



UT2315

Preliminary

Power MOSFET

**-3.3A, -20V P-CHANNEL
ENHANCEMENT MODE
POWER MOSFET**

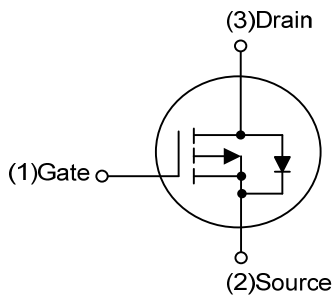
■ DESCRIPTION

The UTC **UT2315** is P-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These devices are well suited for high efficiency fast switching applications.

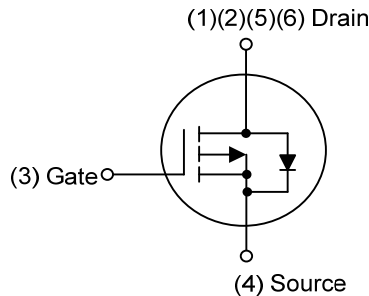
■ FEATURES

- * Extremely low on-resistance due to high density cell
- * Perfect thermal performance and electrical capability with advanced technology of trench process

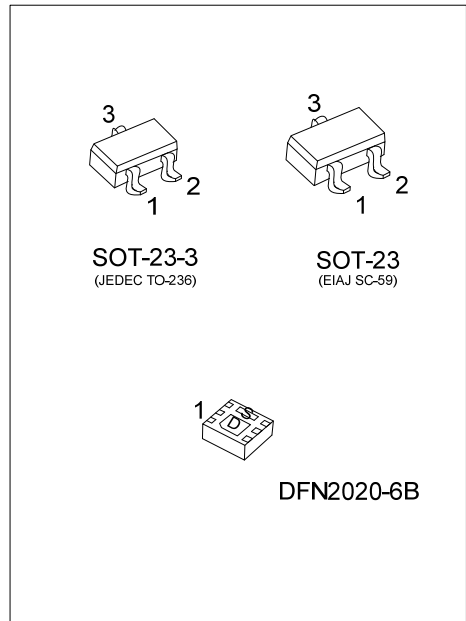
■ SYMBOL



SOT-23-3 / SOT-23



DFN2020-6B



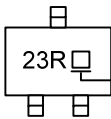

■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment						Packing
Lead Free	Halogen Free		1	2	3	4	5	6	
UT2315L-AE2-R	UT2315G-AE2-R	SOT-23-3	G	S	D	-	-	-	Tape Reel
UT2315L-AE3-R	UT2315G-AE3-R	SOT-23	G	S	D	-	-	-	Tape Reel
UT2315L-K06B-2020-R	UT2315G-K06B-2020-R	DFN2020-6B	D	D	G	S	D	D	Tape Reel

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

<p>UT2315G-AE2-R</p> <ul style="list-style-type: none"> (1) Packing Type (2) Package Type (3) Green Package 	<ul style="list-style-type: none"> (1) R: Tape Reel (2) AE2: SOT-23-3, AE3: SOT-23 K06B-2020: DFN2020-6B (3) G: Halogen Free and Lead Free, L: Lead Free
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MARKING

SOT-23-3 / SOT-23	DFN2020-6B
 <p>23R</p> <p>L: Lead Free G: Halogen Free</p>	 <p>315</p> <p>L: Lead Free G: Halogen Free Date Code</p>

■ ABSOLUTE MAXIMUM RATING ($T_C=25^\circ\text{C}$ unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	-20	V
Gate-Source Voltage		V_{GSS}	± 10	V
Drain Current	DC	I_D	-3.3	A
	Pulsed (Note 2)	I_{DM}	-13.2	A
Peak Diode Recovery dv/dt (Note 4)		dv/dt	2.5	V/ns
Power Dissipation ($T_A=25^\circ\text{C}$)	SOT-23-3	P_D	0.7	W
	SOT-23		0.8	W
	DFN2020-6B		1.2	W
Junction Temperature		T_J	+150	$^\circ\text{C}$
Storage Temperature Range		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. $I_{SD} \leq -3.3\text{A}$, $di/dt \leq 200\text{A}/\mu\text{s}$, $V_{DD} \leq BV_{DSS}$, Starting $T_J = 25^\circ\text{C}$

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	SOT-23-3	θ_{JA}	178	$^\circ\text{C}/\text{W}$
	SOT-23		156	$^\circ\text{C}/\text{W}$
	DFN2020-6B		104	$^\circ\text{C}/\text{W}$

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

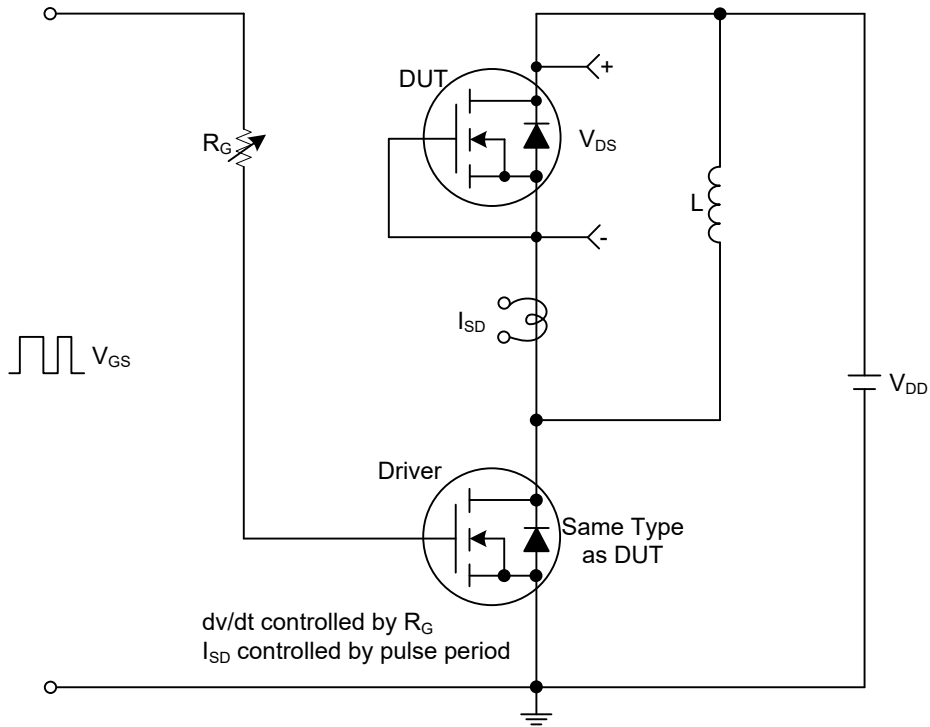
■ ELECTRICAL CHARACTERISTICS (T_J=25°C unless otherwise specified)

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}			+10	μA
	Reverse					
		V _{GS} =-10V, V _{DS} =0V			-10	μA
ON CHARACTERISTICS						
Gate Threshold Voltage	V _{GS(TH)}	V _{DS} =V _{GS} , I _D =-250μA	-0.3		-1.0	V
Static Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =-4.5V, I _D =-3.0A			103	mΩ
		V _{GS} =-2.5V, I _D =-2.0A			140	mΩ
		V _{GS} =-1.8V, I _D =-1.0A			200	mΩ
DYNAMIC PARAMETERS						
Input Capacitance	C _{ISS}	V _{GS} =0V, V _{DS} =-15V, f=1.0MHz		370		pF
Output Capacitance	C _{OSS}			82		pF
Reverse Transfer Capacitance	C _{RSS}			68		pF
SWITCHING PARAMETERS						
Total Gate Charge	Q _G	V _{DS} =-10V, V _{GS} =-4.5V, I _D =-1.0A, I _D =-1mA (Note 1, 2)		8		nC
Gate to Source Charge	Q _{GS}			1.2		nC
Gate to Drain Charge	Q _{GD}			1.5		nC
Turn-ON Delay Time	t _{D(ON)}	V _{DS} =-10V, V _{GS} =-10V, I _D =-1.0A, R _G =3.3Ω (Note 1, 2)		3		ns
Rise Time	t _R			15		ns
Turn-OFF Delay Time	t _{D(OFF)}			20		ns
Fall-Time	t _F			18		ns
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS						
Maximum Continuous Drain-Source Diode Forward Current	I _S				-3.3	A
Maximum Pulsed Drain-Source Diode Forward Current	I _{SM}				-13.2	A
Diode Forward Voltage	V _{SD}	I _F =-1.0A, V _{GS} =0V			-1.0	V

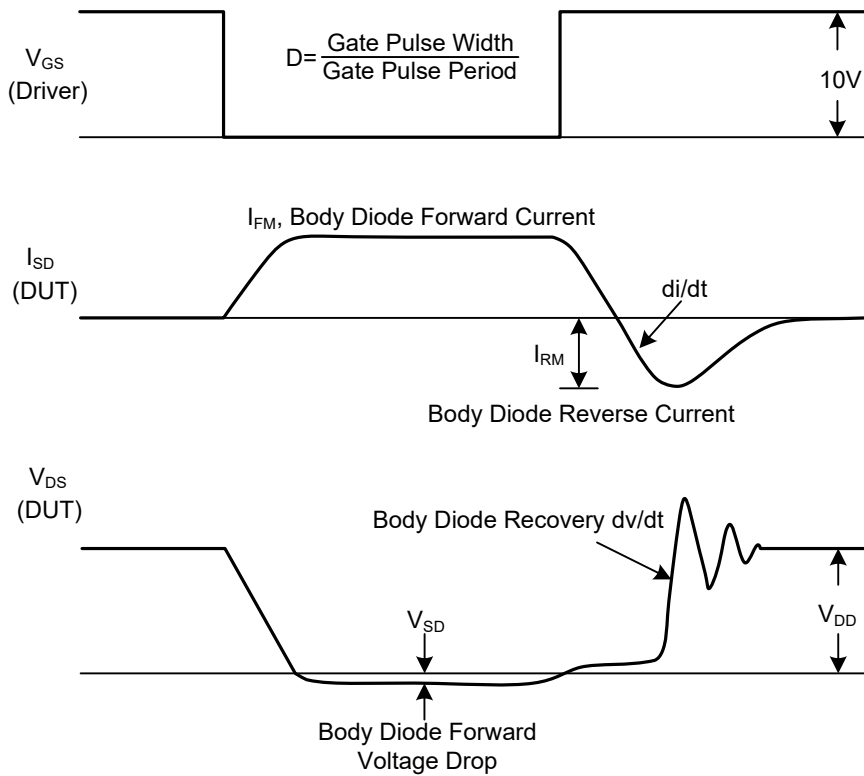
Notes: 1. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%.

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS



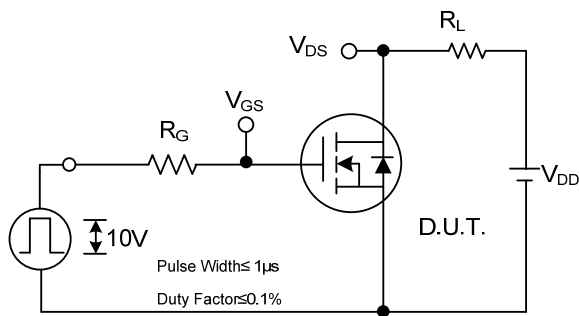
Peak Diode Recovery dv/dt Test Circuit



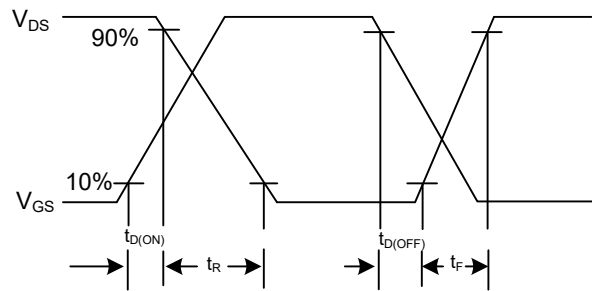
Peak Diode Recovery dv/dt Test Circuit and Waveforms

Peak Diode Recovery dv/dt Waveforms

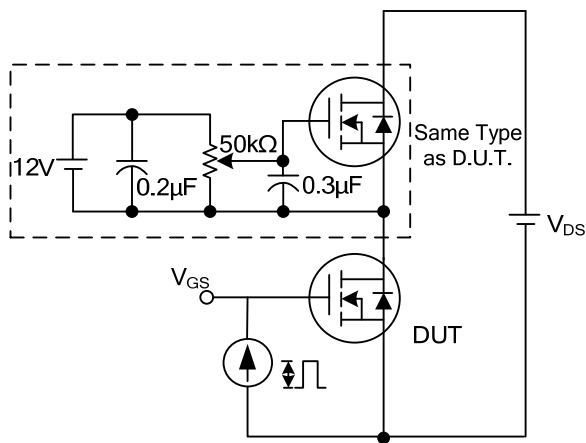
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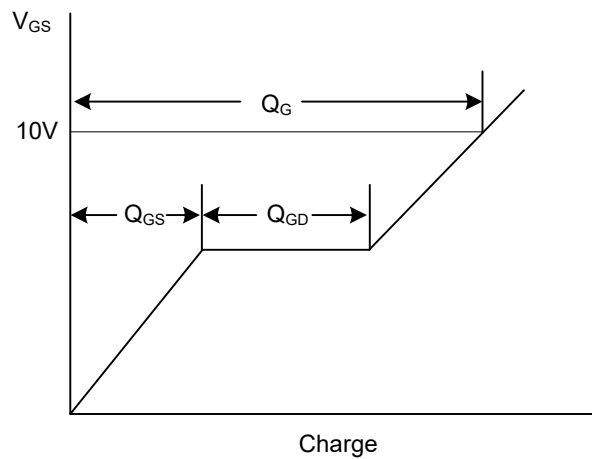
Switching Test Circuit



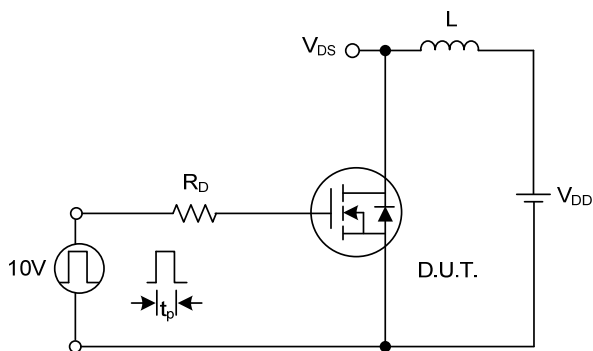
Switching Waveforms



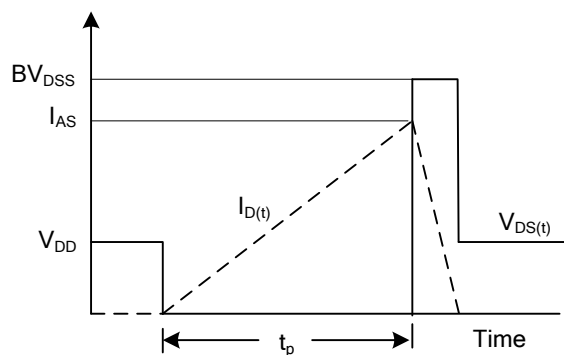
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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