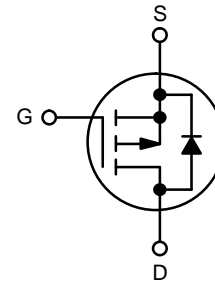


Description

This P-Channel enhancement mode power MOSFET is produced using planar stripe and DMOS technology. This advanced MOSFET technology has been especially tailored to reduce on-state resistance, and to provide superior switching performance and high avalanche energy strength. These devices are suitable for switched mode power supplies, audio amplifier, DC motor control, and variable switching power applications.



P-Channel MOSFET

Features

- $V_{DS} (V) = -60V$
- $R_{DS(on)} = 26 \text{ m}\Omega (V_{GS} = -10V)$
- $I_D = -47A$
- Low Gate Charge (Typ. 84 nC)
- Low Crss (Typ. 320 pF)
- 100% Avalanche Tested
- 175°C Maximum Junction Temperature Rating

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

Symbol	Parameter	FQP47P06	Unit
V_{DSS}	Drain-Source Voltage	-60	V
I_D	Drain Current	- Continuous ($T_C = 25^\circ\text{C}$)	-47
		- Continuous ($T_C = 100^\circ\text{C}$)	-33.2
I_{DM}	Drain Current (Note 1)	- Pulsed	-188
V_{GSS}	Gate-Source Voltage	± 25	V
E_{AS}	Single Pulsed Avalanche Energy (Note 2)	820	mJ
I_{AR}	Avalanche Current (Note 1)	-47	A
E_{AR}	Repetitive Avalanche Energy (Note 1)	16	mJ
dv/dt	Peak Diode Recovery dv/dt (Note 3)	-7.0	V/ns
P_D	Power Dissipation ($T_C = 25^\circ\text{C}$)		160
		- Derate above 25°C	1.06
T_J, T_{STG}	Operating and Storage Temperature Range	-55 to +175	°C
T_L	Maximum Lead Temperature for Soldering Purposes, 1/8" from Case for 5 Seconds	300	°C

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

1. Repetitive Rating : Pulse width limited by maximum junction temperature
2. $L = 0.43 \text{ mH}$, $I_{AS} = -47 \text{ A}$, $V_{DD} = -25 \text{ V}$, $R_G = 25 \Omega$, Starting $T_J = 25^\circ\text{C}$
3. $I_{SD} \leq -47 \text{ A}$, $di/dt \leq 300 \text{ A}/\mu\text{s}$, $V_{DD} \leq BV_{DSS}$, Starting $T_J = 25^\circ\text{C}$

THERMAL CHARACTERISTICS

Symbol	Characteristic	FQP47P06	Unit
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case, Max.	0.94	°C/W
$R_{\theta CS}$	Thermal Resistance, Case-to-Sink, Typ.	0.5	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient, Max.	62.5	°C/W

ELECTRICAL CHARACTERISTICS ($T_C = 25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Test Condition	Min	Typ	Max	Unit
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OFF CHARACTERISTICS

BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS} = 0\text{ V}, I_D = -250\ \mu\text{A}$	-60			V
$\Delta BV_{DSS} / \Delta T_J$	Breakdown Voltage Temperature Coefficient	$I_D = -250\ \mu\text{A}$, Referenced to 25°C		-0.06		$\text{V}/^\circ\text{C}$
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = -60\text{ V}, V_{GS} = 0\text{ V}$			-1	μA
		$V_{DS} = -48\text{ V}, T_C = 150^\circ\text{C}$			-10	μA
I_{GSSF}	Gate-Body Leakage Current, Forward	$V_{GS} = -25\text{ V}, V_{DS} = 0\text{ V}$			-100	nA
I_{GSSR}	Gate-Body Leakage Current, Reverse	$V_{GS} = 25\text{ V}, V_{DS} = 0\text{ V}$			100	nA

ON CHARACTERISTICS

$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = -250\ \mu\text{A}$	-1.1	-1.8	-2.5	V
$R_{DS(on)}$	Static Drain-Source On-Resistance	$V_{GS} = -10\text{ V}, I_D = -23.5\text{ A}$		21	26	$\text{m}\Omega$
g_{FS}	Forward Transconductance	$V_{DS} = -30\text{ V}, I_D = -23.5\text{ A}$ (Note 4)		21		S

DYNAMIC CHARACTERISTICS

C_{iss}	Input Capacitance	$V_{DS} = -25\text{ V}, V_{GS} = 0\text{ V}, f = 1.0\text{ MHz}$		2800	3600	pF
C_{oss}	Output Capacitance			1300	1700	pF
C_{rss}	Reverse Transfer Capacitance			320	420	pF

SWITCHING CHARACTERISTICS

$t_{d(on)}$	Turn-On Delay Time	$V_{DD} = -30\text{ V}, I_D = -23.5\text{ A}, R_G = 25\ \Omega$ (Note 4, 5)		50	110	ns
t_r	Turn-On Rise Time			450	910	ns
$t_{d(off)}$	Turn-Off Delay Time			100	210	ns
t_f	Turn-Off Fall Time			195	400	ns
Q_g	Total Gate Charge	$V_{DS} = -48\text{ V}, I_D = -47\text{ A}, V_{GS} = -10\text{ V}$ (Note 4, 5)		84	110	nC
Q_{gs}	Gate-Source Charge			18		nC
Q_{gd}	Gate-Drain Charge			44		nC

DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATING

I_S	Maximum Continuous Drain-Source Diode Forward Current			-47	A
I_{SM}	Maximum Pulsed Drain-Source Diode Forward Current			-188	A
V_{SD}	Drain-Source Diode Forward Voltage	$V_{GS} = 0\text{ V}, I_S = -47\text{ A}$		-4.0	V
t_{rr}	Reverse Recovery Time	$V_{GS} = 0\text{ V}, I_S = -47\text{ A},$ $dI_F / dt = 100\text{ A}/\mu\text{s}$ (Note 4)		130	ns
Q_{rr}	Reverse Recovery Charge			0.55	μC

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

4. Pulse Test: Pulse width $\leq 300\ \mu\text{s}$, Duty cycle $\leq 2\%$
5. Essentially independent of operating temperature

TYPICAL CHARACTERISTICS

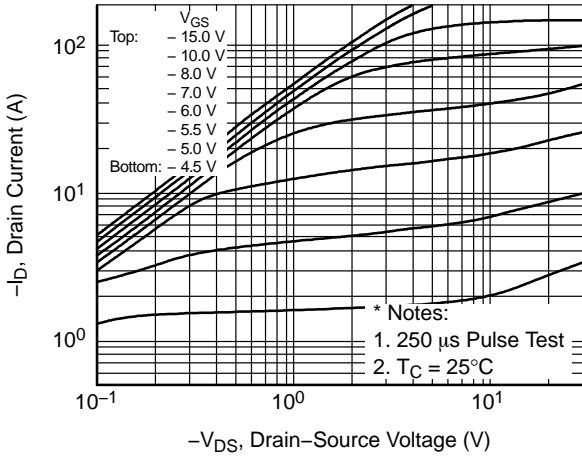


Figure 1. On-Region Characteristics

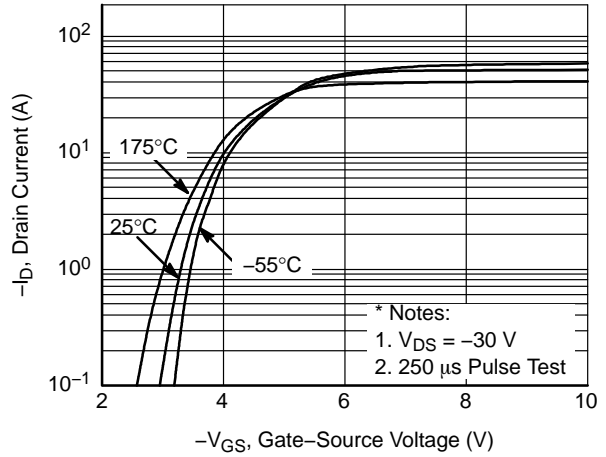


Figure 2. Transfer Characteristics

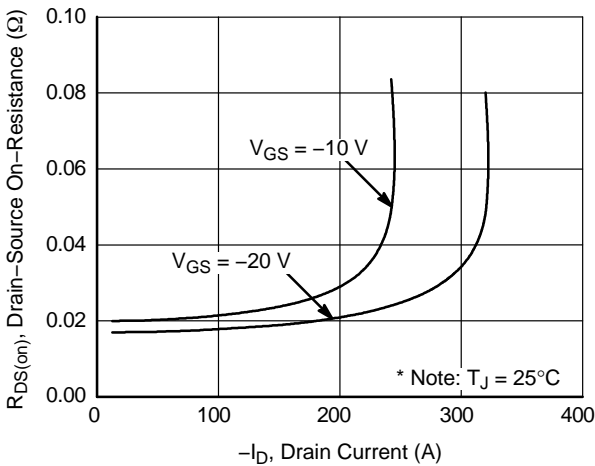


Figure 3. On-Resistance Variation vs. Drain Current and Gate Voltage

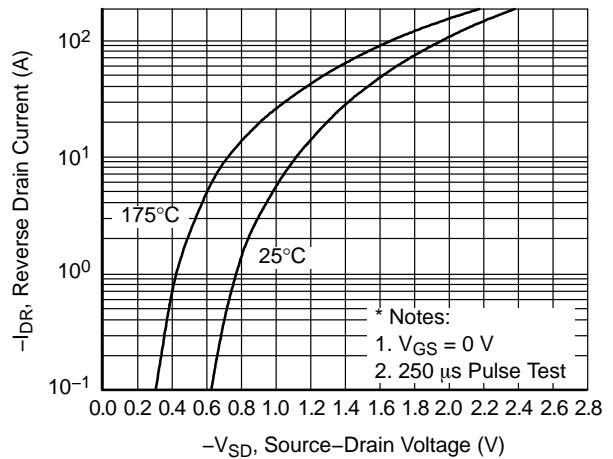


Figure 4. Body Diode Forward Voltage Variation vs. Source Current and Temperature

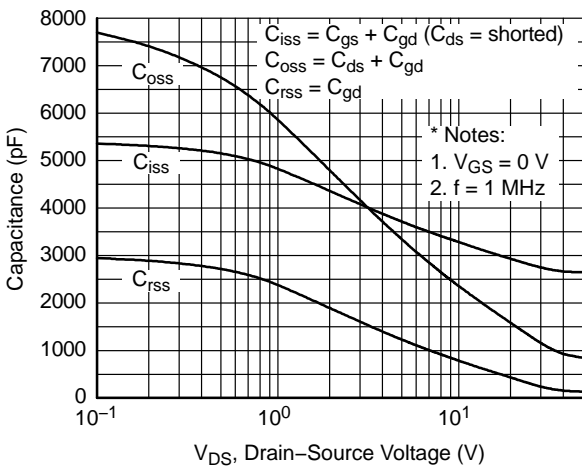


Figure 5. Capacitance Characteristics

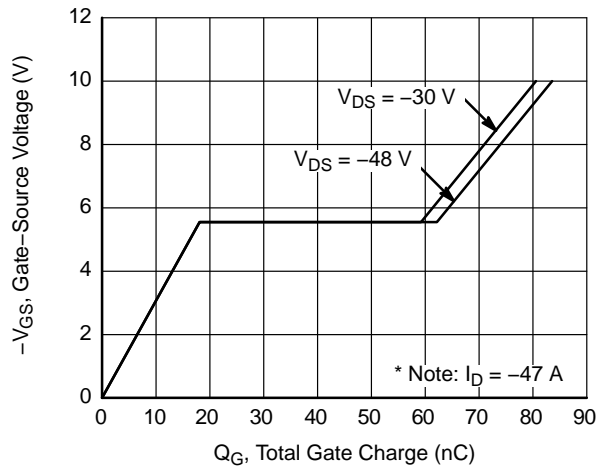


Figure 6. Gate Charge Characteristics

TYPICAL CHARACTERISTICS (Continued)

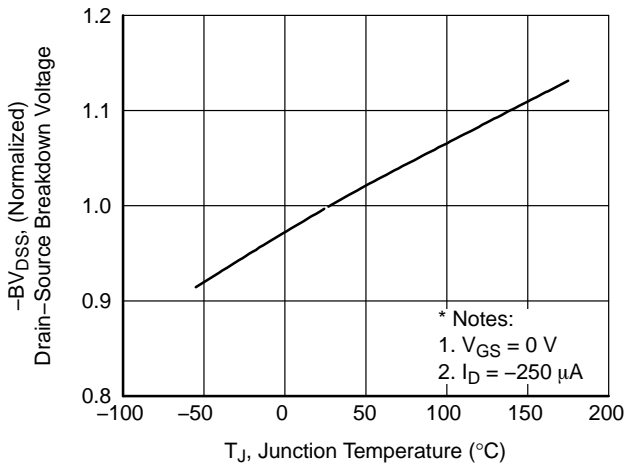


Figure 7. Breakdown Voltage Variation vs. Temperature

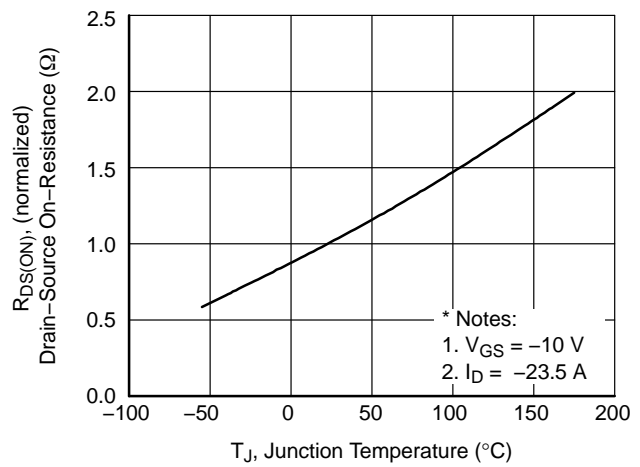


Figure 8. On-Resistance Variation vs. Temperature

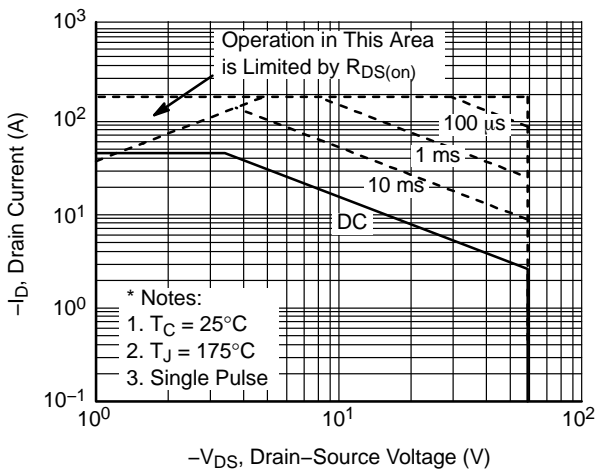


Figure 9. Maximum Safe Operating Area

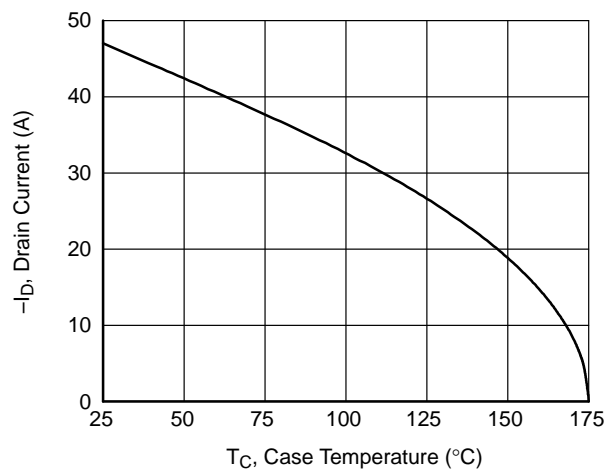


Figure 10. Maximum Drain Current vs. Case Temperature

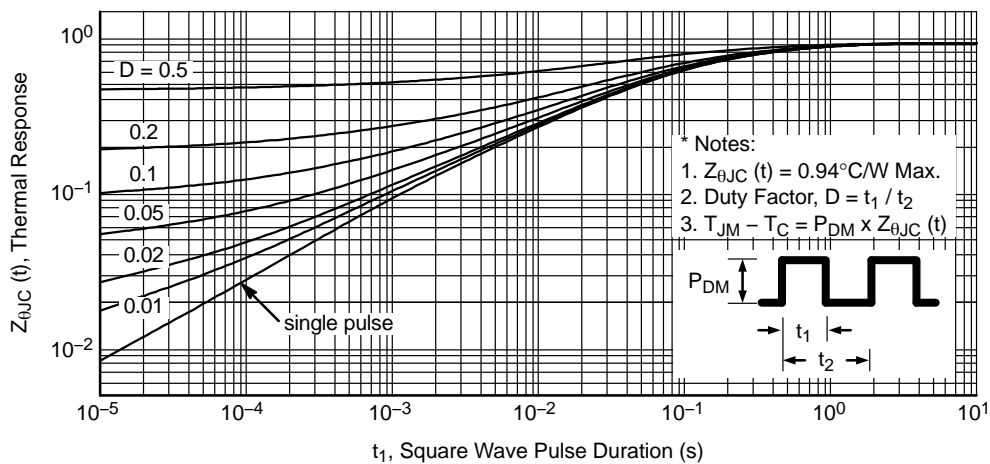


Figure 11. Transient Thermal Response Curve

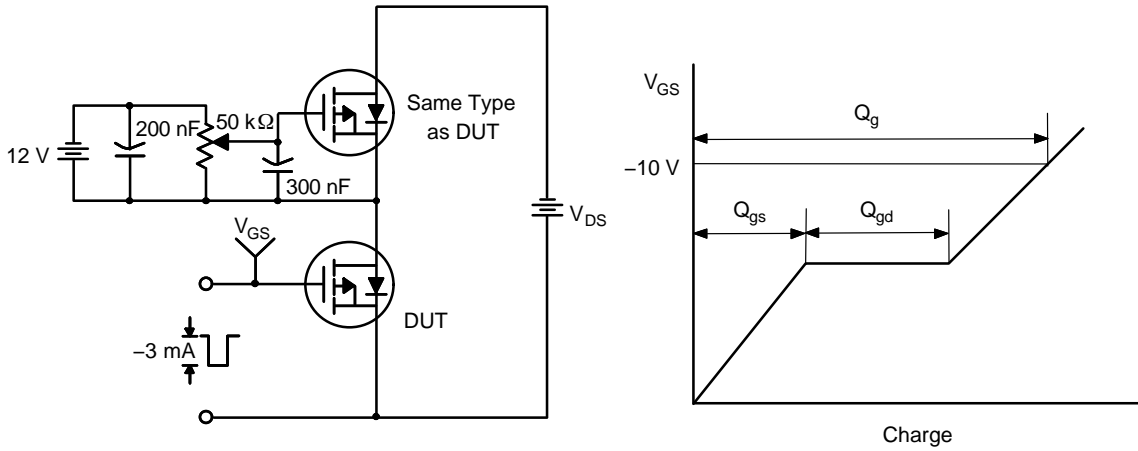


Figure 12. Gate Charge Test Circuit & Waveform

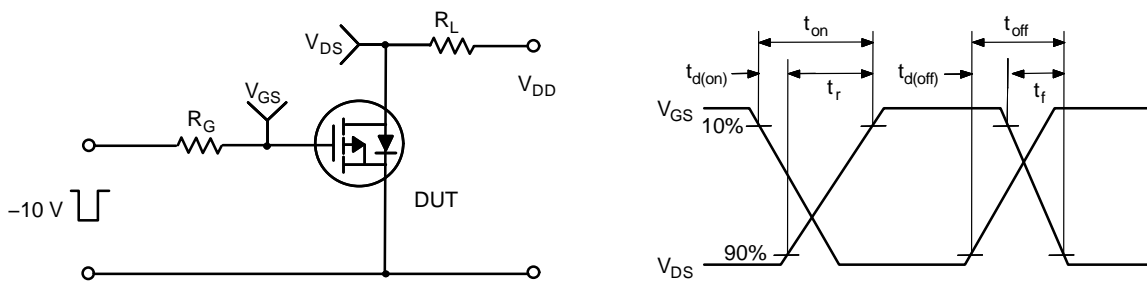


Figure 13. Resistive Switching Test Circuit & Waveforms

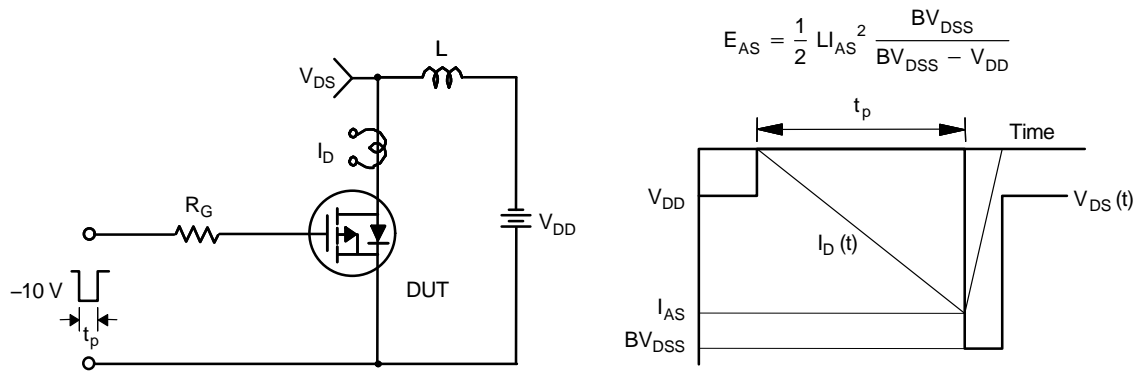


Figure 14. Unclamped Inductive Switching Test Circuit & Waveforms

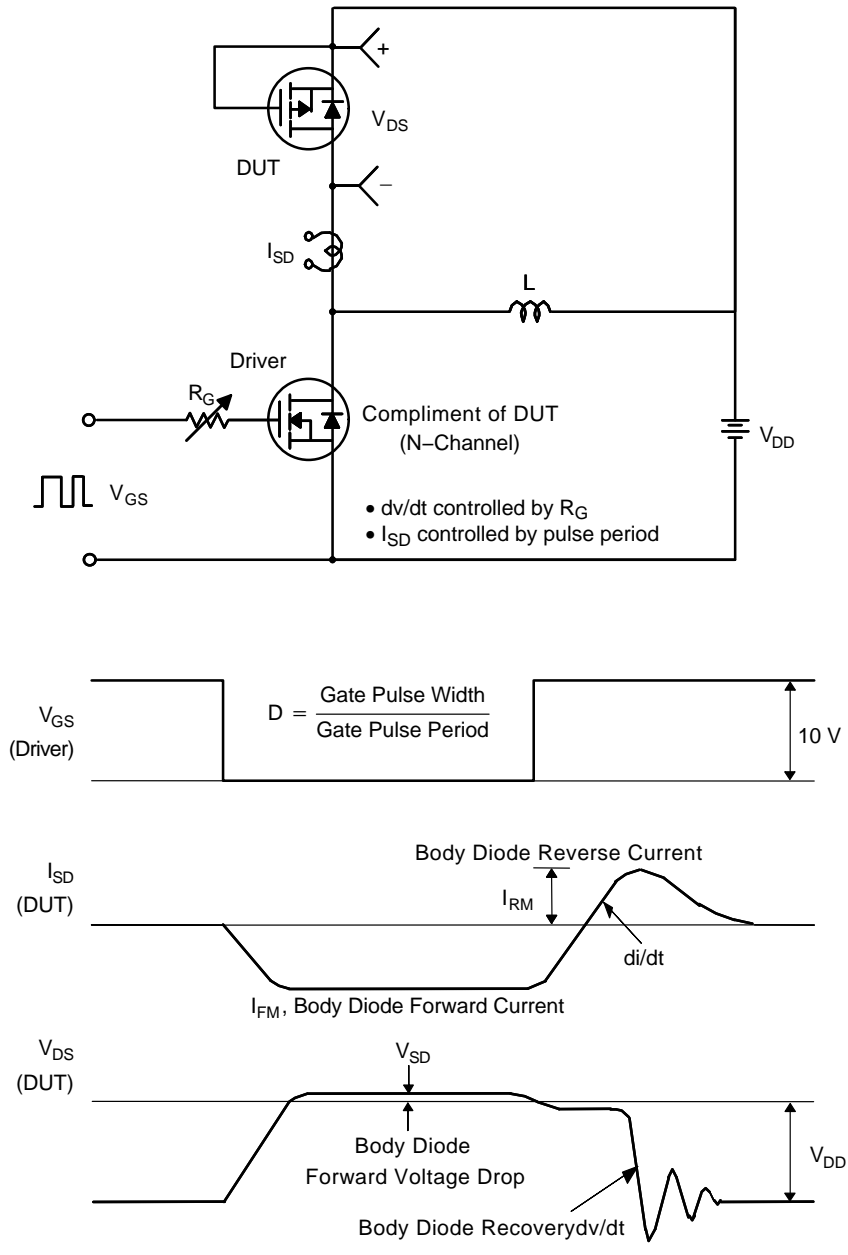
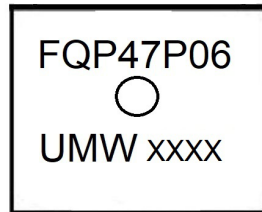


Figure 15. Peak Diode Recovery dv/dt Test Circuit & Waveforms

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Marking



Ordering information

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