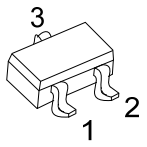
UT1D2P10M

Preliminary | ***Power MOSFET***

-1.2A, -100V P-CHANNEL ENHANCEMENT MODE



SOT-23-3
(JEDEC TO-236)

■ DESCRIPTION

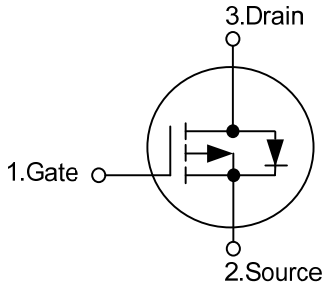
The UTC **UT1D2P10M** is P-Channel enhancement mode Power MOSFET, designed in serried ranks with fast switching speed, low on-resistance and favorable stabilization.

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

■ FEATURES

* $R_{DS(ON)} \leq 0.95\ \Omega$ @ V_{GS} = -10V, I_D = -0.6A
  $R_{DS(ON)} \leq 1.1\ \Omega$ @ V_{GS} = -4.5V, I_D = -0.6A
* High switching speed
* Low input capacitance

■ SYMBOL



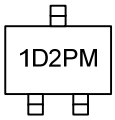
■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UT1D2P10ML-AE2-R	UT1D2P10MG-AE2-R	SOT-23-3	G	S	D	Tape Reel

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

UT1D2P10MG-AE2-R (1)Packing Type (2)Package Type (3)Green Package	(1) R: Tape Reel (2) AE2: SOT-23-3 (3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING



■ ABSOLUTE MAXIMUM RATINGS (T_A=25°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	I_D	-1.2	A
	Pulsed (Note 2)	I_{DM}	-3.6	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	2	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	3.3	V/ns
Power Dissipation		P_D	0.3	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 = 1mH, I_{AS} = -2A, V_{DD} = -70V, R_G = 25Ω, Starting T_J = 25°C
4. I_{SD} ≤ -1.2A, di/dt ≤ 200A/μs, V_{DD} ≤ BV_{DSS}, Starting T_J = 25°C

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	416	°C/W

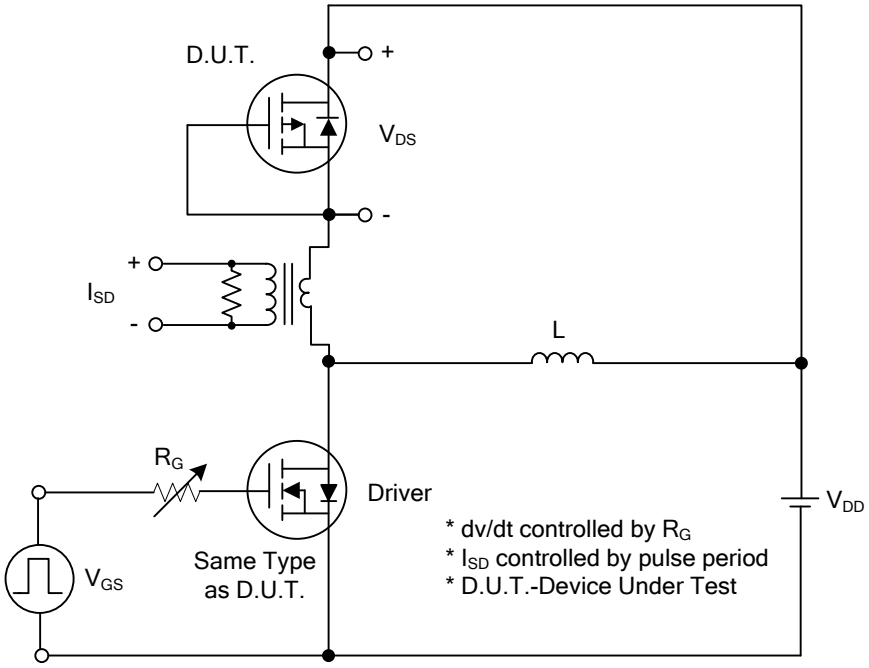
Note: Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.

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

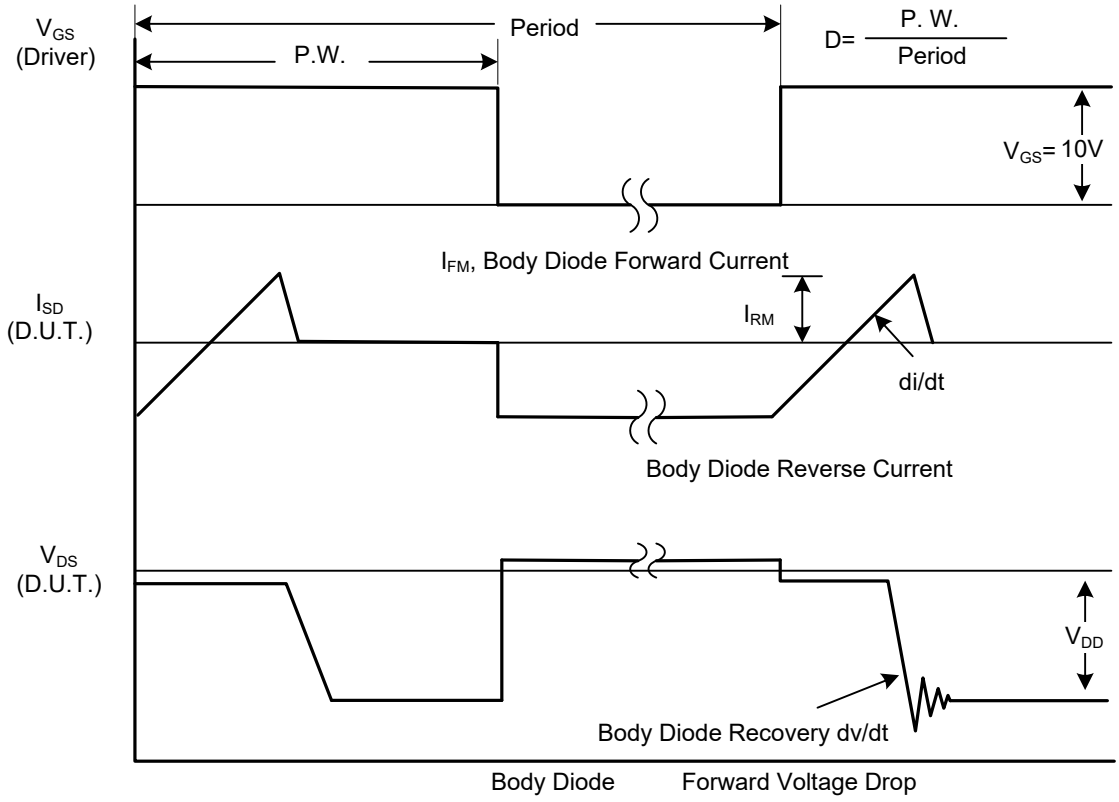
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V, I_D=-250μA	-100			V
Drain-Source Leakage Current	I_{DSS}	V_{DS}=-100V, V_{GS}=0V			-1	μA
Gate-Source Leakage Current	I_{GSS}	V_{GS}=±20V, V_{DS}=0V			±100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	V_{DS}=V_{GS}, I_D=-250μA	-1.0		-3	V
Drain-Source On-State Resistance (Note 1, 2)	$R_{DS(ON)}$	V_{GS}=-10V, I_D=-0.6A			0.95	Ω
		V_{GS}=-4.5V, I_D=-0.6A			1.1	Ω
DYNAMIC PARAMETERS						
Input Capacitance	C_{ISS}	V_{GS}=0V, V_{DS}=-25V, f=1.0MHz		338		pF
Output Capacitance	C_{OSS}			21		pF
Reverse Transfer Capacitance	C_{RSS}			13		pF
SWITCHING CHARACTERISTICS						
Total Gate Charge	Q_G	V_{DS}=-80V, V_{GS}=-10V, I_D=-1.2A (Note 1, 2)		12		nC
Gate-Source Charge	Q_{GS}			2		nC
Gate-Drain Charge	Q_{GD}			2		nC
Turn-ON Delay Time	$t_{D(ON)}$	V_{DS}=-50V, V_{GS}=-10V, I_D=-1.2A, R_G=3Ω (Note 1, 2)		5		ns
Turn-ON Rise Time	t_R			17		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			13		ns
Turn-OFF Fall Time	t_F			19		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Maximum Continuous Drain-Source Diode Forward Current (Note 1, 2)	I_S				-1.2	A
Diode Forward Voltage (Note 1)	V_{SD}	I_F=-1.2A, V_{GS}=0V			-1.4	V
Body Diode Reverse Recovery Time (Note 1)	t_{rr}	I_S=-1.2A, V_{GS}=0V, dI_F/dt =100A/μs		24		ns
Body Diode Reverse Recovery Charge	Q_{rr}			30		nC

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

■ TEST CIRCUITS AND WAVEFORMS

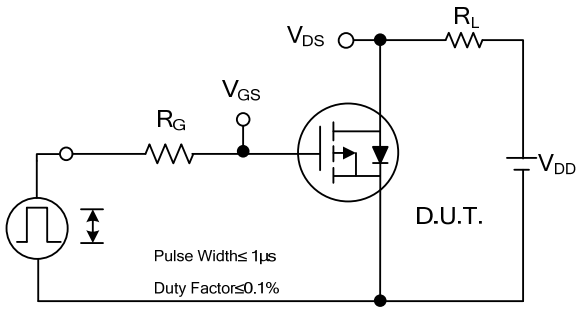


Peak Diode Recovery dv/dt Test Circuit

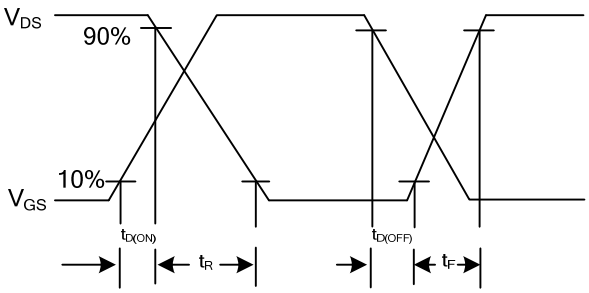


Peak Diode Recovery dv/dt Waveforms

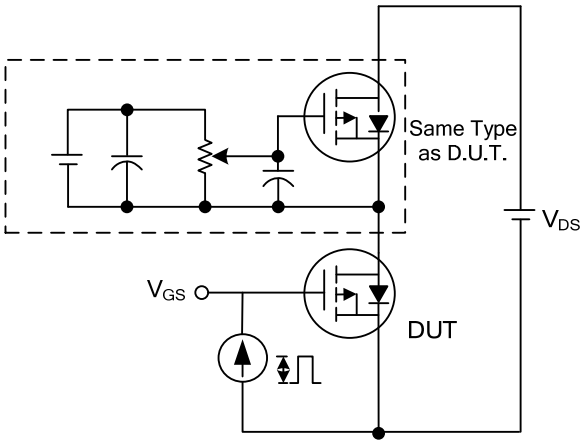
■ TEST CIRCUITS AND WAVEFORMS



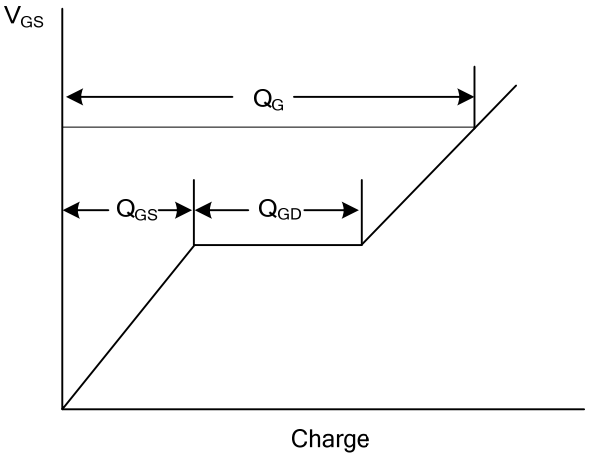
Switching Test Circuit



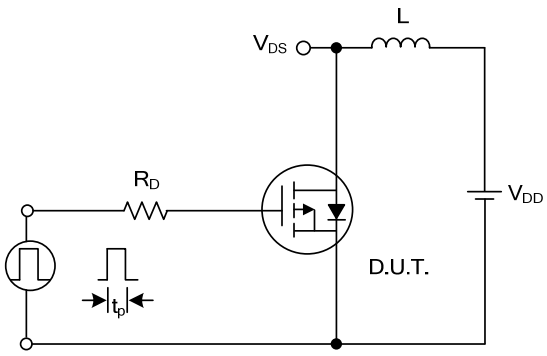
Switching Waveforms



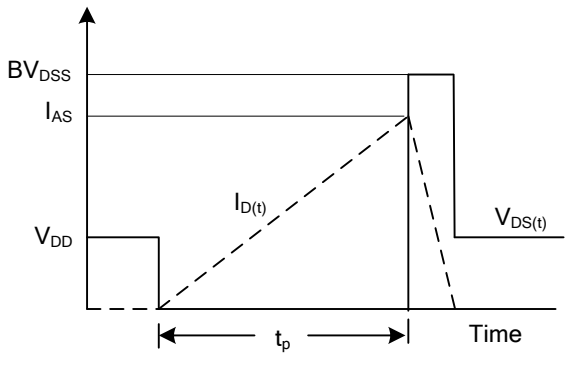
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms