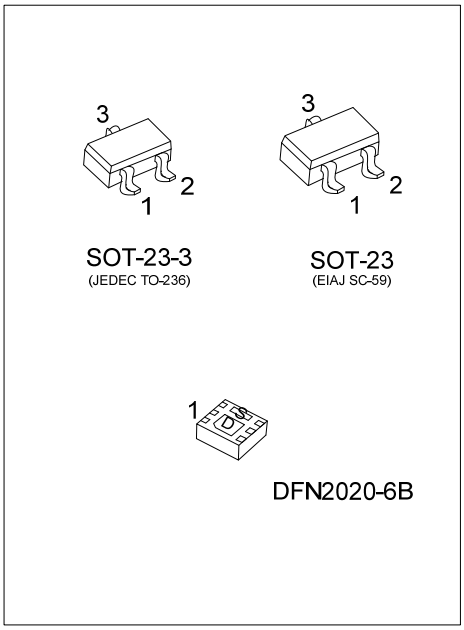
-3.3A, -20V P-CHANNEL ENHANCEMENT MODE POWER MOSFET



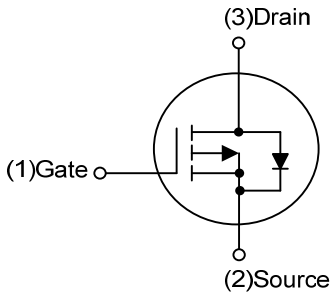
■ DESCRIPTION

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.

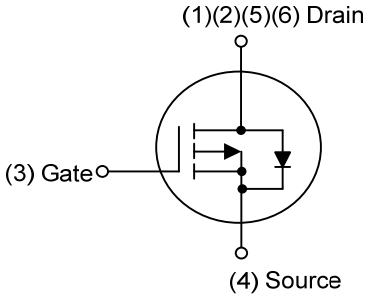
■ FEATURES

* 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

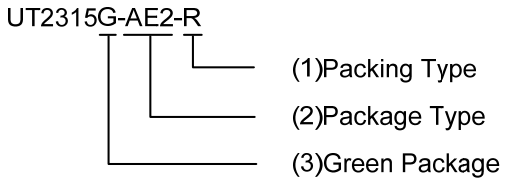


DFN2020-6B

■ 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

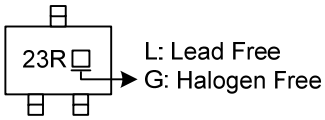
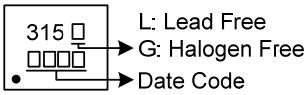


(1) R: Tape Reel

(2) AE2: SOT-23-3, AE3: SOT-23
K06B-2020: DFN2020-6B

(3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING

SOT-23-3 / SOT-23	DFN2020-6B
	

■ ABSOLUTE MAXIMUM RATING (T_C=25°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°C)	SOT-23-3	P_D	0.7	W
	SOT-23		0.8	W
	DFN2020-6B		1.2	W
Junction Temperature		T_J	+150	°C
Storage Temperature Range		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. I_{SD} ≤ -3.3A, di/dt ≤ 200A/μs, V_{DD} ≤ BV_{DSS}, Starting T_J = 25°C

■ THERMAL DATA

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

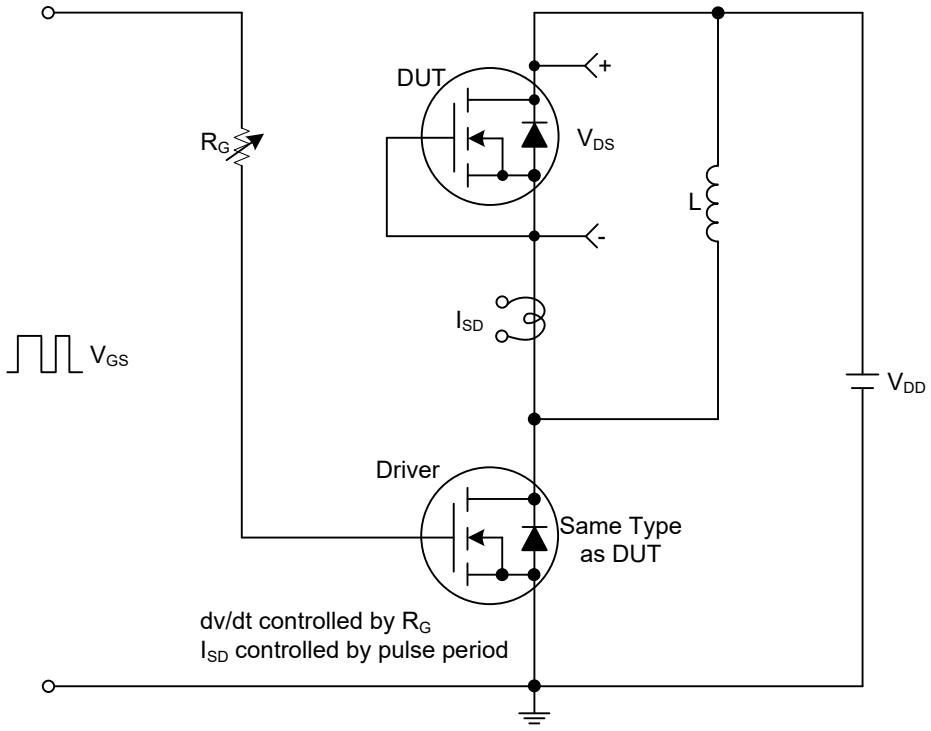
Note: Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.

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

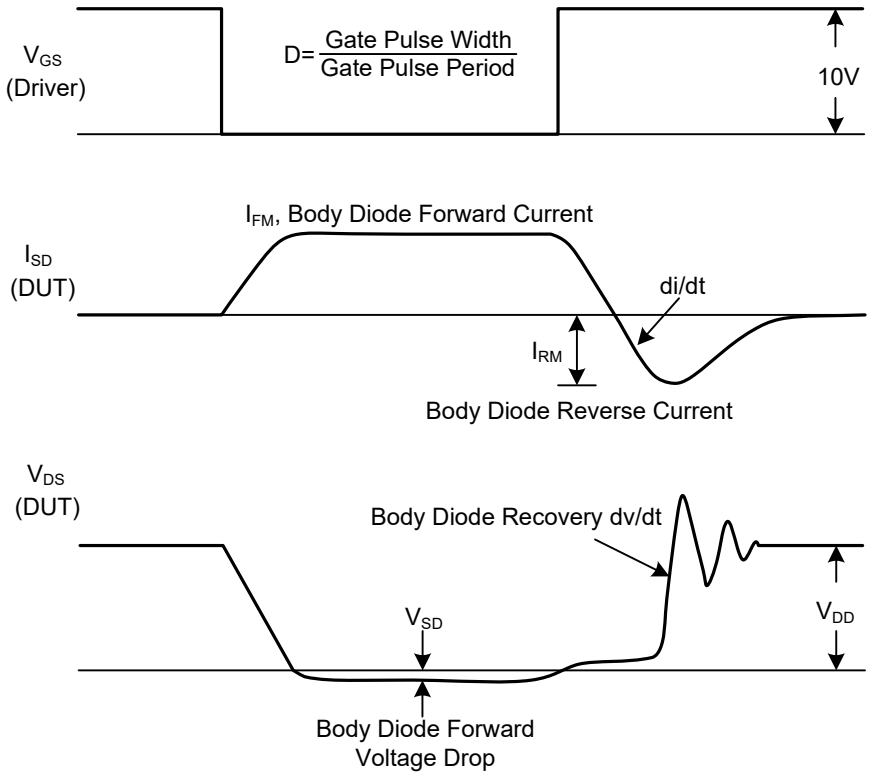
PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV_{DSS}	V_{GS}=0V, I_D=-250μA	-20			V
Drain-Source Leakage Current		I_{DSS}	V_{DS}=-20V, V_{GS}=0V			-1	μA
Gate-Source Leakage Current	Forward	I_{GSS}	V_{GS}=+16V, V_{DS}=0V			+10	μA
	Reverse		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



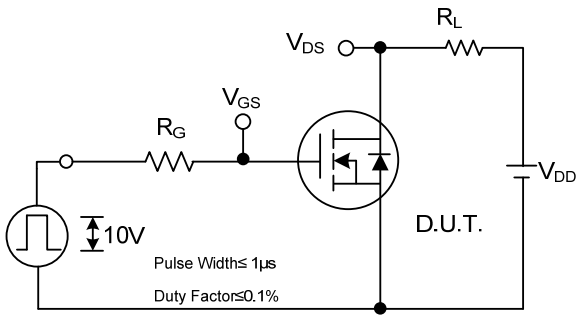
Peak Diode Recovery dv/dt Test Circuit



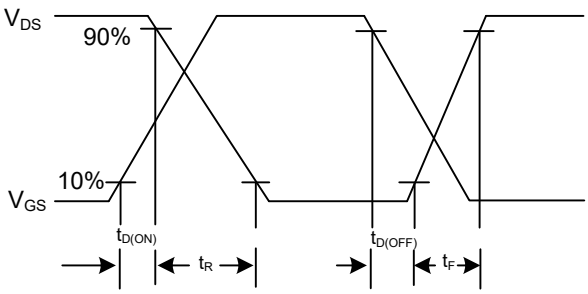
Peak Diode Recovery dv/dt Test Circuit and Waveforms

Peak Diode Recovery dv/dt Waveforms

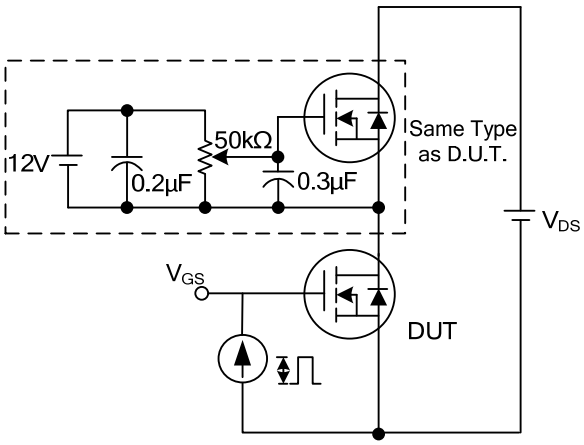
■ TEST CIRCUITS AND WAVEFORMS



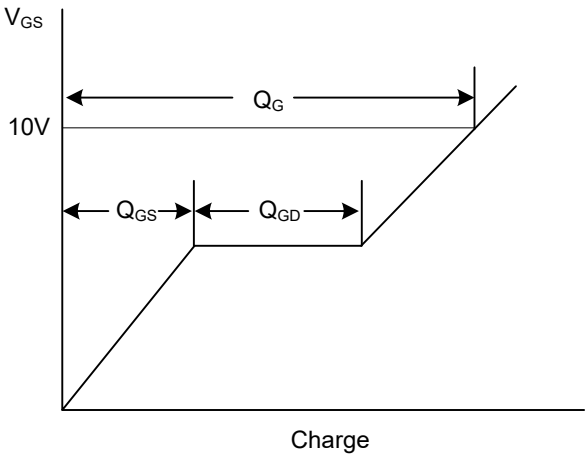
Switching Test Circuit



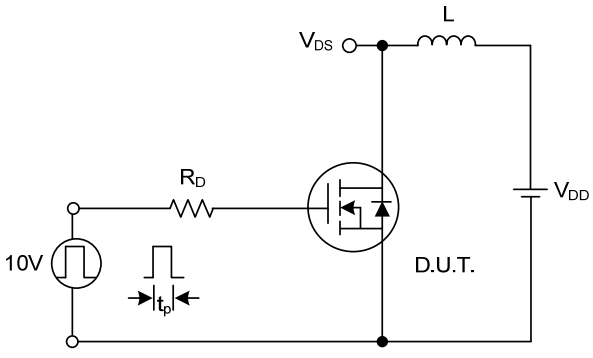
Switching Waveforms



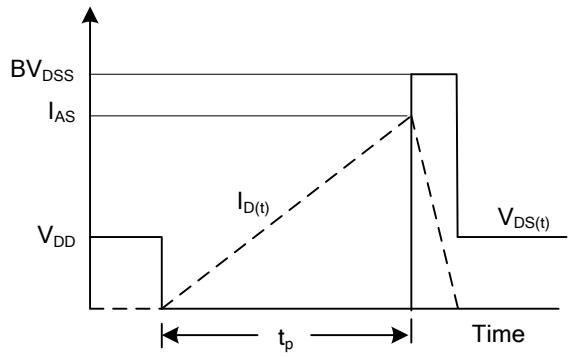
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms