



UT03R028M

Preliminary

POWER MOSFET

110A, 30V N-CHANNEL POWER MOSFET

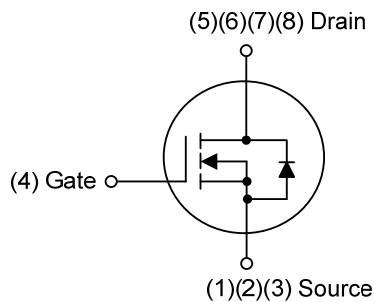
DESCRIPTION

The UTC **UT03R028M** uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications.

FEATURES

- * $R_{DS(ON)} \leq 2.8 \text{ m}\Omega$ @ $V_{GS}=10\text{V}$, $I_D=50\text{A}$
- * $R_{DS(ON)} \leq 3.4 \text{ m}\Omega$ @ $V_{GS}=4.5\text{V}$, $I_D=50\text{A}$
- * High density cell design for ultra low $R_{DS(ON)}$
- * Fully characterized avalanche voltage and current
- * Good stability and uniformity with high EAS
- * Excellent package for good heat dissipation

SYMBOL



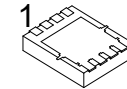
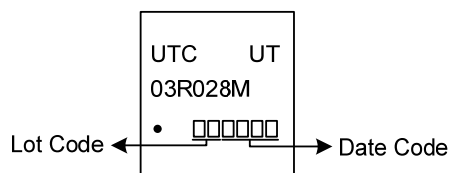
ORDERING INFORMATION

Ordering Number		Package	Pin Assignment								Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	
UT03R028ML-P5060-R	UT03R028MG-P5060-R	PDFN5×6	S	S	S	G	D	D	D	D	Tape Reel

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

UT03R028MG-P5060-R (1) Packing Type (2) Package Type (3) Green Package	(1) R: Tape Reel (2) P5060: PDFN5×6 (3) G: Halogen Free and Lead Free, L: Lead Free
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MARKING



PDFN5×6

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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DS}	30	V
Gate-Source Voltage		V_{GS}	± 20	V
Drain Current	DC	I_D	110	A
	Pulsed (Note 2)	I_{DM}	220	A
Avalanche Energy	Single Pulsed	E_{AS}	305	mJ
	(Note 3)			
Peak Diode Recovery dv/dt (Note 4)		dv/dt	0.8	V/ns
Power Dissipation		P_D	50	W
Junction Temperature		T_J	+150	$^{\circ}\text{C}$
Storage Temperature Range		T_{STG}	-28 ~ +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. $L = 0.1\text{mH}$, $I_{AS} = 77.8\text{A}$, $V_{DD} = 50\text{V}$, $R_G = 25\ \Omega$, Starting $T_J = 25^{\circ}\text{C}$

4. $I_{SD} \leq 30\text{A}$, $di/dt \leq 200\text{A}/\mu\text{s}$, $V_{DD} \leq V_{(BR)DS}$, $T_J = 25^{\circ}\text{C}$

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	110	$^{\circ}\text{C}/\text{W}$
Junction to Case	θ_{JC}	2.5	$^{\circ}\text{C}/\text{W}$

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

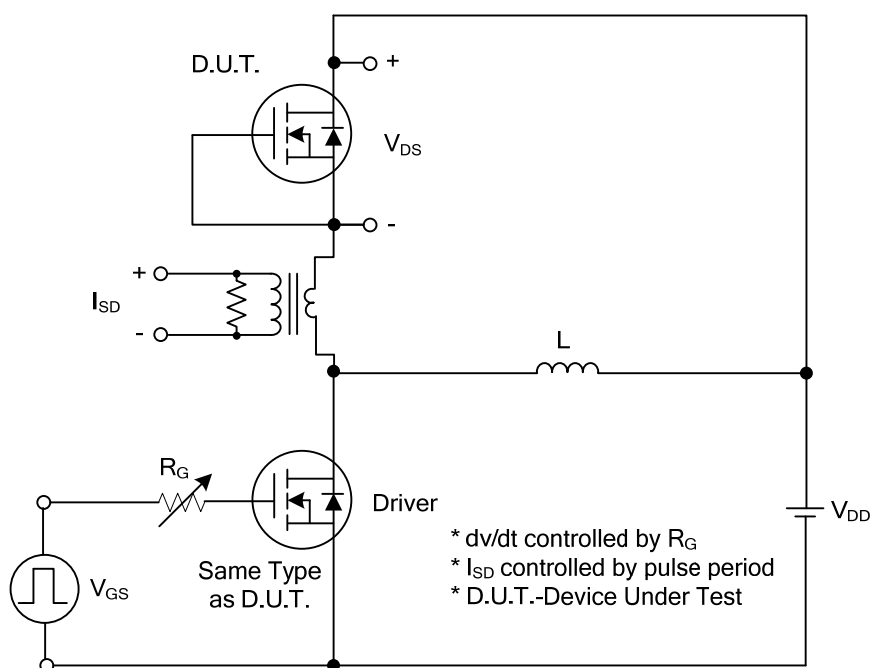
■ ELECTRICAL CHARACTERISTICS (T_A=25°C unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV _{DSS}	V _{GS} =0V, I _D =250μA	30			V
Drain-Source Leakage Current		I _{DSS}	V _{DS} =30V, V _{GS} =0V			1	μA
Gate-Source Leakage Current	Forward	I _{GSS}	V _{GS} =+20V, V _{DS} =0V			+100	nA
	Reverse		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		3.0	V
Static Drain-Source On-State Resistance		R _{DS(ON)}	V _{GS} =10V, I _D =50A			2.8	mΩ
			V _{GS} =4.5V, I _D =50A			3.4	mΩ
DYNAMIC PARAMETERS							
Input Capacitance		C _{ISS}	V _{GS} =0V, V _{DS} =25V, f=1.0MHz		4638		pF
Output Capacitance		C _{OSS}			808		pF
Reverse Transfer Capacitance		C _{RSS}			654		pF
SWITCHING PARAMETERS							
Total Gate Charge		Q _G	V _{DS} =24V, V _{GS} =10V, I _D =110A (Note 1, 2)		123		nC
Gate to Source Charge		Q _{GS}			9		nC
Gate to Drain Charge		Q _{GD}			41		nC
Turn-ON Delay Time		t _{D(ON)}	V _{DD} =15V, V _{GS} =10V, I _D =110A, R _G =3Ω (Note 1, 2)		10		ns
Rise Time		t _R			20		ns
Turn-OFF Delay Time		t _{D(OFF)}			109		ns
Fall-Time		t _F			89		ns
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Continuous Drain-Source Diode Forward Current		I _S				110	A
Diode Forward Voltage		V _{SD}	I _F =110A, V _{GS} =0V			1.4	V
Reverse Recovery Time (Note 1)		t _{rr}	I _S =30A, V _{GS} =0V,		304		nS
Reverse Recovery Charge		Q _{rr}	dl _F /dt =100A/μs		862		nC

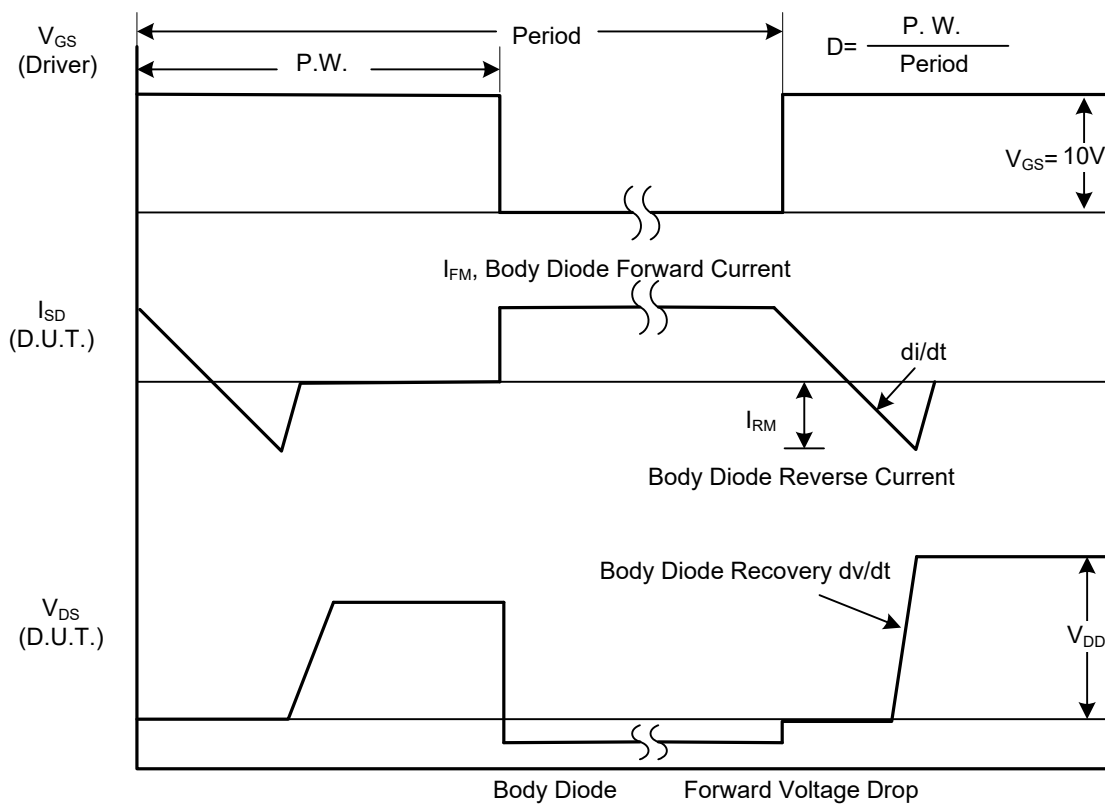
Notes: 1. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%.

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

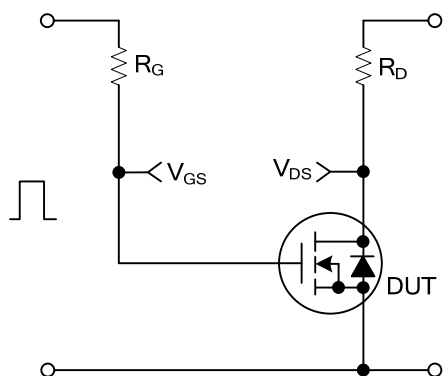


Peak Diode Recovery dv/dt Test Circuit

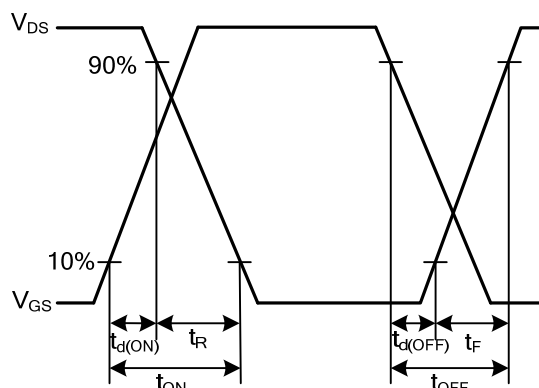


Peak Diode Recovery dv/dt Waveforms

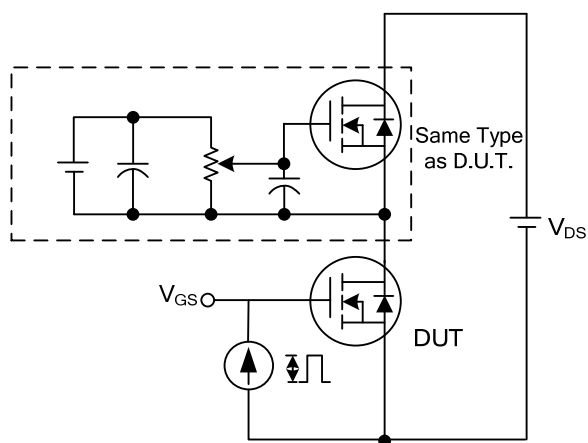
■ TEST CIRCUITS AND WAVEFORMS



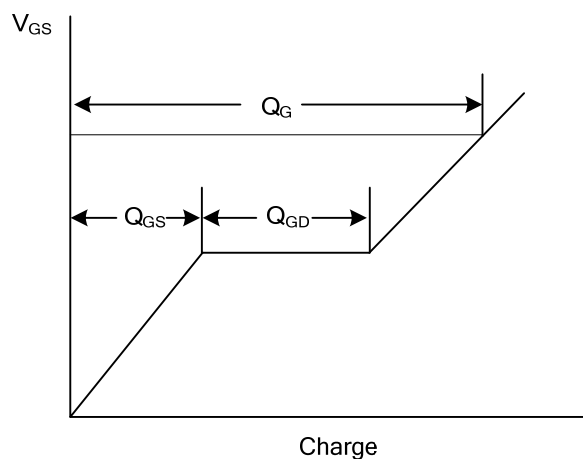
Switching Test Circuit



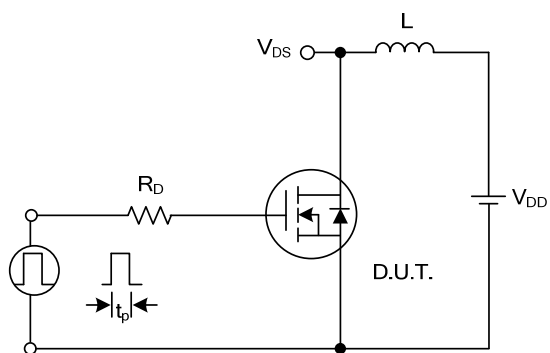
Switching Waveforms



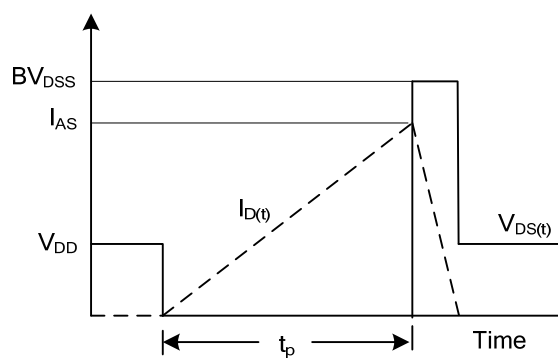
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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