



1D5N10

Preliminary

Power MOSFET

1.5A, 100V N-CHANNEL LOGIC LEVEL ENHANCEMENT MODE FIELD EFFECT TRANSISTOR

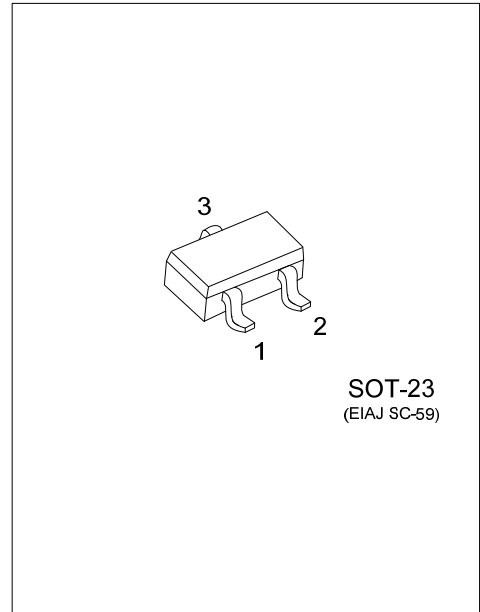
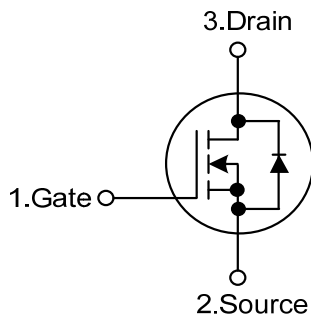
DESCRIPTION

The UTC **1D5N10** is a N-channel MOSFET, it uses UTC's advanced technology to provide the customers with high switch speed and low gate charge.

FEATURES

- * $R_{DS(ON)} \leq 0.6 \Omega$ @ $V_{GS}=10V, I_D=0.75A$
- * High switch speed
- * Low gate charge

SYMBOL



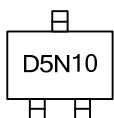
ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
1D5N10L-AE3-R	1D5N10G-AE3-R	SOT-23	G	S	D	Tape Reel

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

<p>1D5N10G-AE3-R</p> <p>(1) Packing Type</p> <p>(2) Package Type</p> <p>(3) Green Package</p>	<p>(1) R: Tape Reel</p> <p>(2) AE3: SOT-23</p> <p>(3) G: Halogen Free and Lead Free, L: Lead Free</p>
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MARKING



■ ABSOLUTE MAXIMUM RATINGS ($T_A=25^\circ\text{C}$, unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT	
Drain-Source Voltage		V_{DSS}	100	V	
Gate-Source Voltage		V_{GSS}	± 20	V	
Drain Current	Continuous (Note 1)	I_D	$T_A=25^\circ\text{C}$	1.5	A
			$T_A=70^\circ\text{C}$	1.2	A
	Pulsed (Note 2)		I_{DM}	6	A
Power Dissipation (Note 1)	$T_A=25^\circ\text{C}$		P_D	1.25	W
	$T_A=70^\circ\text{C}$			0.8	W
Junction Temperature		T_J	-55 ~ +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.

■ THERMAL CHARACTERISTICS

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	100	$^\circ\text{C}/\text{W}$

Note: The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.

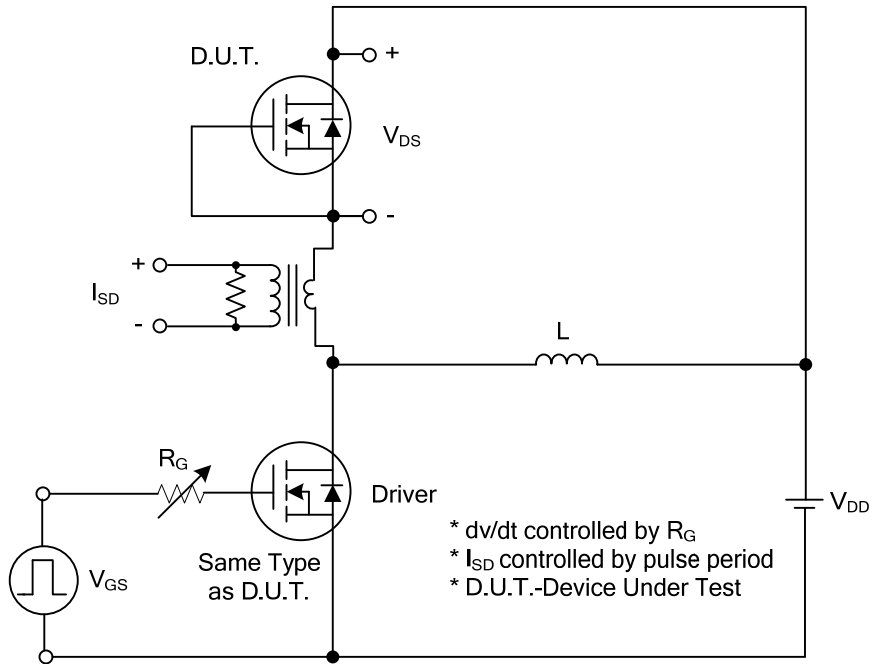
■ ELECTRICAL CHARACTERISTICS ($T_A=25^\circ\text{C}$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT	
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage	BV_{DSS}	$I_D=250\mu\text{A}$, $V_{GS}=0\text{V}$	100			V	
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=80\text{V}$, $V_{GS}=0\text{V}$			1	μA	
Gate-Source Leakage Current	I_{GSS}	Forward	$V_{GS}=+20\text{V}$, $V_{DS}=0\text{V}$		+100	nA	
		Reverse	$V_{GS}=-20\text{V}$, $V_{DS}=0\text{V}$		-100	nA	
ON CHARACTERISTICS							
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}$, $I_D=250\mu\text{A}$	0.8		1.2	V	
Static Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10\text{V}$, $I_D=0.75\text{A}$			0.6	Ω	
DYNAMIC PARAMETERS (Note 3)							
Input Capacitance	C_{ISS}	$V_{GS}=0\text{V}$, $V_{DS}=25\text{V}$, $f=1.0\text{MHz}$		170		pF	
Output Capacitance	C_{OSS}				34		pF
Reverse Transfer Capacitance	C_{RSS}				8.2		pF
SWITCHING PARAMETERS (Note 3)							
Total Gate Charge	Q_G	$V_{GS}=10\text{V}$, $V_{DS}=50\text{V}$, $I_D=1.3\text{A}$ $I_G=100\mu\text{A}$		10		nC	
Gate to Source Charge	Q_{GS}			0.7		nC	
Gate to Drain Charge	Q_{GD}			0.3		nC	
Turn-ON Delay Time	$t_{D(ON)}$	$V_{DD}=30\text{V}$, $I_D=0.5\text{A}$, $R_{GEN}=25\Omega$, $V_{GS}=10\text{V}$		8		ns	
Rise Time	t_R			14		ns	
Turn-OFF Delay Time	$t_{D(OFF)}$			86		ns	
Fall-Time	t_F			60		ns	
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Continuous Drain-Source Current	I_S				1.5	A	
Pulsed Drain-Source Current	I_{SM}				6.0	A	
Drain-Source Diode Forward Voltage	V_{SD}	$I_S=1.5\text{A}$, $V_{GS}=0\text{V}$		0.8	1.2	V	

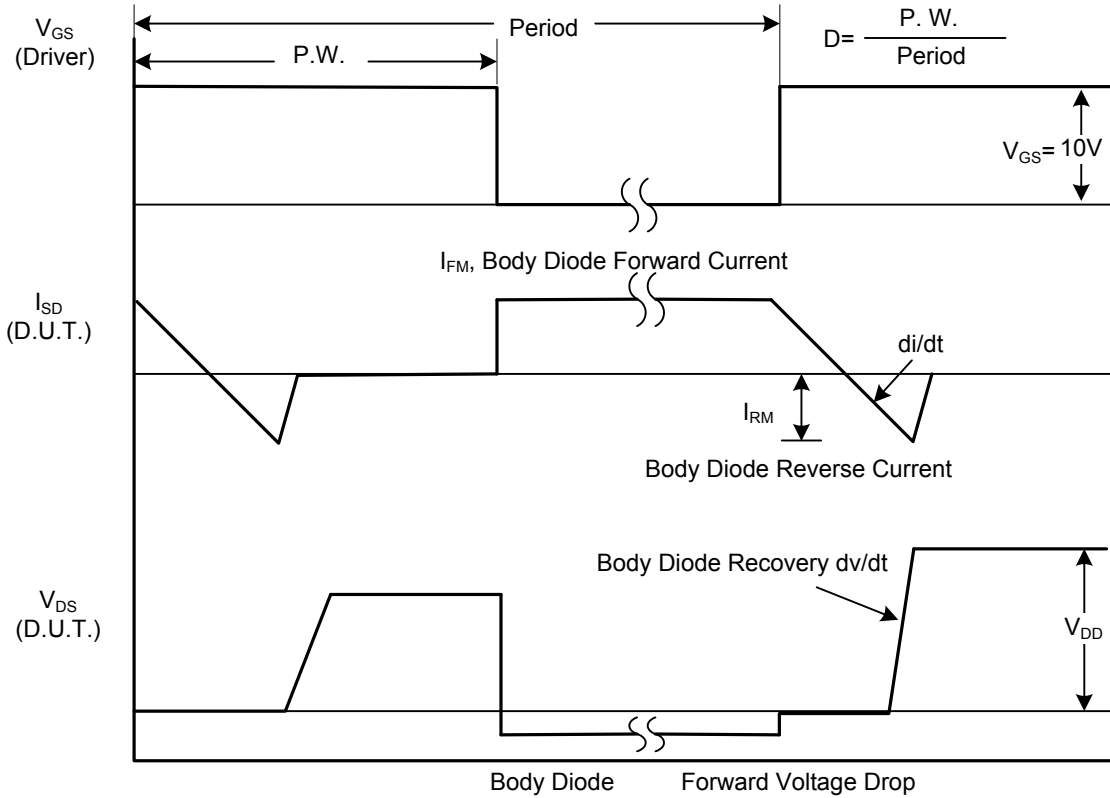
Note: 1. Pulse Test : Pulse width $\leq 300\mu\text{s}$, Duty cycle $\leq 2\%$.

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

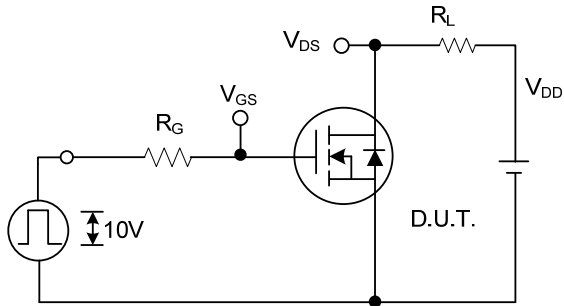


Peak Diode Recovery dv/dt Test Circuit

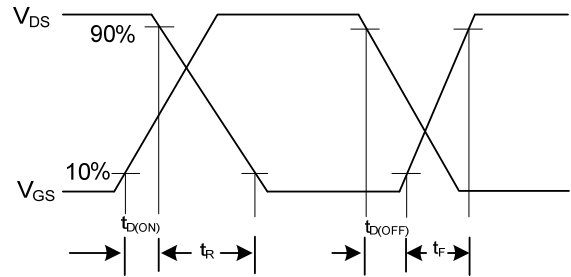


Peak Diode Recovery dv/dt Waveforms

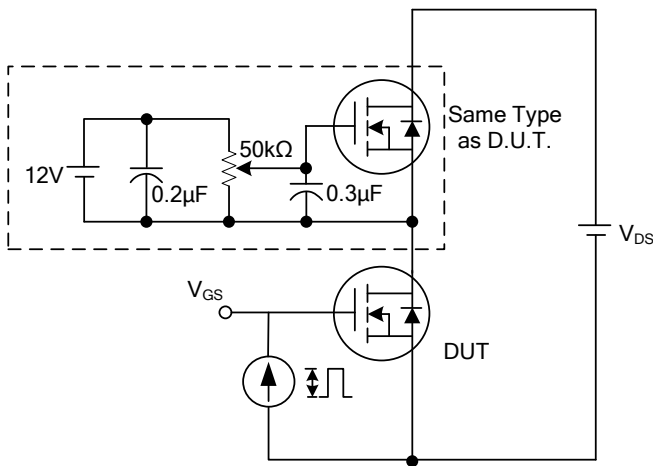
■ TEST CIRCUITS AND WAVEFORMS (Cont.)



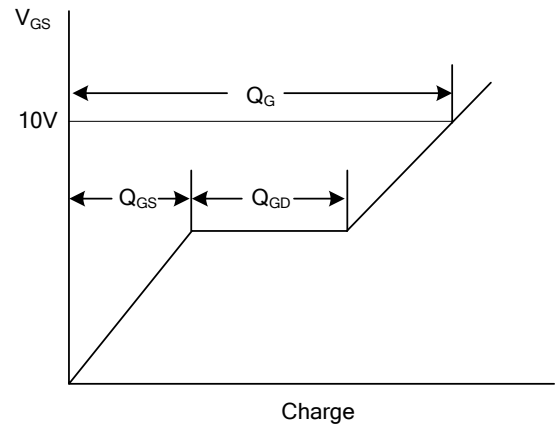
Switching Test Circuit



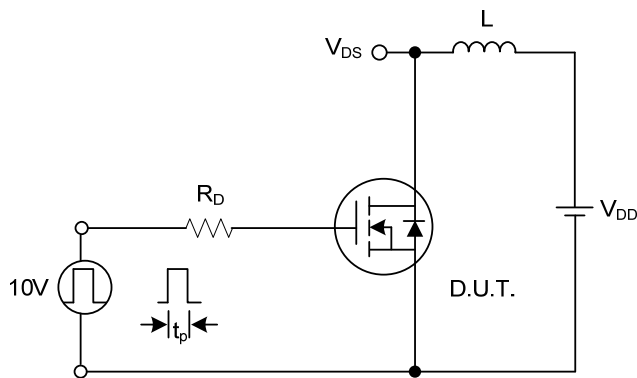
Switching Waveforms



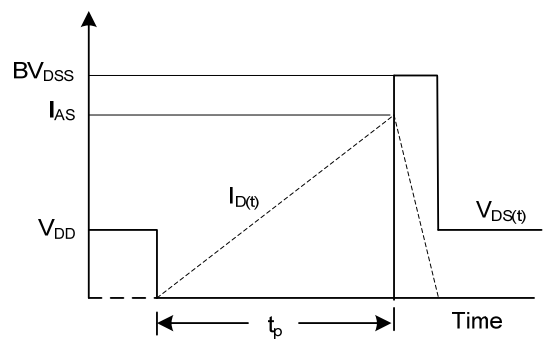
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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