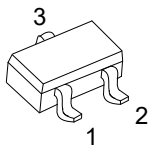
20V, 6.0A N-CHANNEL POWER MOSFET



SOT-23
(EIAJ SC-59)

■ DESCRIPTION

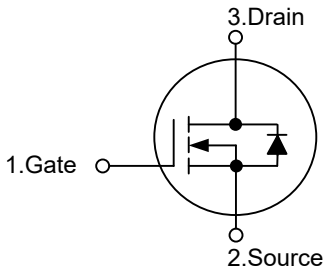
The UTC **UT2300** is N-channel enhancement mode Power MOSFET, designed in serried ranks with fast switching speed, low on-resistance and favorable stabilization.

Used in commercial and industrial surface mount applications and suited for low voltage applications such as DC/DC converters.

■ FEATURES

* $R_{DS(ON)} \leq 30\ m\Omega$ @ V_{GS}=10V, I_D=6.0A
  $R_{DS(ON)} \leq 40\ m\Omega$ @ V_{GS}=4.5V, I_D=3.0A
  $R_{DS(ON)} \leq 60\ m\Omega$ @ V_{GS}=2.5V, I_D=2.0A
* Super High Dense Cell Design for Extremely Low $R_{DS(ON)}$

■ SYMBOL



■ ORDERING INFORMATION

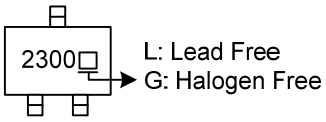
Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UT2300L-AE3-R	UT2300G-AE3-R	SOT-23	G	S	D	Tape Reel

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

UT2300G-AE3-R

(1)Packing Type	(1) R: Tape Reel
(2)Package Type	(2) AE3: SOT-23
(3)Green Package	(3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING



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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	20	V
Gate-Source Voltage		V_{GSS}	±12	V
Drain Current	Continuous	I_D	6	A
	Pulsed	I_{DM}	20	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	9	mJ
Power Dissipation		P_D	0.8	W
Junction Temperature		T_J	-55 ~ +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} = 13.4A, V_{DD} = 15V, R_G = 25 Ω, Starting T_J = 25°C

■ THERMAL DATA

PARAMETER	SYMBOL	RATING	UNIT
Junction to Ambient	θ_{JA}	156 (Note)	°C/W

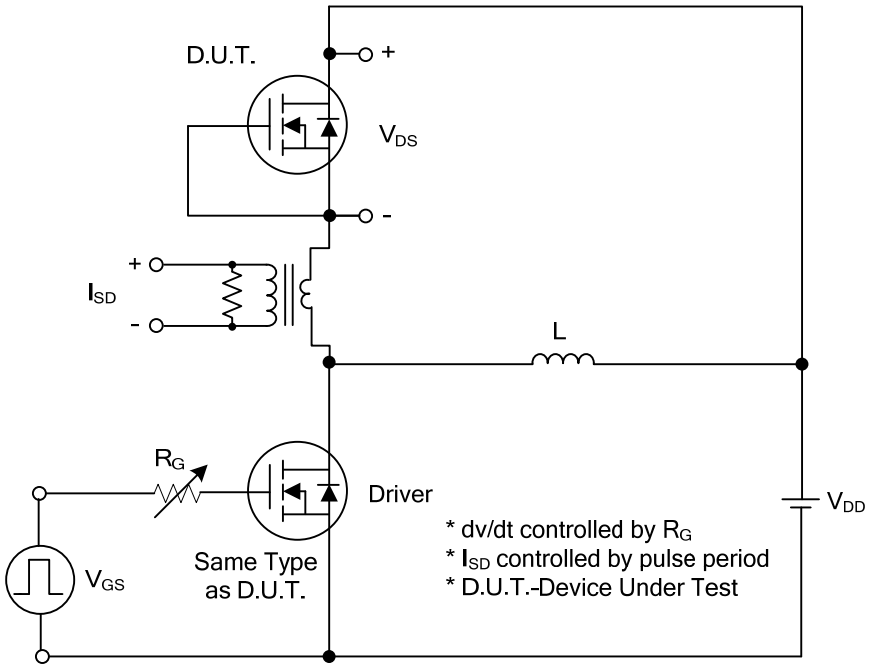
Note: Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.

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

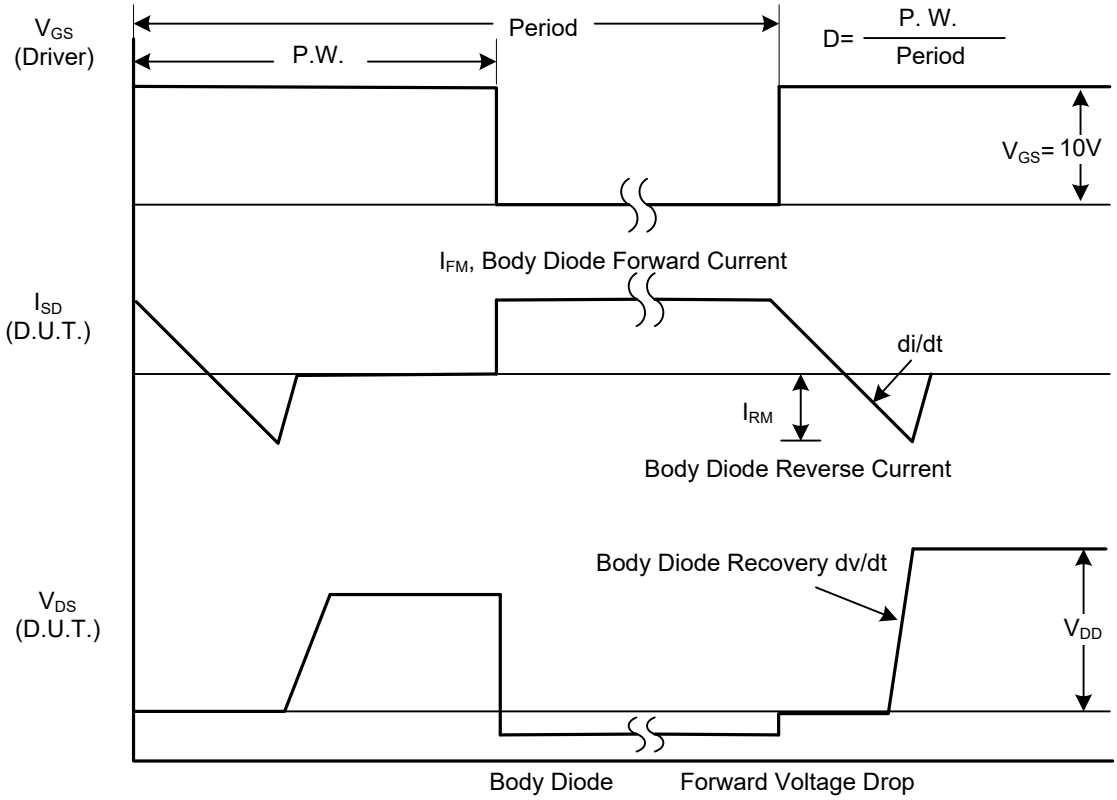
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V, I_D=250μA	20			V
Drain-Source Leakage Current	I_{DSS}	V_{DS}=20V, V_{GS}=0V			1	μA
Gate-Source Leakage Current	I_{GSS}	V_{GS}=±12V, V_{DS}=0V			100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	V_{DS}=V_{GS}, I_D=250μA	0.4		1.0	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=6.0A			30	mΩ
		V_{GS}=4.5V, I_D=3.0A			40	mΩ
		V_{GS}=2.5V, I_D=2.0A			60	mΩ
DYNAMIC PARAMETERS						
Input Capacitance	C_{ISS}	V_{DS}=15V, V_{GS}=0V, f=1MHz		305		pF
Output Capacitance	C_{OSS}			83		pF
Reverse Transfer Capacitance	C_{RSS}			70		pF
SWITCHING PARAMETERS						
Total Gate Charge	Q_G	V_{DS}=16V, V_{GS}=10V, I_D=6.0A (Note 1, 2)		16		nC
Gate Source Charge	Q_{GS}			1		nC
Gate Drain Charge	Q_{GD}			1		nC
Turn-ON Delay Time	$t_{D(ON)}$	V_{DS}=10V, V_{GS}=10V, I_D=6.0A R_G=3Ω (Note 1, 2)		4		ns
Turn-ON Rise Time	t_R			14		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			13		ns
Turn-OFF Fall-Time	t_F			17		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Maximum Body-Diode Continuous Current	I_S				6	A
Drain-Source Diode Forward Voltage	V_{SD}	I_S=1.25A			1.3	V

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

■ TEST CIRCUITS AND WAVEFORMS

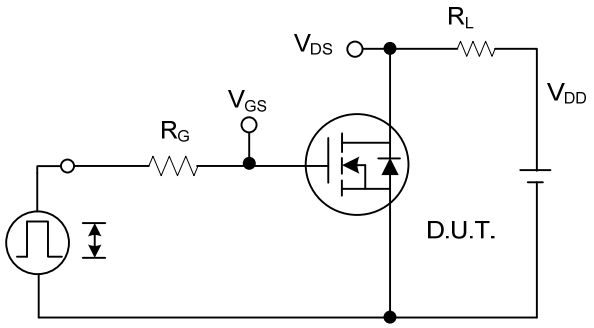


Peak Diode Recovery dv/dt Test Circuit

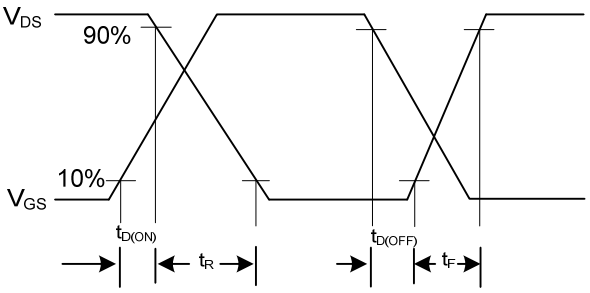


Peak Diode Recovery dv/dt Waveforms

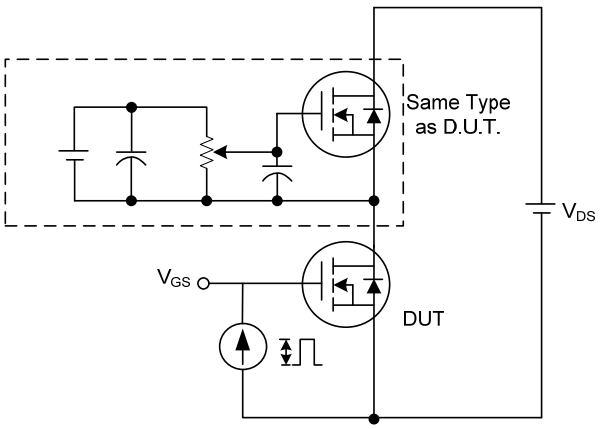
■ TEST CIRCUITS AND WAVEFORMS



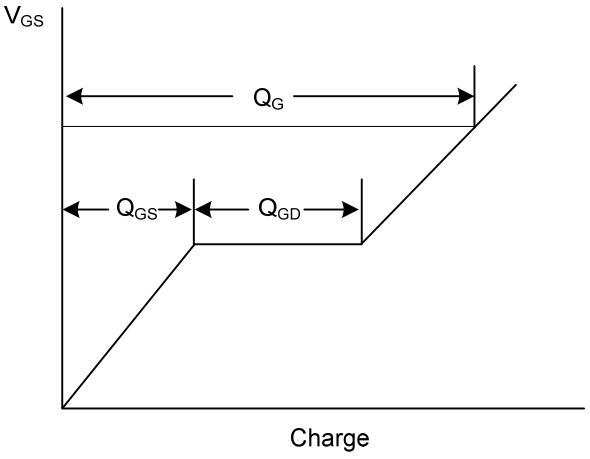
Switching Test Circuit



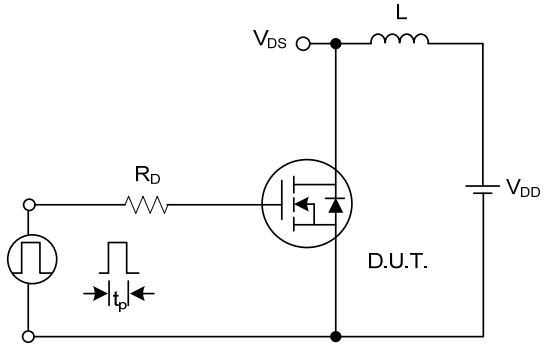
Switching Waveforms



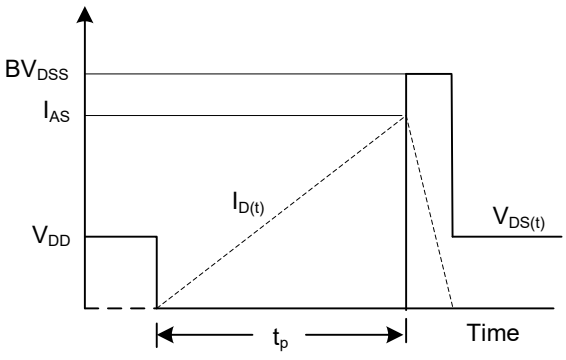
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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