



UT50P03

Preliminary

Power MOSFET

-50A, -30V P-CHANNEL ENHANCEMENT MODE

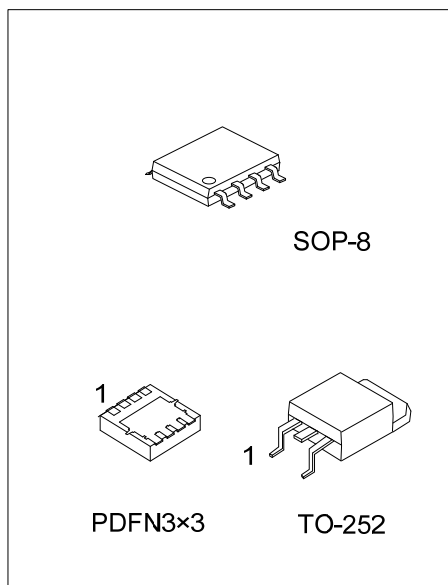
DESCRIPTION

The UTC **UT50P03** is P-Channel enhancement mode Power MOSFET, designed in serried ranks with fast switching speed, low on-resistance and favorable stabilization.

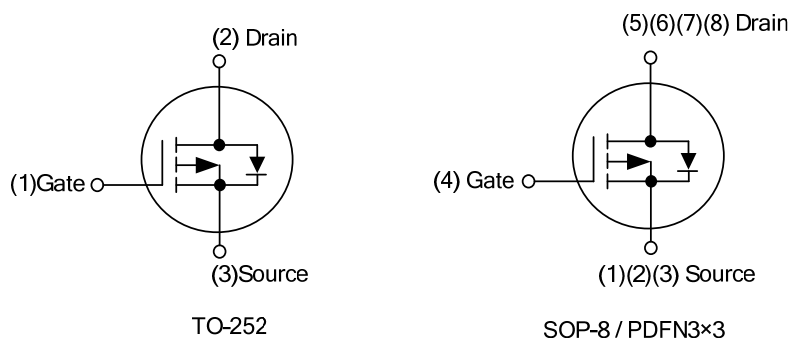
Used in commercial and industrial surface mount applications and suited for low voltage applications such as DC/DC converters.

FEATURES

- * $R_{DS(ON)} \leq 12 \text{ m}\Omega$ @ $V_{GS} = -10\text{V}$, $I_D = -25\text{A}$
- * $R_{DS(ON)} \leq 18 \text{ m}\Omega$ @ $V_{GS} = -4.5\text{V}$, $I_D = -25\text{A}$
- * Fast switching capability
- * Avalanche energy tested



SYMBOL



ORDERING INFORMATION

Ordering Number		Package	Pin Assignment								Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	
UT50P03L-TN3-R	UT50P03G-TN3-R	TO-252	G	D	S	-	-	-	-	-	Tape Reel
UT50P03L-S08-R	UT50P03G-S08-R	SOP-8	S	S	S	G	D	D	D	D	Tape Reel
UT50P03L-P3030-R	UT50P03G-P3030-R	PDFN3x3	S	S	S	G	D	D	D	D	Tape Reel

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

UT50P03G-TN3-R		(1) Packing Type	(1) R: Tape Reel
		(2) Package Type	(2) TN3: TO-252, S08: SOP-8, P3030: PDFN3x3
		(3) Green Package	(3) G: Halogen Free and Lead Free, L: Lead Free

MARKING

TO-252	SOP-8
UTC UT50P03 Lot Code 1 L: Lead Free G: Halogen Free Date Code	8765 UTC UT50P03 1234 Date Code L: Lead Free G: Halogen Free Lot Code
PDFN3×3	-
UT 50P03 Date Code	-

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

PARAMETER			SYMBOL	RATINGS	UNIT
Drain-Source Voltage			V _{DSS}	-30	V
Gate-Source Voltage			V _{GSS}	±20	V
Drain Current	Continuous	PDFN3×3	I _D	-50	A
		TO-252			
	Pulsed (Note 2)	SOP-8		-12	A
		PDFN3×3	I _{DM}	-100	A
TO-252					
	SOP-8		-48	A	
Avalanche Energy	Single Pulsed (Note 3)		E _{AS}	65	mJ
Power Dissipation	TO-252		P _D	48	W
	SOP-8			2	W
	PDFN3×3			30	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. $L = 0.1\text{mH}$, $I_{AS} = -36\text{A}$, $V_{DD} = -25\text{V}$, $R_G = 25\Omega$ Starting $T_J = 25^{\circ}\text{C}$

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-252	θ_{JA}	50	$^{\circ}\text{C/W}$
	SOP-8		90	$^{\circ}\text{C/W}$
	PDFN3×3		75	$^{\circ}\text{C/W}$
Junction to Case	TO-252	θ_{JC}	2.6	$^{\circ}\text{C/W}$
	SOP-8		62.5	$^{\circ}\text{C/W}$
	PDFN3×3		4.16	$^{\circ}\text{C/W}$

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

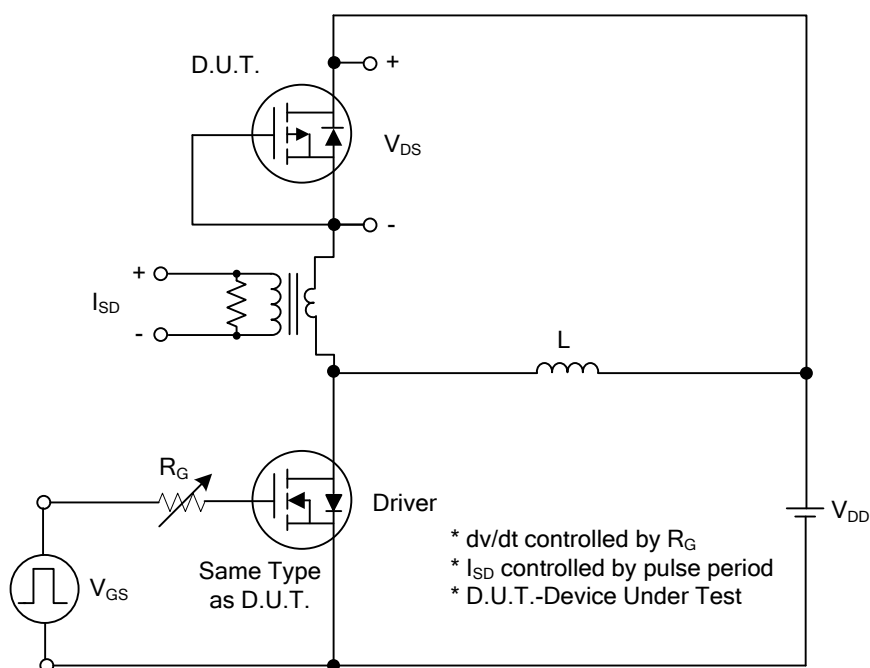
■ ELECTRICAL CHARACTERISTICS ($T_J=25^{\circ}\text{C}$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =-250Ma	-30			V
Drain-Source Leakage Current	I _{DSS}	V _{DS} =-30V, 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 =-250uA	-1.0		-3.0	V
Drain-Source On-State Resistance (Note 2)	R _{DS(ON)}	V _{GS} =-10V, I _D =-25A			12	mΩ
		V _{GS} =-4.5V, I _D =-25A			18	mΩ
DYNAMIC PARAMETERS						
Input Capacitance	C _{ISS}	V _{GS} =0V, V _{DS} =-15V, f=1.0MHz		3110		pF
Output Capacitance	C _{OSS}			450		pF
Reverse Transfer Capacitance	C _{RSS}			375		pF
SWITCHING CHARACTERISTICS						
Total Gate Charge (Note 2)	Q _G	V _{DS} =-24V, V _{GS} =-10V, I _D =-50A (Note 1, 2)		51		nC
Gate-Source Charge	Q _{GS}			7.2		nC
Gate-Drain Charge	Q _{GD}			12		nC
Turn-ON Delay Time (Note 2)	t _{D(ON)}	V _{DS} =-15V, V _{GS} =-10V, I _D =-50A, R _G =3Ω (Note 1, 2)		5.2		ns
Turn-ON Rise Time	t _R			4.8		ns
Turn-OFF Delay Time	t _{D(OFF)}			96		ns
Turn-OFF Fall Time	t _F			54		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Maximum Continuous Drain-Source Diode Forward Current	I _S				-50	A
Maximum Pulsed Drain-Source Diode Forward Current	I _{SM}				-100	A
Drain-Source Diode Forward Voltage (Note 1)	V _{SD}	I _S =-50A, V _{GS} =0V			-1.6	V

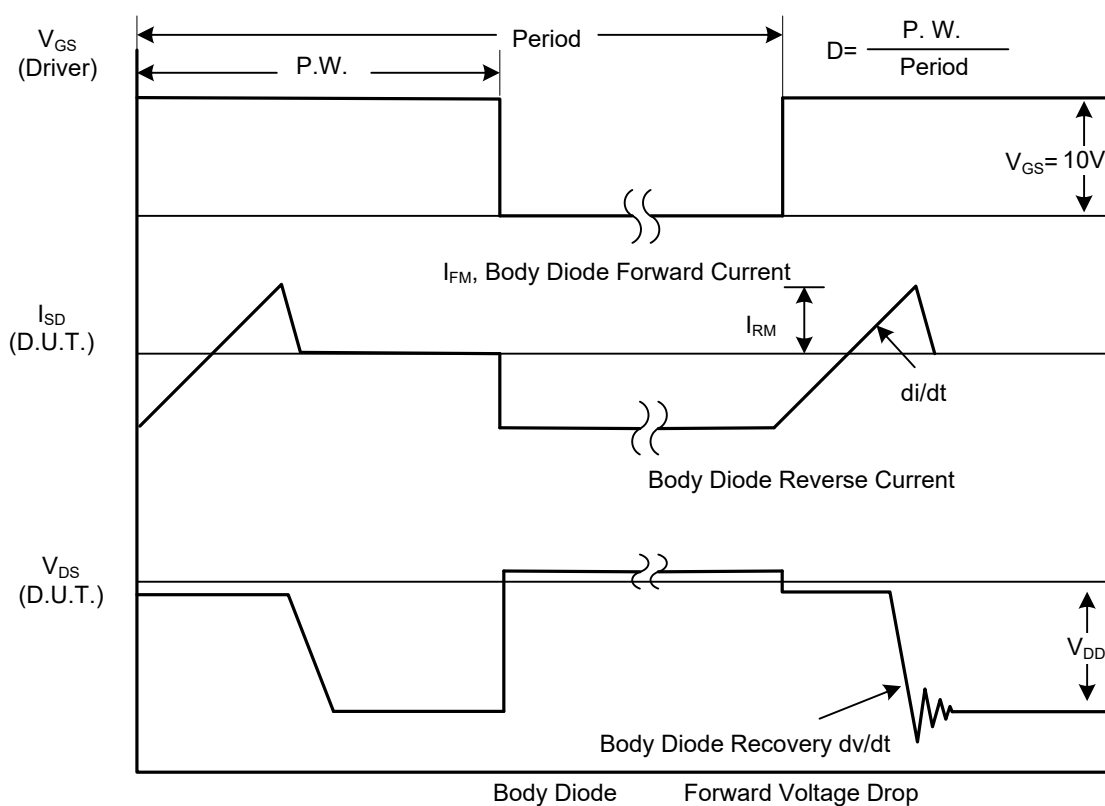
Notes: 1. Pulse Test: Pulse width $\leq 300\mu\text{s}$, Duty cycle $\leq 2\%$.

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

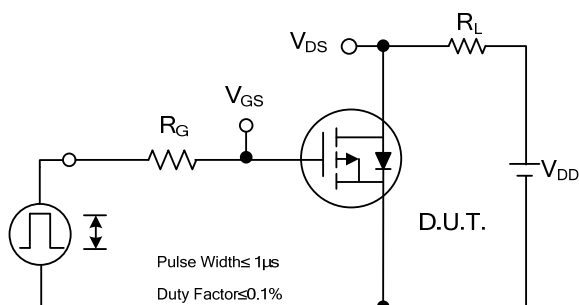


Peak Diode Recovery dv/dt Test Circuit

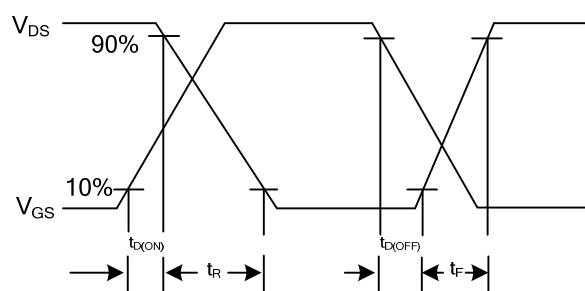


Peak Diode Recovery dv/dt Waveforms

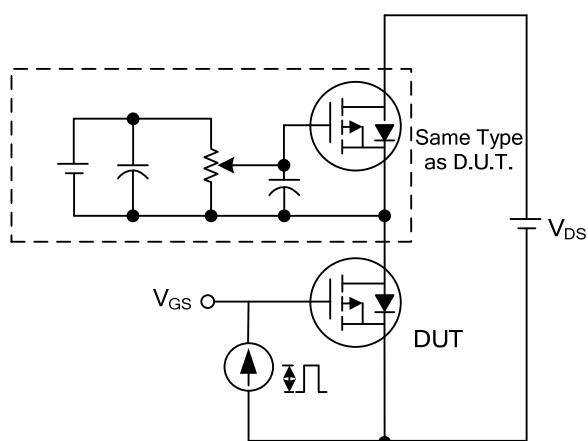
■ TEST CIRCUITS AND WAVEFORMS



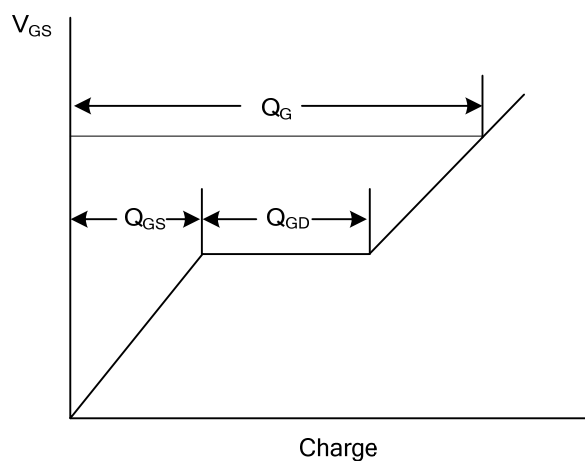
Switching Test Circuit



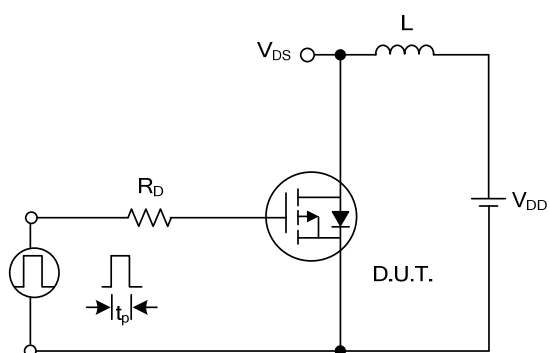
Switching Waveforms



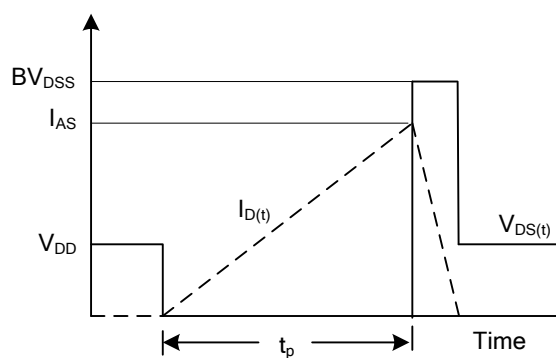
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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