

**UT58N025**

Preliminary

Power MOSFET

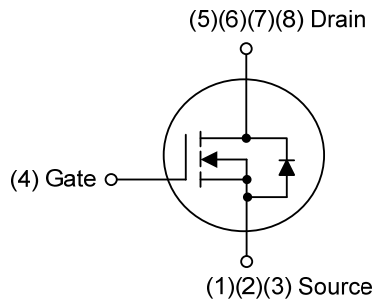
**58A, 25V N-CHANNEL
POWER MOSFET****DESCRIPTION**

The UTC **UT58N025** is a N-channel mode power MOSFET using UTC's advanced technology to provide customers with a minimum on-state resistance, low gate charge and high switching speed.

This power MOSFET is usually used at high speed switching applications in power supplies, PWM motor controls, high efficient AC to DC converters and bridge circuits.

FEATURES

- * $R_{DS(ON)} \leq 3.6 \text{ m}\Omega$ @ $V_{GS}=10\text{V}$, $I_D=30\text{A}$
- * $R_{DS(ON)} \leq 8.2 \text{ m}\Omega$ @ $V_{GS}=4.5\text{V}$, $I_D=30\text{A}$
- * Fast switching capability
- * Avalanche energy specified
- * Improved dv/dt capability, high ruggedness

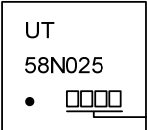
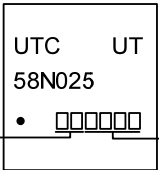
SYMBOL**ORDERING INFORMATION**

Ordering Number		Package	Pin Assignment								Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	
UT58N025L-P3030-R	UT58N025G-P3030-R	PDFN3×3	S	S	S	G	D	D	D	D	Tape Reel
UT58N025L-P5060-R	UT58N025G-P5060-R	PDFN5×6	S	S	S	G	D	D	D	D	Tape Reel

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

UT58N025G-P3030-R	(1) R: Tape Reel
(1)Packing Type	(2) P3030: PDFN3×3, P5060: PDFN5×6
(2)Package Type	(3) G: Halogen Free and Lead Free, L: Lead Free
(3)Green Package	

■ MARKING

PDFN3×3	PDFN5×6
 UT 58N025 • □□□□ → Date Code	 UTC UT 58N025 • □□□□□□ ← Lot Code → Date Code

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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DS}	25	V
Gate-Source Voltage		V_{GS}	± 20	V
Drain Current	Continuous	I_D	58	A
	Pulsed (Note 2)	I_{DM}	116	A
Avalanche energy	Single Pulsed (Note 3)	E_{AS}	144.5	mJ
Power Dissipation	PDFN3×3	P_D	36	W
	PDFN5×6		47	W
Junction Temperature		T_J	+150	$^{\circ}\text{C}$
Storage Temperature		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.

3. $L = 0.1\text{mH}$, $I_{AS} = 53.8\text{A}$, $V_{DD} = 25\text{V}$, $R_G = 25\Omega$, Starting $T_J = 25^{\circ}\text{C}$

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction-to-Ambient	PDFN3×3	θ_{JA}	75	$^{\circ}\text{C/W}$
	PDFN5×6		65	$^{\circ}\text{C/W}$
Junction-to-Case	PDFN3×3	θ_{JC}	3.47	$^{\circ}\text{C/W}$
	PDFN5×6		2.66	$^{\circ}\text{C/W}$

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

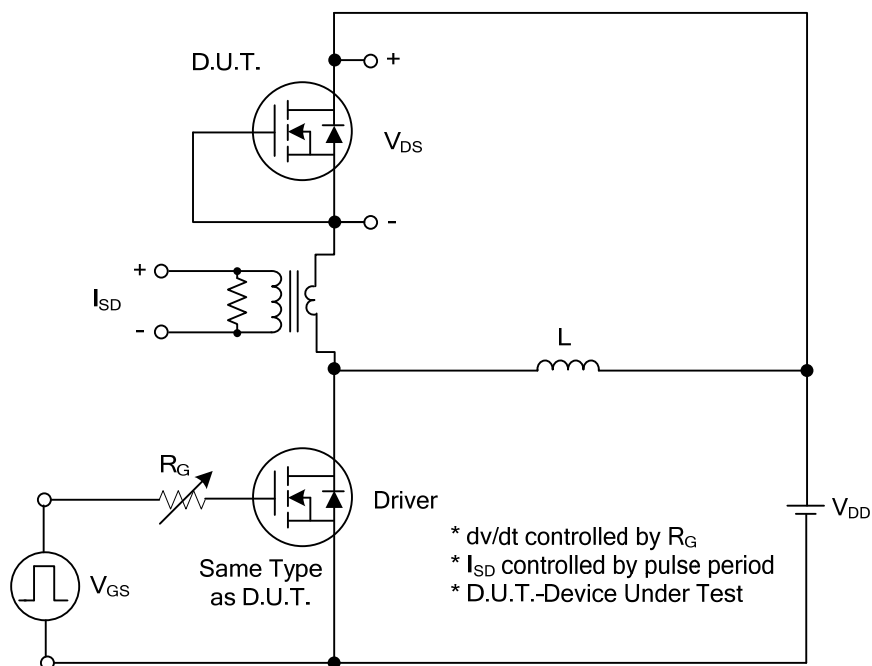
■ ELECTRICAL CHARACTERISTICS ($T_J=25^{\circ}\text{C}$, unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV _{DSS}	V _{GS} =0V, I _D =250μA	25			V
Drain-Source Leakage Current		I _{DSS}	V _{DS} =25V, 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 =30A			3.6	mΩ
			V _{GS} =4.5V, I _D =30A			8.2	mΩ
DYNAMIC CHARACTERISTICS							
Input Capacitance		C _{ISS}	V _{DS} =25V, V _{GS} =0V, f=1MHz		2229		pF
Output Capacitance		C _{OSS}			436		pF
Reverse Transfer Capacitance		C _{RSS}			343		pF
SWITCHING CHARACTERISTICS							
Total Gate Charge (Note 1)		Q _G	V _{DS} =20V, V _{GS} =10V, I _D =58A, (Note 1, 2)		57		nC
Gate to Source Charge		Q _{GS}			7		nC
Gate to Drain Charge		Q _{GD}			21		nC
Turn-ON Delay Time (Note 1)		t _{D (ON)}	V _{DD} =12.5V, V _{GS} =10V, I _D =58A, R _G =3Ω (Note 1, 2)		8		ns
Rise Time		t _R			14		ns
Turn-OFF Delay Time		t _{D (OFF)}			46		ns
Fall-Time		t _F			34		ns
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS							
Maximum Body-Diode Continuous Current		I _S				58	A
Maximum Body-Diode Pulsed Current (Note 1)		I _{SM}				116	A
Drain-Source Diode Forward Voltage (Note 1)		V _{SD}	I _S =58A, V _{GS} =0V			1.4	V

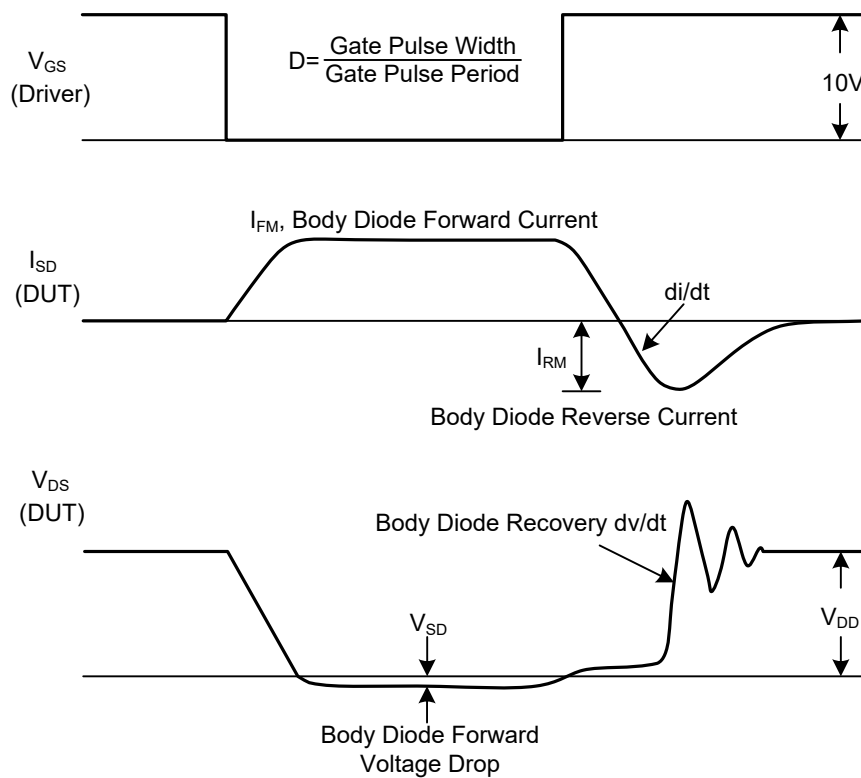
Notes: 1. Pulse Test: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2\%$.

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

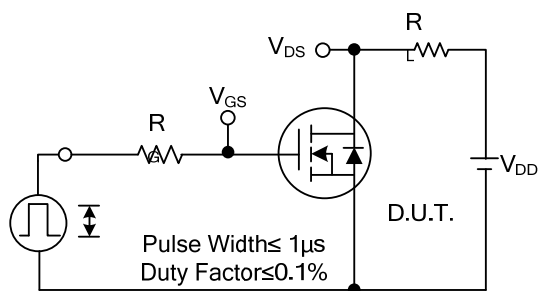


Peak Diode Recovery dv/dt Test Circuit

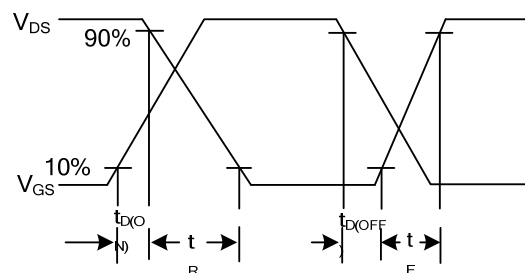


Peak Diode Recovery dv/dt Waveforms

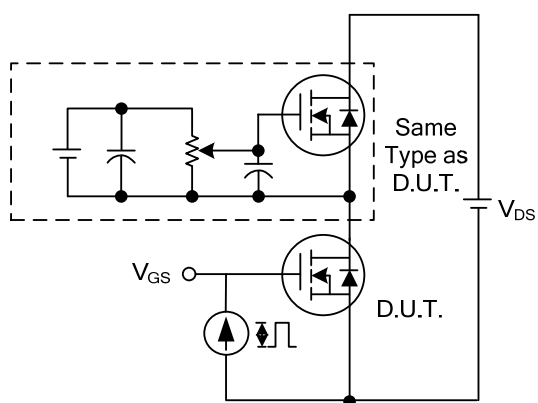
■ TEST CIRCUITS AND WAVEFORMS



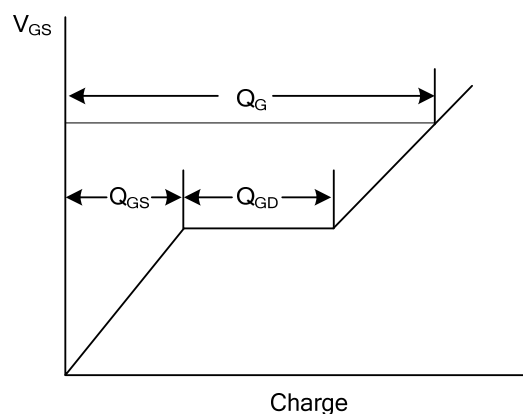
Switching Test Circuit



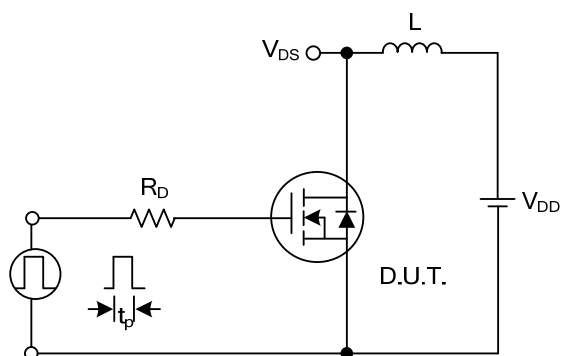
Switching Waveforms



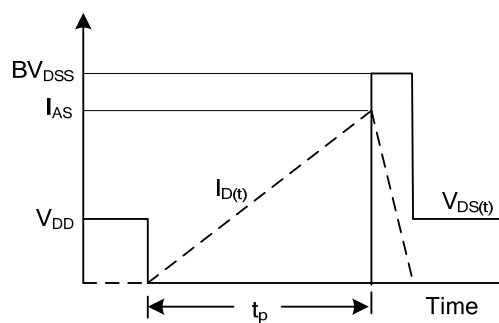
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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