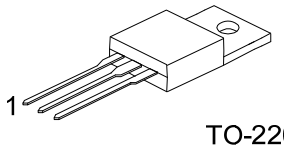
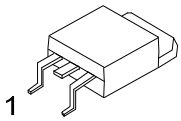
UT136N03H

Preliminary | ***Power MOSFET***

136A, 30V N-CHANNEL POWER MOSFET



TO-220



TO-263

PDFN5×6

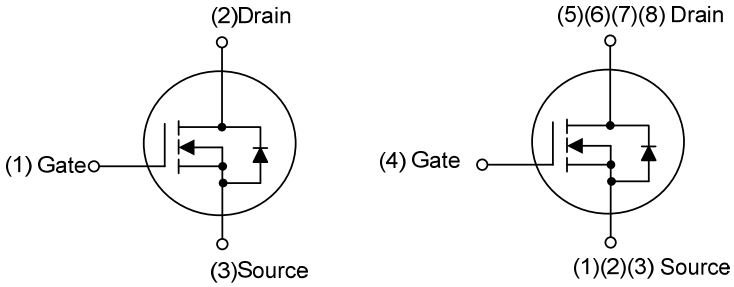
■ DESCRIPTION

The **UT136N03H** uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with low gate voltages. This device is suitable for use as a load switch or in PWM applications.

■ FEATURES

* $R_{DS(ON)} \leq 3.6\ m\Omega$ @ V_{GS}=10V, I_D=68A
* High switching speed
* Improved dv/dt capability

■ SYMBOL



TO-220/TO-263 PDFN5×6

■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment								Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	
UT136N03HL-TA3-T	UT136N03HG-TA3-T	TO-220	G	D	S	-	-	-	-	-	Tube
UT136N03HL-TQ2-T	UT136N03HG-TQ2-T	TO-263	G	D	S	-	-	-	-	-	Tube
UT136N03HL-TQ2-R	UT136N03HG-TQ2-R	TO-263	G	D	S	-	-	-	-	-	Tape Reel
UT136N03HL-P5060-R	UT136N03HG-P5060-R	PDFN5×6	S	S	S	G	D	D	D	D	Tape Reel

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

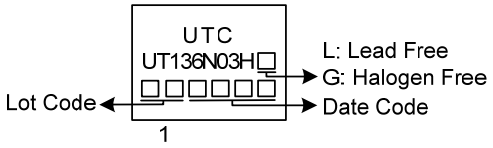
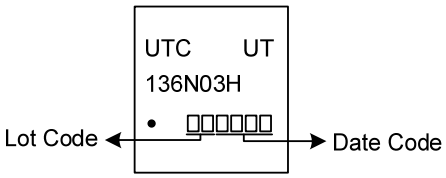
UT136N03HG-TA3-T

(1)Packing Type — (1) T: Tube, R: Tape Reel

(2)Package Type — (2) TA3: TO-220, TQ2: TO-263, P5060: PDFN5×6

(3)Green Package — (3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING

TO-220 / TO-263	PDFN5×6
	

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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	30	V
Gate-Source Voltage		V_{GSS}	±20	V
Drain Current	Continuous	I_D	136	A
	Pulsed (Note 2)	I_{DM}	272	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	198	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	1.3	V/ns
Power Dissipation	TO-220/TO-263	P_D	190	W
	PDFN5×6		45	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=0.1mH, I_{AS}=63A, V_{DD}=25V, R_G=25Ω, Starting T_J = 25°C
4. I_{SD} ≤ 30A, di/dt ≤ 200A/μs, V_{DD} ≤ BV_{DSS}, Starting T_J = 25°C

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220/TO-263	θ_{JA}	62.5	°C/W
	PDFN5×6		65	°C/W
Junction to Case	TO-220/TO-263	θ_{JC}	0.65	°C/W
	PDFN5×6		2.7 (Note)	°C/W

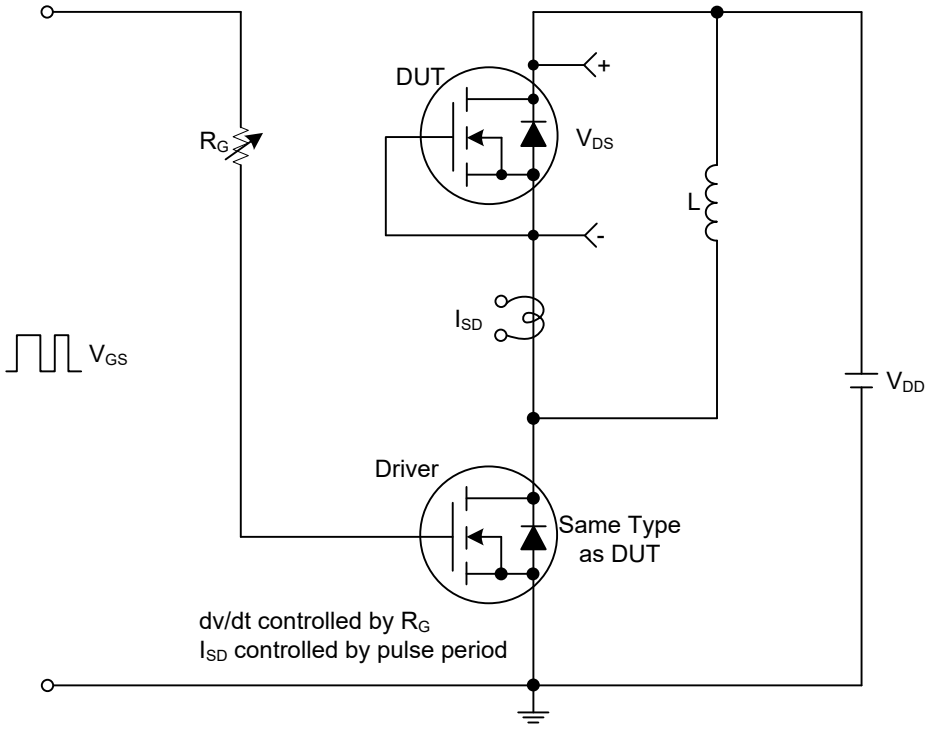
Note: Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.

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

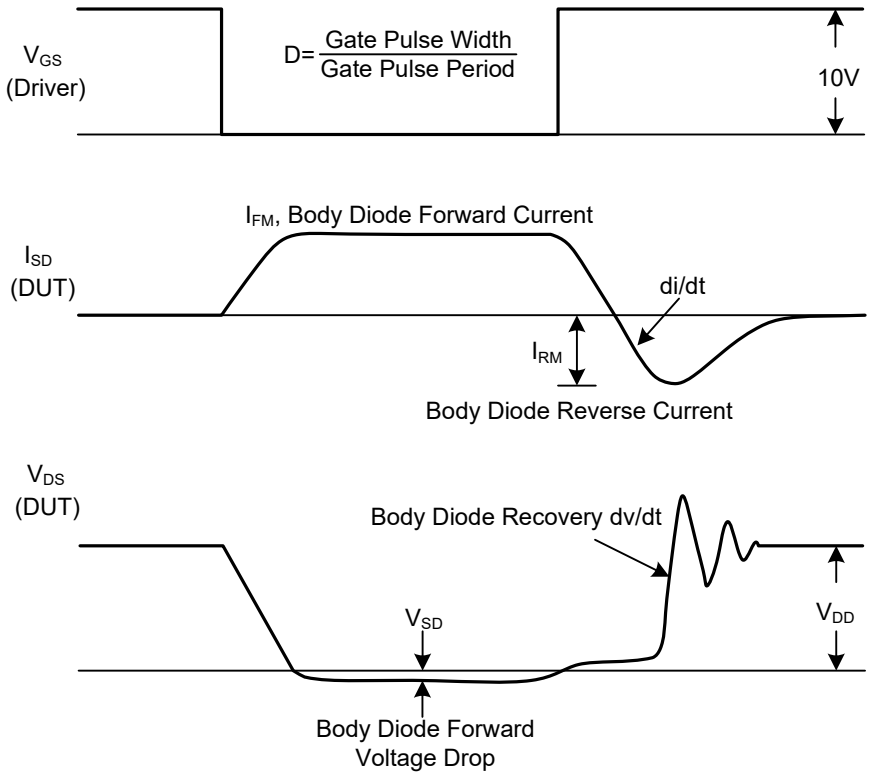
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V, I_D=250μA	30			V
Drain-Source Leakage Current	I_{DSS}	V_{DS}=30V, V_{GS}=0V			1	μA
Gate-Source Leakage Current	I_{GSS}	V_{DS}=0V, V_{GS}=±20V			±100	nA
ON CHARACTERISTICS (Note2)						
Gate Threshold Voltage	$V_{GS(TH)}$	V_{DS}=V_{GS}, I_D=250μA	2.0		4.0	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=68A			3.6	mΩ
DYNAMIC PARAMETERS (Note3)						
Input Capacitance	C_{ISS}	V_{DS} =15V, V_{GS} =0V, f=1.0MHz		7250		pF
Output Capacitance	C_{OSS}			1300		pF
Reverse Transfer Capacitance	C_{RSS}			900		pF
SWITCHING PARAMETERS (Note3)						
Total Gate Charge	Q_G	V_{DS}=24V, V_{GS}=45V, I_D=136A, (Note 1, 2)		145		nC
Gate Source Charge	Q_{GS}			70		nC
Gate Drain Charge	Q_{GD}			38		nC
Turn-ON Delay Time	$t_{D(ON)}$	V_{DD}=15V, V_{GS}=10V, I_D=136A, R_G =3Ω (Note 1, 2)		20		ns
Turn-ON Rise Time	t_R			22		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			60		ns
Turn-OFF Fall-Time	t_F			32		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Maximum Continuous Drain-Source Diode Forward Current	I_S				136	A
Maximum Pulsed Drain-Source Diode Forward Current	I_{SM}				272	A
Drain-Source Diode Forward Voltage	V_{SD}	I_S=136A, V_{GS}=0V			1.4	V
Reverse Recovery Time	t_{rr}	I_S=30A, V_{GS}=0V, dI_F/dt=100A/μs		200		ns
Reverse Recovery Charge (Note 1)	Q_{rr}			470		ns

Notes: 1. Pulse width limited by maximum junction temperature.
2. Pulse Test: Pulse Width < 300μs, Duty Cycle < 2%.

■ TEST CIRCUITS AND WAVEFORMS



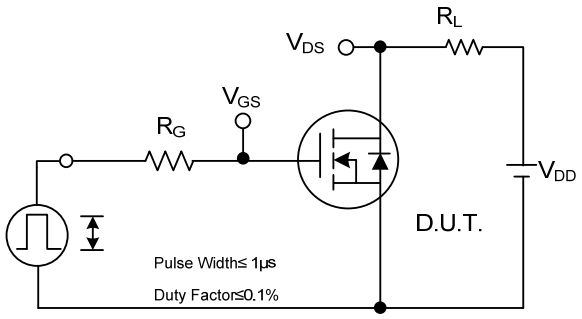
Peak Diode Recovery dv/dt Test Circuit



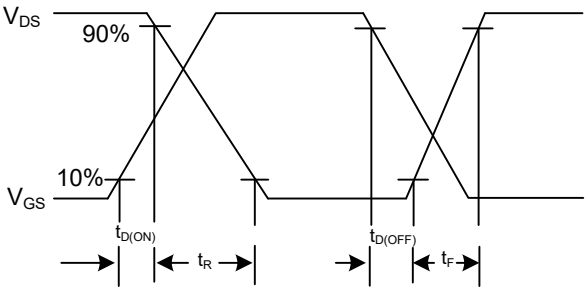
Peak Diode Recovery dv/dt Test Circuit and Waveforms

Peak Diode Recovery dv/dt Waveforms

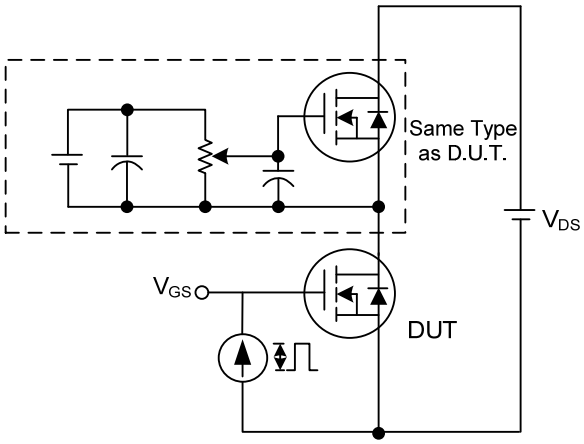
■ TEST CIRCUITS AND WAVEFORMS



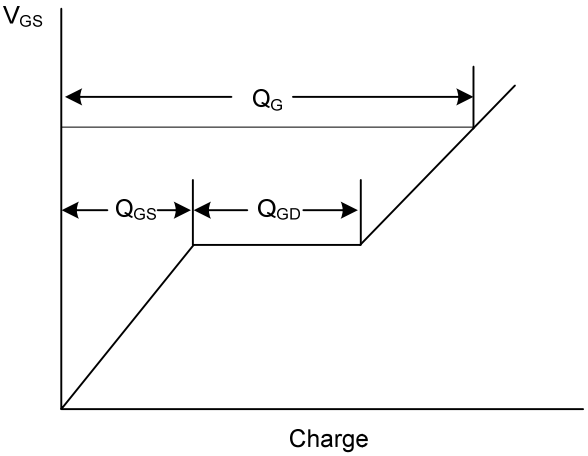
Switching Test Circuit



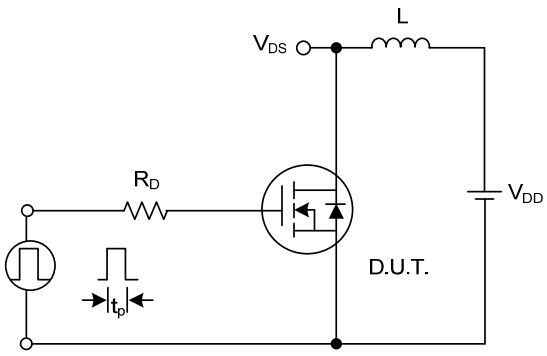
Switching Waveforms



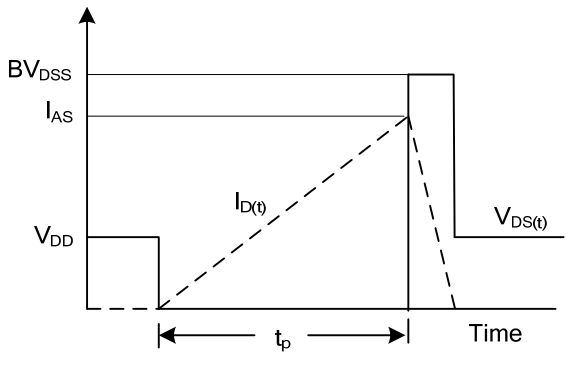
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms