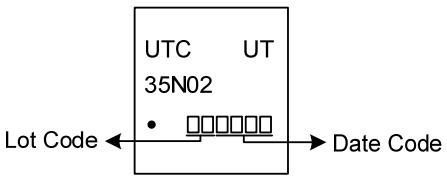
■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment								Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	
UT35N02L-P5060-R	UT35N02G-P5060-R	PDFN5×6	S	S	S	G	D	D	D	D	Tape Reel

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

UT35N02G-P5060-R (1)Packing Type (2)Package Type (3)Green Package	(1) R: Tape Reel (2) P5060: PDFN5×6 (3) G: Halogen Free and Lead Free, K: Lead Free

■ MARKING



■ ABSOLUTE MAXIMUM RATINGS

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	20	V
Gate-Source Voltage		V_{GSS}	±20	V
Drain Current	Continuous (V_{GS}=10V)	I_D	35	A
	Pulsed(Note 2)	I_{DM}	70	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	121	mJ
Power Dissipation		P_D	34	W
Junction Temperature		T_J	+150	°C
Storage Temperature		T_{STG}	-55 ~ +175	°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 = 1mH, I_{AS} = 15.6A, V_{DD} = 90V, R_G = 25Ω, Starting T_J = 25°C

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	65	°C/W
Junction to Case	θ_{JC}	3.68	°C/W

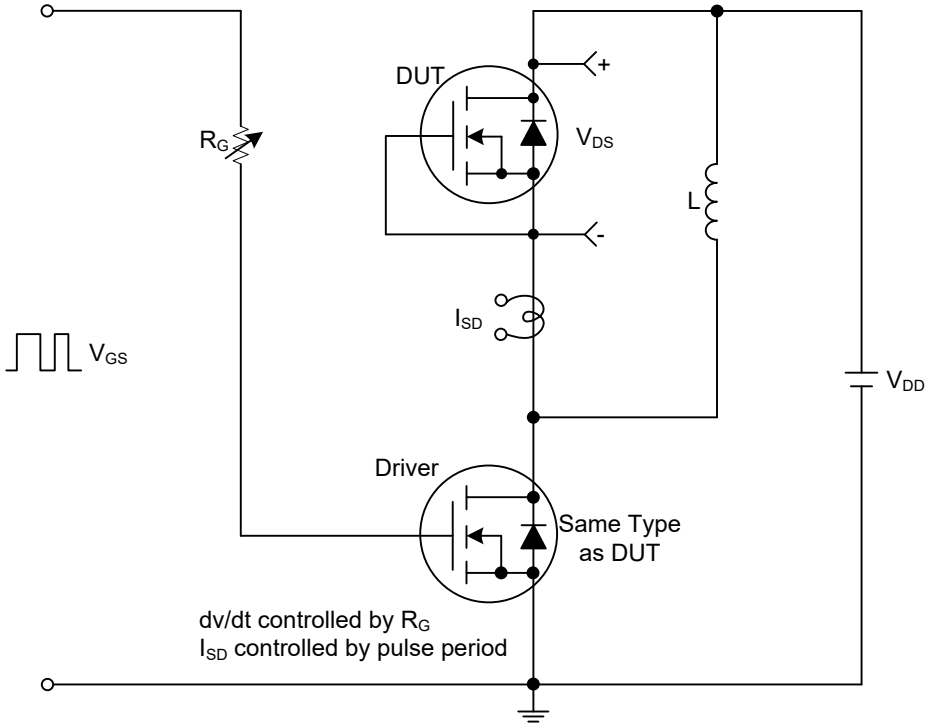
Note: Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.

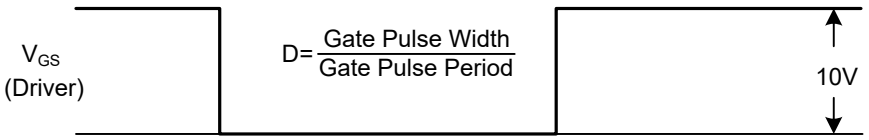
■ ELECTRICAL CHARACTERISTICS (T_J=25°C, unless otherwise specified)

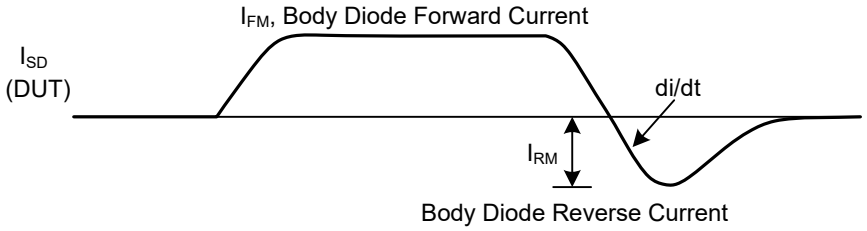
PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV_{DSS}	V_{GS}=0V, I_D=250μA	20			V
Drain-Source Leakage Current		I_{DSS}	V_{DS}=20V, V_{GS}=0V			1	μA
Gate- Source Leakage Current	Forward	I_{GSS}	V_{GS}=+20V, V_{DS}=0V			+100	nA
	Reverse		V_{GS}=-20V, V_{DS}=0V			-100	nA
ON CHARACTERISTICS							
Gate Threshold Voltage		$V_{GS(TH)}$	V_{DS}=V_{GS}, I_D=250μA	1.0		3.0	V
Static Drain-Source On-State Resistance		$R_{DS(ON)}$	V_{GS}=10V, I_D=20A			4.5	mΩ
			V_{GS}=4.5V, I_D=10A			5.0	mΩ
DYNAMIC PARAMETERS							
Input Capacitance		C_{ISS}	V_{GS}=0V, V_{DS}=15V, f=1.0MHz		2743		pF
Output Capacitance		C_{OSS}			770		pF
Reverse Transfer Capacitance		C_{RSS}			674		pF
SWITCHING PARAMETERS							
Total Gate Charge		Q_G	V_{DS}=16V, V_{GS}=10V, I_D=35A (Note 1, 2)		76		nC
Gate to Source Charge		Q_{GS}			7		nC
Gate to Drain Charge		Q_{GD}			29		nC
Turn-ON Delay Time		$t_{D(ON)}$	V_{DD}=10V, V_{GS}=10V, I_D=35A, R_G=3.3Ω, (Note 1, 2)		12		ns
Rise Time		t_R			19		ns
Turn-OFF Delay Time		$t_{D(OFF)}$			72		ns
Fall-Time		t_F			67		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Continuous Drain-Source Diode Forward Current		I_S				35	A
Maximum Pulsed Drain-Source Diode Forward Current		I_{SM}				70	A
Drain-Source Diode Forward Voltage		V_{SD}	I_S=35A,V_{GS}=0V			1.4	V

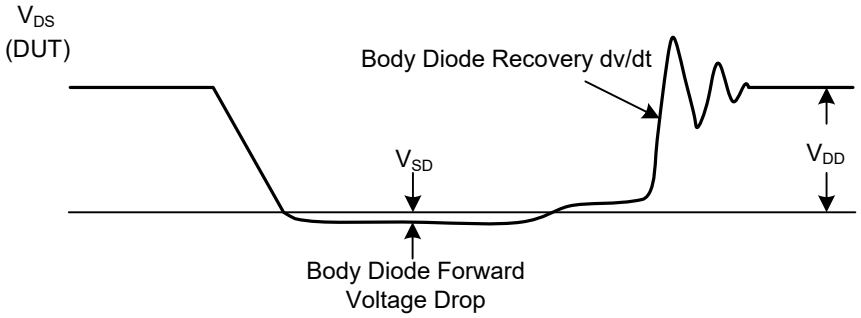
Notes: 1. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%.
2. Essentially independent of operating ambient temperature.

■ TEST CIRCUITS AND WAVEFORMS



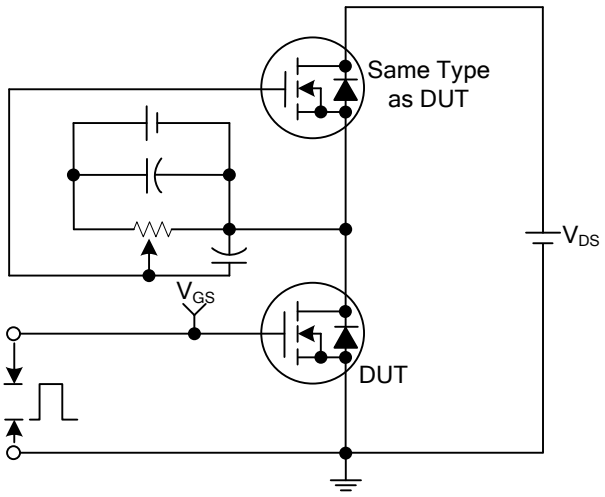




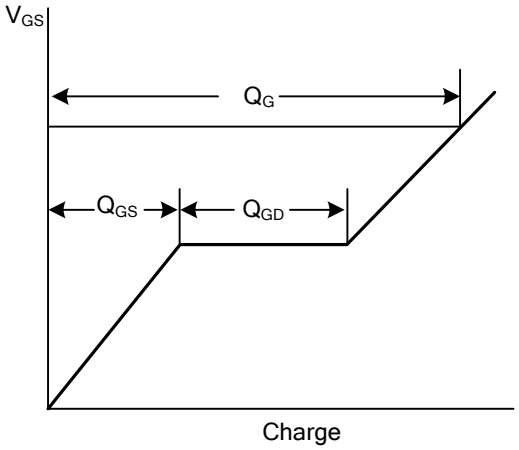


Peak Diode Recovery dv/dt Test Circuit and Waveforms

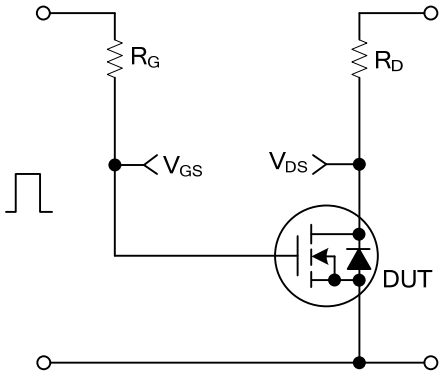
■ TEST CIRCUITS AND WAVEFORMS



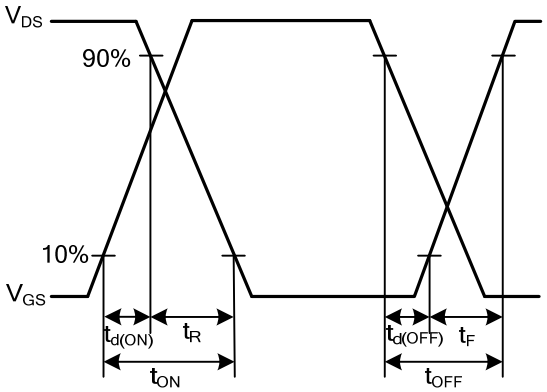
Gate Charge Test Circuit



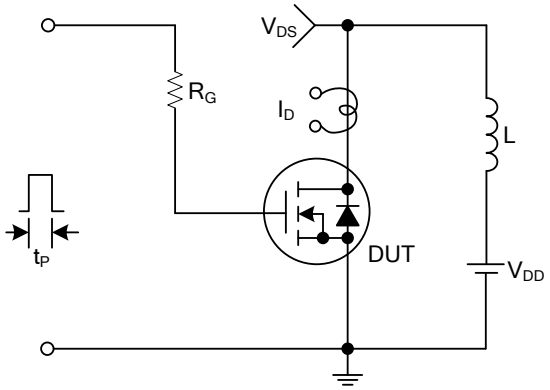
Gate Charge Waveforms



Resistive Switching Test Circuit

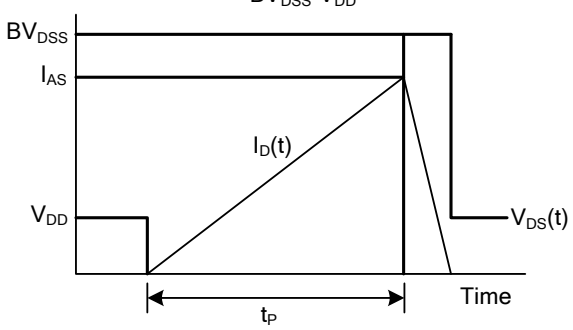


Resistive Switching Waveforms



Unclamped Inductive Switching Test Circuit

$$E_{AS}=\frac{1}{2}LI_{AS}^{2}\frac{BV_{DSS}}{BV_{DSS}-V_{DD}}$$



Unclamped Inductive Switching Waveforms