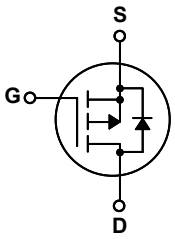
-60V P-Channel MOSFET

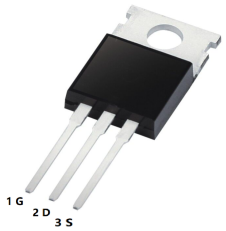
Description

These devices are suitable for switched mode power supplies, audio amplifier, DC motor control, and variable switching power applications.



Features

- V_{DS} (V) =-60V
- I_D = -13.5A (V_{GS} = -10V)
- $R_{DS(ON)}$ < 70mΩ (V_{GS} = -10V)



Absolute Maximum Ratings

T_C = 25°C unless otherwise noted

Symbol	Parameter			FQP27P06	Unit
V_{DSS}	Drain-Source Voltage			-60	V
I_D	Drain Current	- Continuous (T_C = 25°C)		-27	A
		- Continuous (T_C = 100°C)		-19.1	A
I_{DM}	Drain Current	- Pulsed	(Note 1)	-108	A
V_{GSS}	Gate-Source Voltage			± 25	V
E_{AS}	Single Pulsed Avalanche Energy		(Note 2)	560	mJ
I_{AR}	Avalanche Current		(Note 1)	-27	A
E_{AR}	Repetitive Avalanche Energy		(Note 1)	12	mJ
dv/dt	Peak Diode Recovery dv/dt		(Note 3)	-7.0	V/ns
P_D	Power Dissipation (T_C = 25°C)			120	W
	- Derate above 25°C			0.8	W/°C
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

Thermal Characteristics

Symbol	Parameter	FQP27P06	Unit
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case, Max.	1.25	°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

Elerical Characteristics

T_C = 25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
Off Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS} = 0 V, I_D = -250 μA	-60			V
ΔBV_{DSS} / ΔT_J	Breakdown Voltage Temperature Coefficient	I_D = -250 μA, Referenced to 25°C		-0.06		V/°C
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = -60 V, V_{GS} = 0 V			-1	μA
		V_{DS} = -48 V, T_C = 150°C			-10	μA
I_{GSSF}	Gate-Body Leakage Current, Forward	V_{GS} = -25 V, V_{DS} = 0 V			-100	nA
I_{GSSR}	Gate-Body Leakage Current, Reverse	V_{GS} = 25 V, V_{DS} = 0 V			100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = -250 μA	-1.1	-2	-3.0	V
$R_{DS(on)}$	Static Drain-Source On-Resistance	V_{GS} = -10 V, I_D = -13.5 A		55	70	mΩ
g_{FS}	Forward Transconductance	V_{DS} = -30 V, I_D = -13.5 A		12.4		S
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS} = -25 V, V_{GS} = 0 V, f = 1.0 MHz		1100	1400	pF
C_{oss}	Output Capacitance			510	660	pF
C_{rss}	Reverse Transfer Capacitance			120	155	pF
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	V_{DD} = -30 V, I_D = -13.5 A, R_G = 25 Ω (Note 4)		18	45	ns
t_r	Turn-On Rise Time			185	380	ns
$t_{d(off)}$	Turn-Off Delay Time			30	70	ns
t_f	Turn-Off Fall Time			90	190	ns
Q_g	Total Gate Charge	V_{DS} = -48 V, I_D = -27 A, V_{GS} = -10 V (Note 4)		33	43	nC
Q_{gs}	Gate-Source Charge			6.8		nC
Q_{gd}	Gate-Drain Charge			18		nC
Drain-Source Diode Characteristics and Maximum Ratings						
I_S	Maximum Continuous Drain-Source Diode Forward Current				-27	A
I_{SM}	Maximum Pulsed Drain-Source Diode Forward Current				-108	A
V_{SD}	Drain-Source Diode Forward Voltage	V_{GS} = 0 V, I_S = -27 A			-4.0	V
t_{rr}	Reverse Recovery Time	V_{GS} = 0 V, I_S = -27 A, dI_F / dt = 100 A/μs		105		ns
Q_{rr}	Reverse Recovery Charge			0.41		μC

Notes:
1. Repetitive Rating : Pulse width limited by maximum junction temperature
2. L = 0.9mH, I_{AS} = -27A, V_{DD} = -25V, R_G = 25 Ω, Starting T_J = 25°C
3. I_{SD} ≤ -27A, di/dt ≤ 300A/μs, V_{DD} ≤ BV_{DSS}, Starting T_J = 25°C
4. Essentially independent of operating temperature

Typical Characteristics

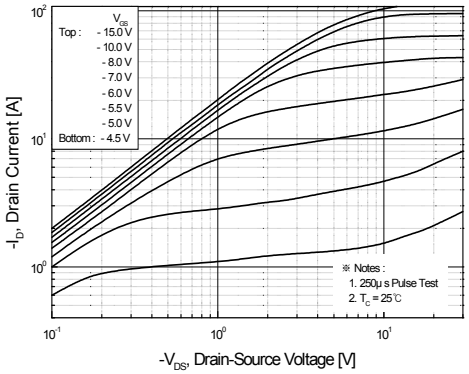


Figure 1. On-Region Characteristics

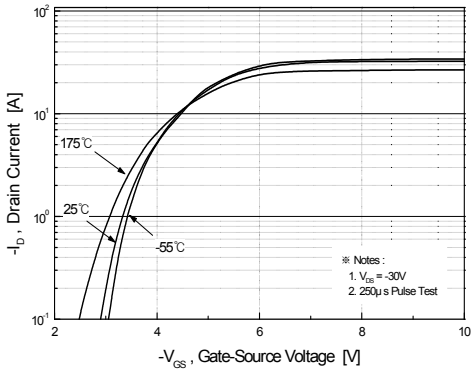


Figure 2. Transfer Characteristics

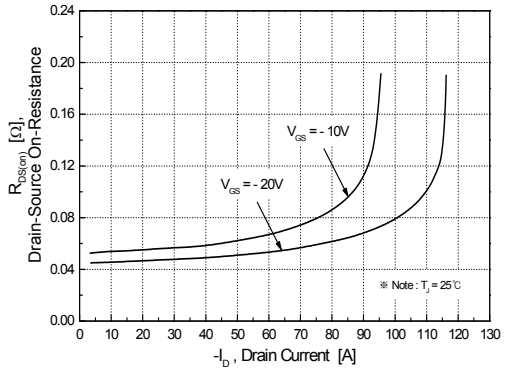


Figure 3. On-Resistance Variation vs. Drain Current and Gate Voltage

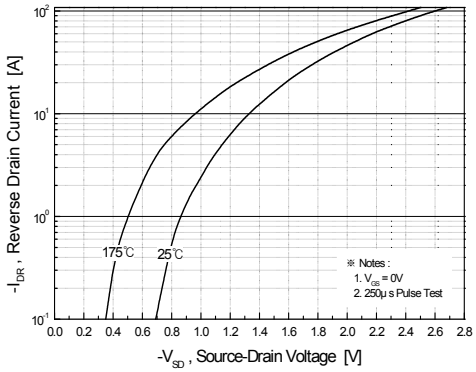


Figure 4. Body Diode Forward Voltage Variation vs. Source Current and Temperature

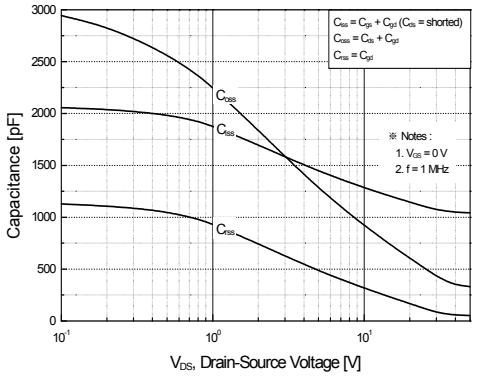


Figure 5. Capacitance Characteristics

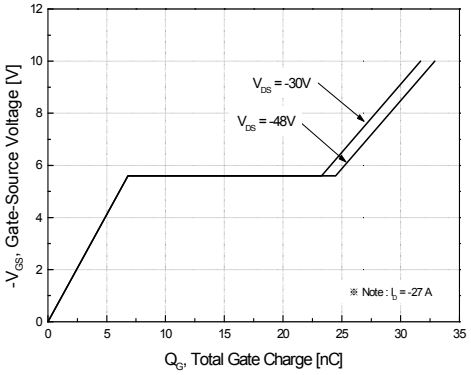


Figure 6. Gate Charge Characteristics

Typical Characteristics

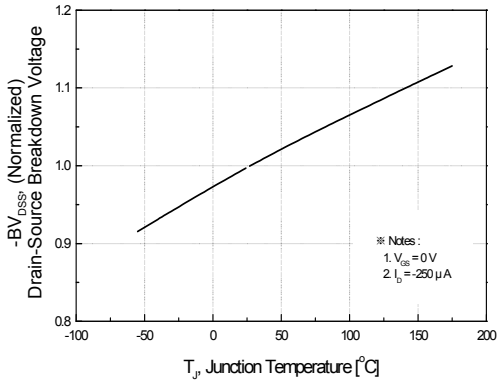


Figure 7. Breakdown Voltage Variation vs. Temperature

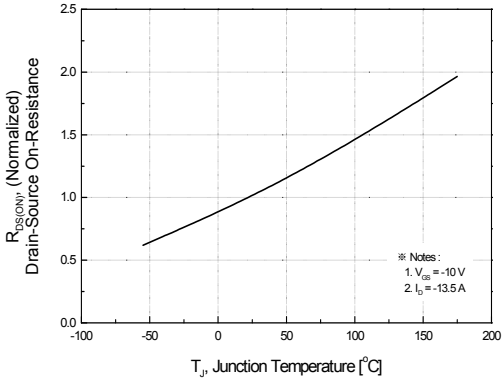


Figure 8. On-Resistance Variation vs. Temperature

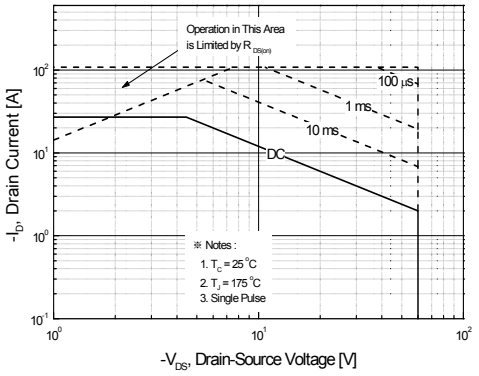


Figure 9. Maximum Safe Operating Area

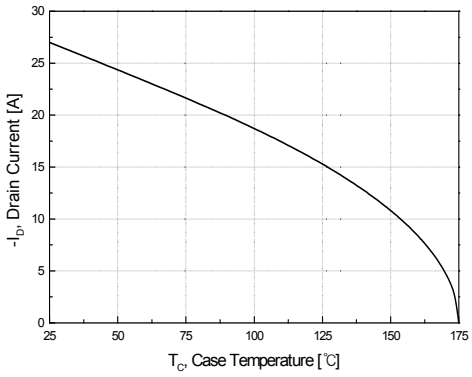


Figure 10. Maximum Drain Current vs. Case Temperature

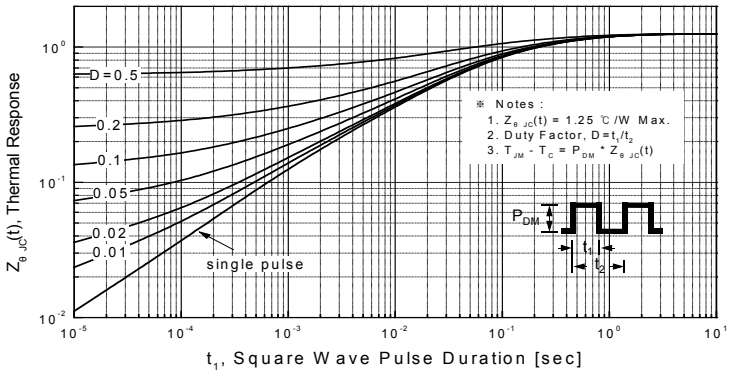
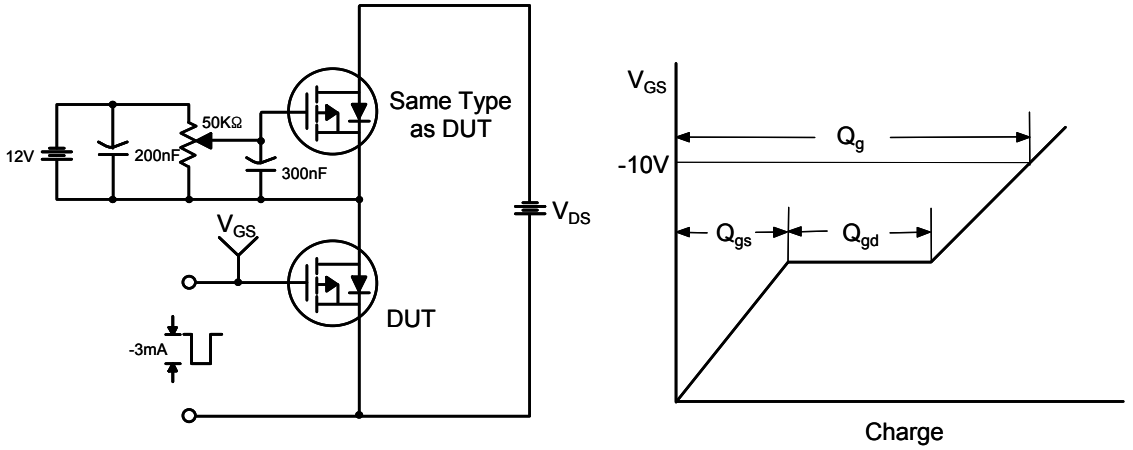
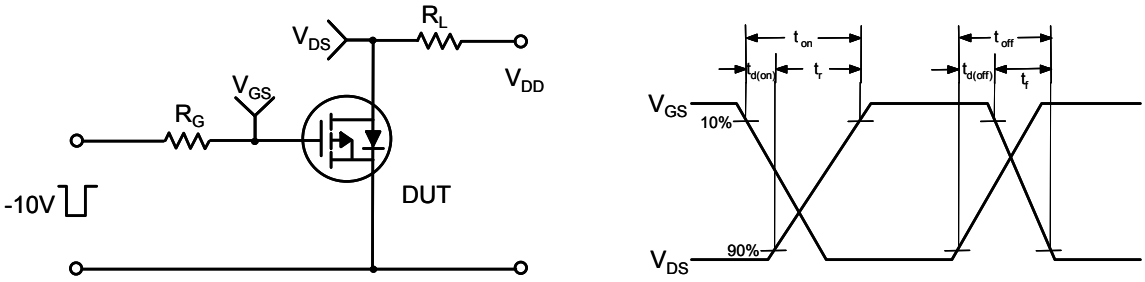


Figure 11. Transient Thermal Response Curve

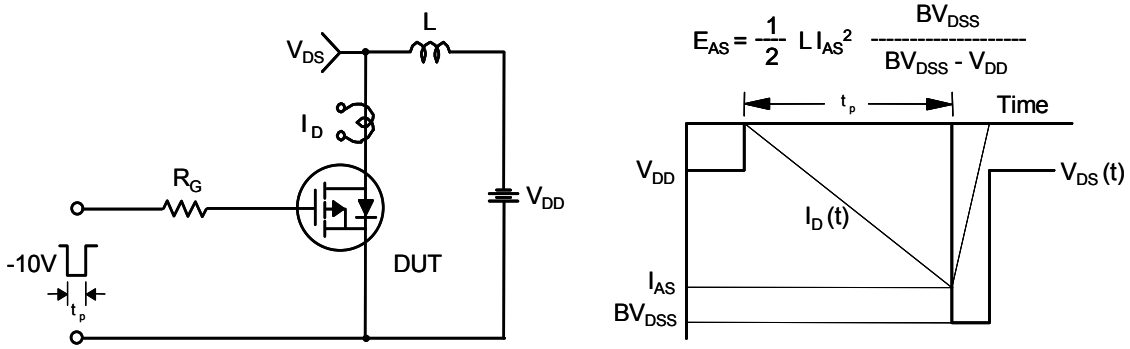
Gate Charge Test Circuit & Waveform



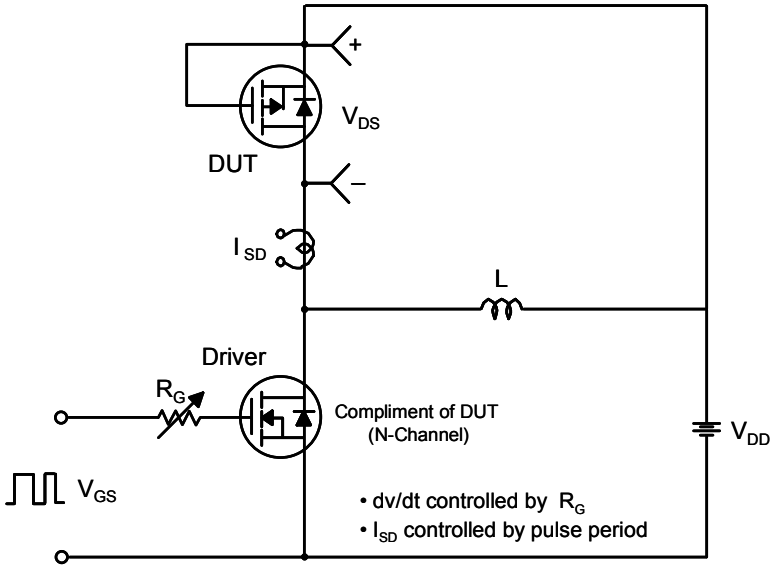
Resistive Switching Test Circuit & Waveforms

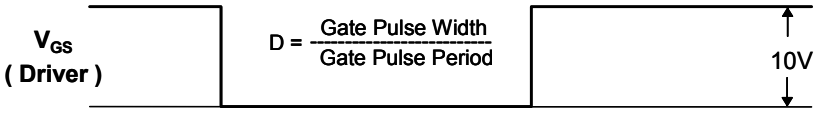


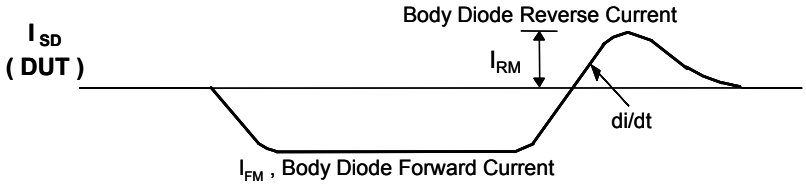
Unclamped Inductive Switching Test Circuit & Waveforms

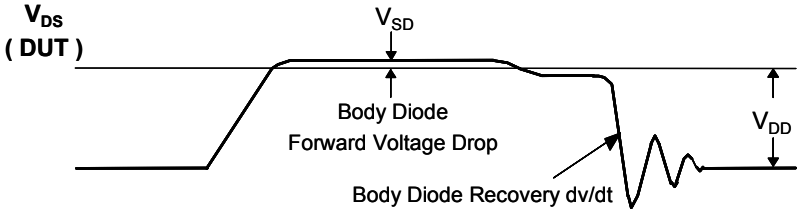


Peak Diode Recovery dv/dt Test Circuit & Waveforms

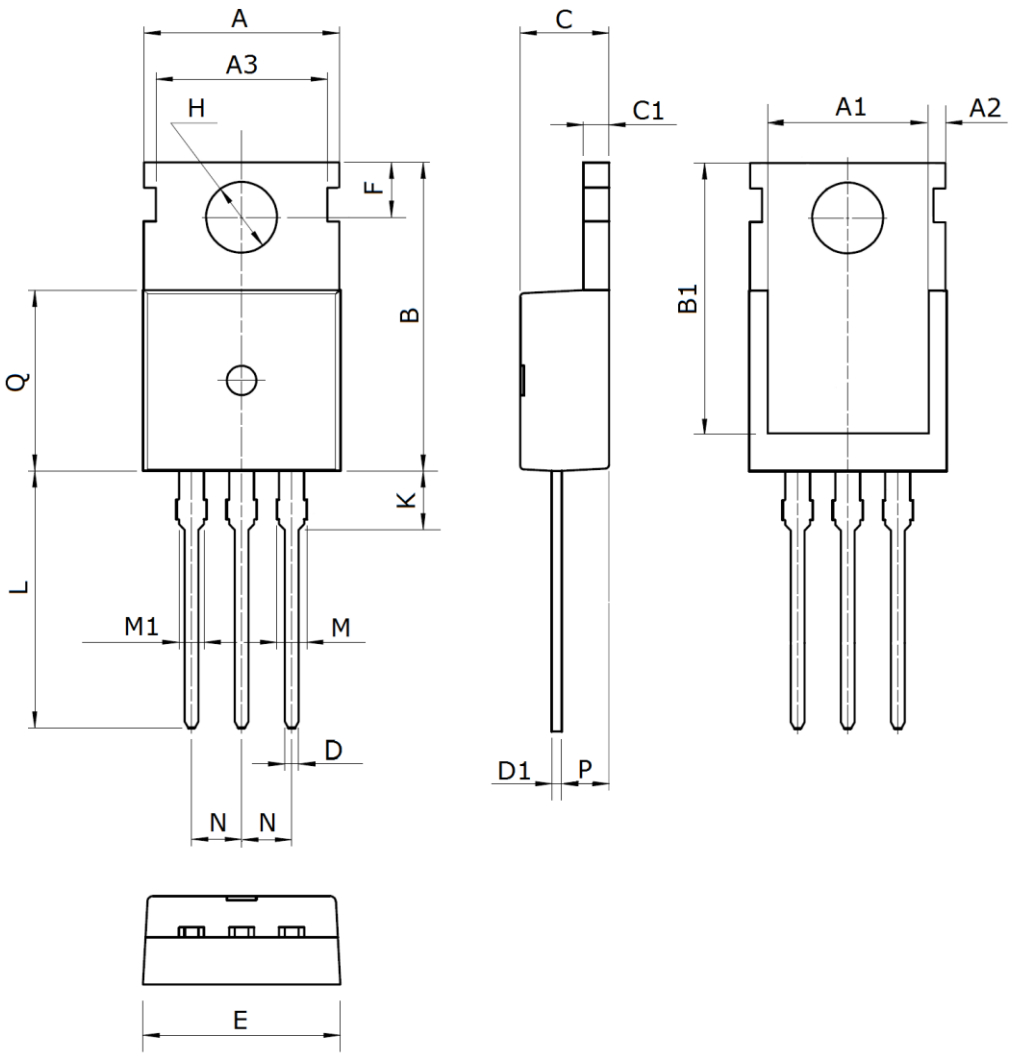






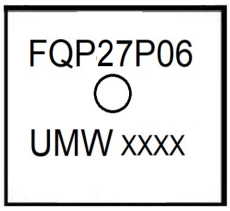


Package Mechanical Data TO-220



Symbol	Dimensions （mm）	Symbol	Dimensions (mm)	Symbol	Dimensions (mm)
A	10.0±0.3	C1	1.3±0.2	L	13.2±0.4
A1	8.0±0.2	D	0.8±0.2	M	1.38±0.1
A2	0.94±0.1	D1	0.5±0.1	M1	1.28±0.1
A3	8.7±0.1	E	10.0±0.3	N	2.54(typ)
B	15.6±0.4	F	2.8 ±0.1	P	2.4±0.3
B1	13.2 ±0.2	H	3.6±0.1	Q	9.15±0. 25
C	4.5±0. 2	K	3.1±0.2		

Marking



Ordering information

Order code	Package	Baseqty	Deliverymode
UMW FQP27P06	TO-220	1000	Tape and reel