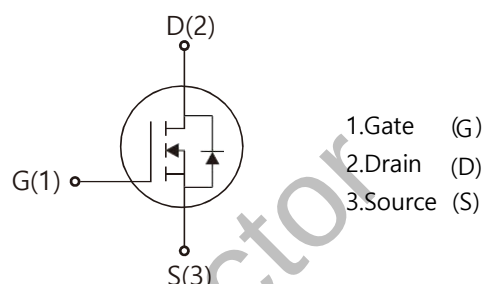
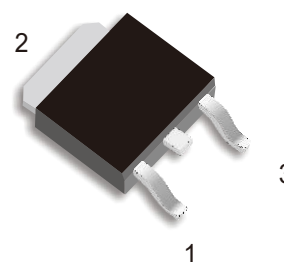


FQD7N65SE

Features:

- ☐ Low Intrinsic Capacitances.
- ☐ Excellent Switching Characteristics.
- ☐ Extended Safe Operating Area.
- ☐ Unrivalled Gate Charge :Qg=29nC (Typ.).
- ☐ $V_{DS}=650\text{ V}, I_D=7\text{ A}$
- ☐ $R_{DS(on)} : 1.35\Omega$ (Max) @ $V_G=10\text{ V}$
- ☐ 100% Avalanche Tested

TO-252



Absolute Maximum Ratings (Ta=25°C unless otherwise noted)

Sy mbol	Parameter	Value	Unit
V_{DS}	Drain-Source Voltage	650	V
I_D	Drain Current	$T_j=25^\circ\text{C}$	A
		$T_j=100^\circ\text{C}$	
V_{GSS}	Gate-Source Voltage	± 30	V
E_{AS}	Single Pulse Avalanche Energy (note1)	300	mJ
I_{AR}	Avalanche Current (note2)	7.0	A
P_D	Power Dissipation ($T_j=25^\circ\text{C}$)	50	W
T_j	Junction Temperature(Max)	150	$^\circ\text{C}$
T_{stg}	Storage Temperature	-55~+150	$^\circ\text{C}$
TL	Maximum lead temperature for soldering purpose, 1/8" from case for 5 seconds	300	$^\circ\text{C}$

Thermal Characteristics

Sy mbol	Parameter	Typ.	Max.	Unit
$R_{\theta JC}$	Thermal Resistance, Junction to Case	-	2.4	$^\circ\text{C/W}$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	-	62.5	$^\circ\text{C/W}$

Electrical Characteristics (Ta=25°C unless otherwise noted)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
Off Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	I _D =250μA , V _{GS} =0	650	-	-	V
△BVDSS/ △T _J	Breakdown Voltage Temperature Coefficient	I _D =250μA ,Reference to 25°C	-	0.67	-	V/°C
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =650V, V _{GS} =0V	-	-	10	μA
		V _{DS} =520V, T _j =125°C			100	
I _{GSSF}	Gate-body leakage Current, Forward	V _{GS} =+30V, V _{DS} =0V	-	-	100	nA
I _{GSSR}	Gate-body leakage Current, Reverse	V _{GS} =-30V, V _{DS} =0V	-	-	-100	
On Characteristics						
V _{GS(TH)}	Date Threshold Voltage	I _D =250μA,V _{DS} =V _{GS}	2	-	4	V
R _{DS(ON)}	Static Drain-Source On-Resistance	I _D =3.5A,V _{GS} =10V	-	1.25	1.35	Ω
Dynamic Characteristics						
Ciss	Input Capacitance	V _{DS} =25V , V _{GS} =0 , f=1.0MHz	-	1000	-	pF
Coss	Output Capacitance		-	95	-	
Crss	Reverse Transfer Capacitance		-	2.4	-	
Sw itching Characteristics						
Td(on)	Turn-On Delay Time	V _{DD} =325V , I _D =7A R _G =25Ω (Note 3,4)	-	30	70	nS
Tr	Turn-On Rise Time		-	80	170	
Td(of f)	Turn-Off Delay Time		-	65	140	
Tf	Turn-Off Rise Time		-	60	130	
Qg	Total Gate Charge	V _{DS} =520V,V _{GS} =10V , I _D =7A (Note3,4)	-	29	38	nC
Qgs	Gate-Source Charge		-	7	-	
Qgd	Gate-Drain Charge		-	14.5	-	
Drain-Source Diode Characteristics and Maximum Ratings						
I _s	Max. Diode Forward Current	-		- -	7	A
I _{SM}	Max. Pulsed Forward Current	-		- -	28	
V _{SD}	Diode Forward Voltage	I _D =7A	-	-	1.4	V
Trr	Reverse Recovery Time	I _S =7A,V _{GS} =0V diF/dt=100A/ μs	-	293	-	nS
Qrr	Reverse Recovery Charge	(Note3)	-	1.7	-	μC

Notes : 1, L=0.5mH, IAS= 7A, VDD=50V, RG=25Ω, Starting TJ =25°C

2, Repetitive Rating : Pulse width limited by maximum junction temperature

3, Pulse Test : Pulse Width ≤ 300μs, Duty Cycle ≤ 2%

4, Essentially Independent of Operating Temperature

Typical Characteristics

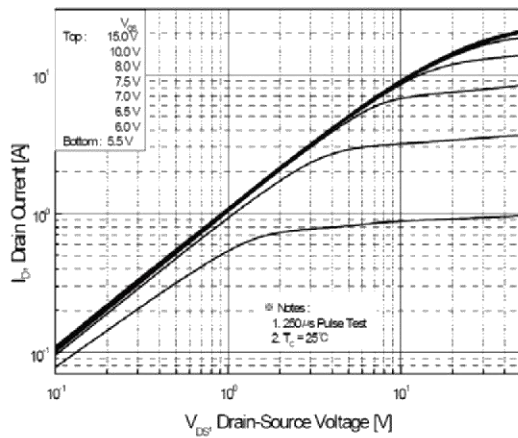


Figure 1. On-Region Characteristics

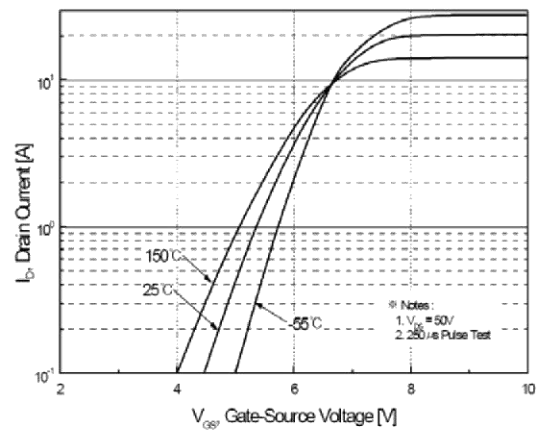


Figure 2. Transfer Characteristics

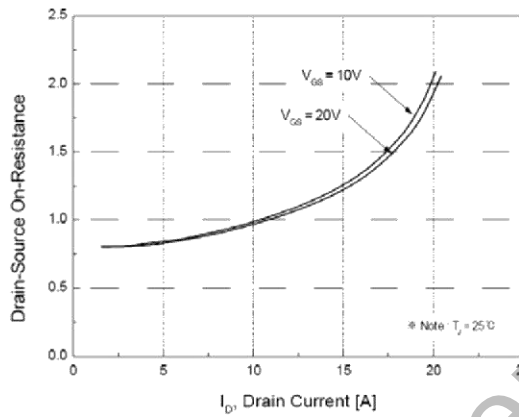


Figure 3. On-Resistance Variation vs. Drain Current and Gate Voltage

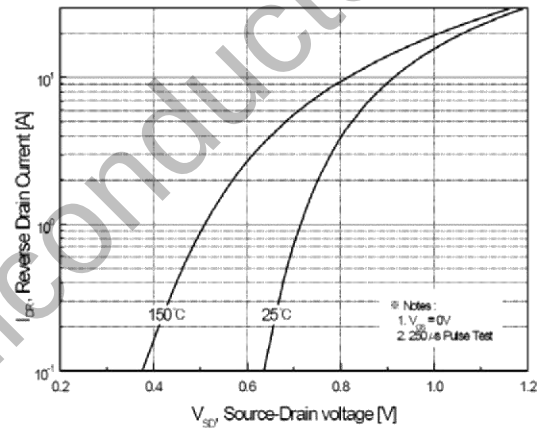


Figure 4. Body Diode Forward Voltage Variation vs. Source Current and Temperature

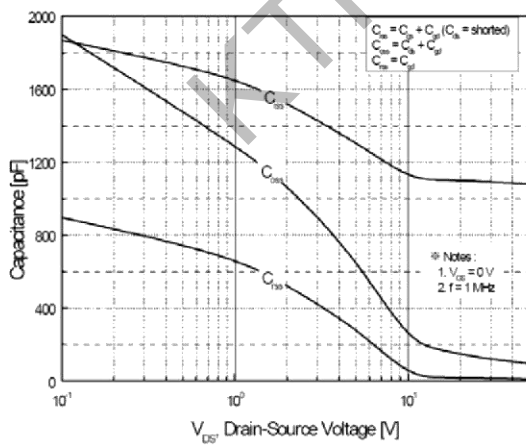


Figure 5. Capacitance Characteristics

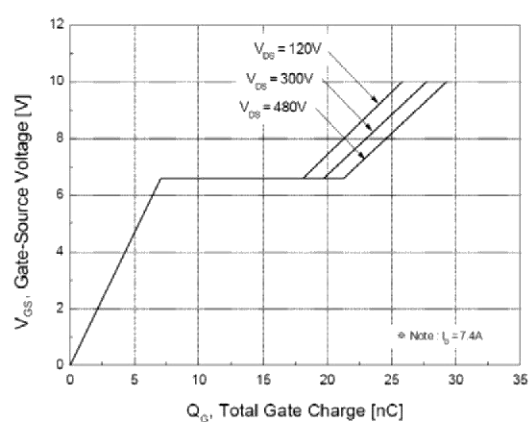


Figure 6. Gate Charge Characteristics

Typical Characteristics (Continued)

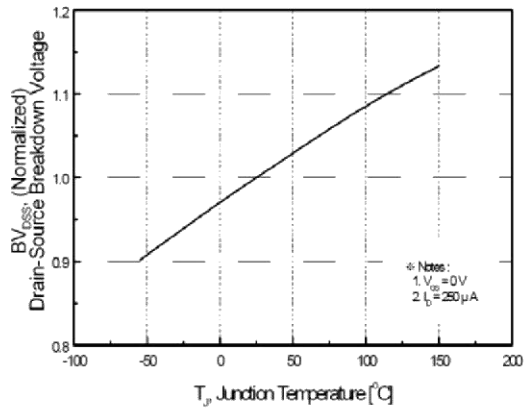


Figure 7. Breakdown Voltage Variation vs Temperature

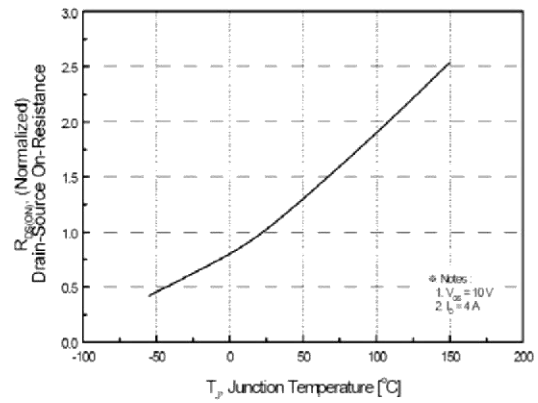


Figure 8. On-Resistance Variation vs Temperature

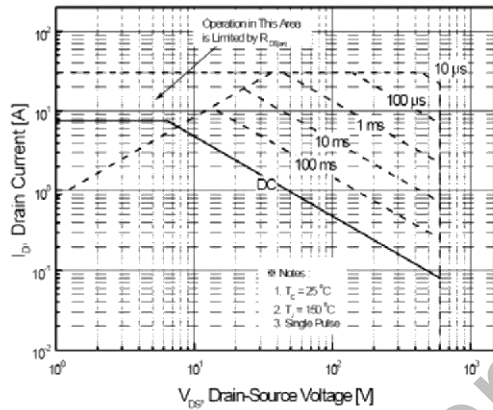


Figure 9-2. Maximum Safe Operating Area

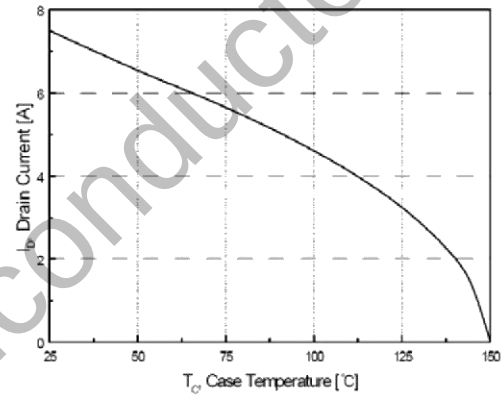


Figure 10. Maximum Drain Current vs Case Temperature

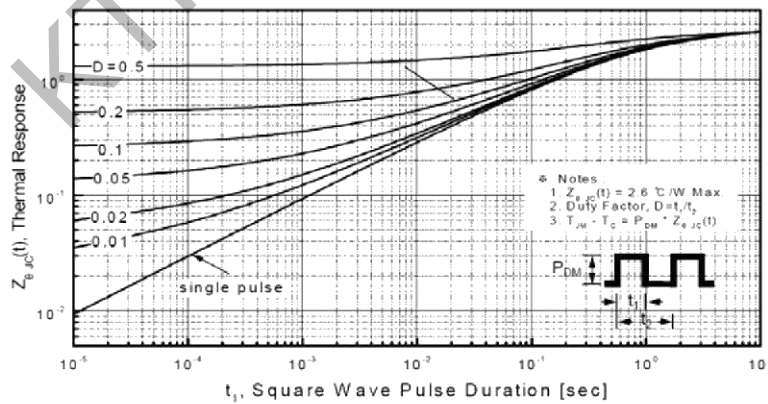
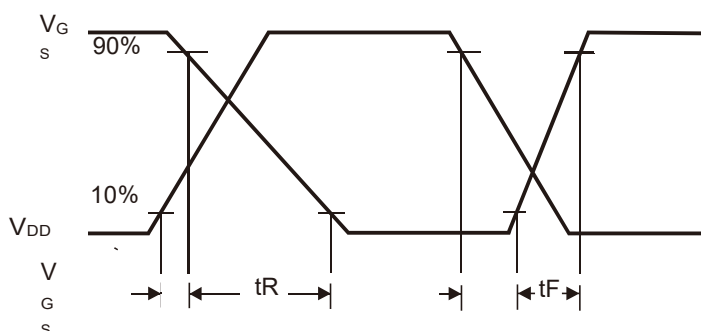
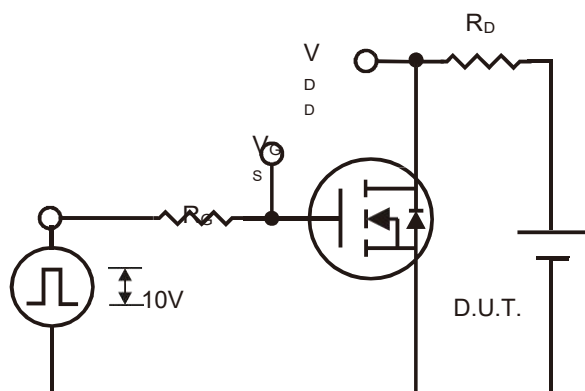


Figure 11-2. Transient Thermal Response Curve

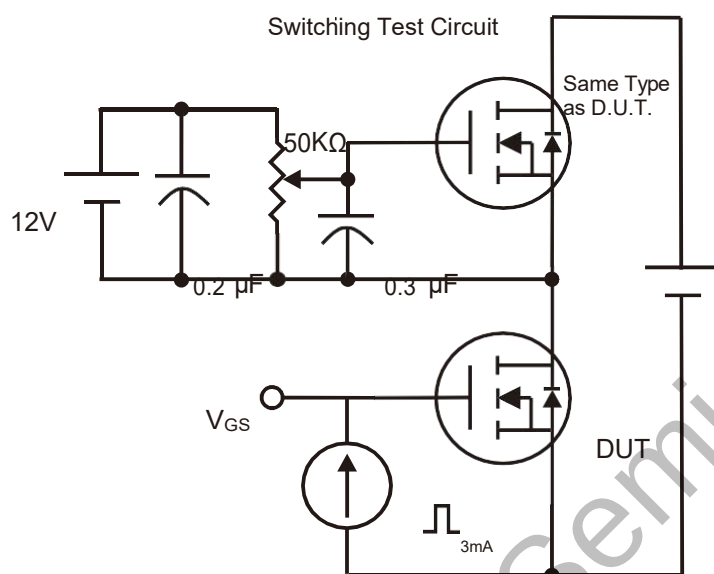
Gate Charge Test Circuit & Waveform



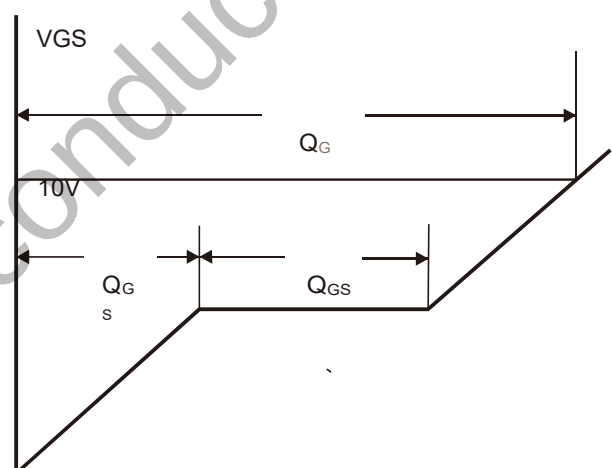
to(ON)

to(OFF)

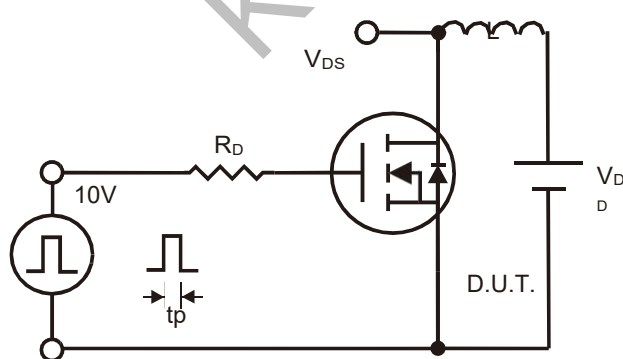
Switching Test Circuit



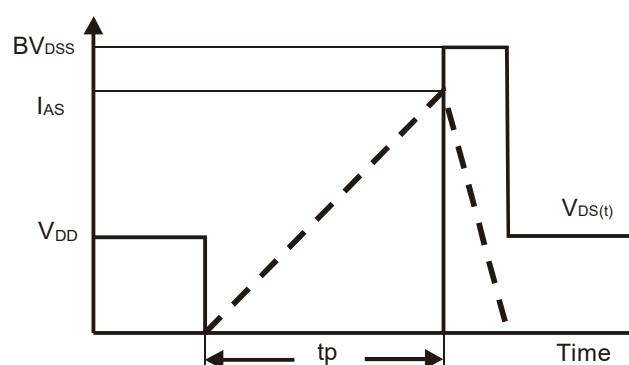
Switching Waveforms



Gate Charge Test Circuit



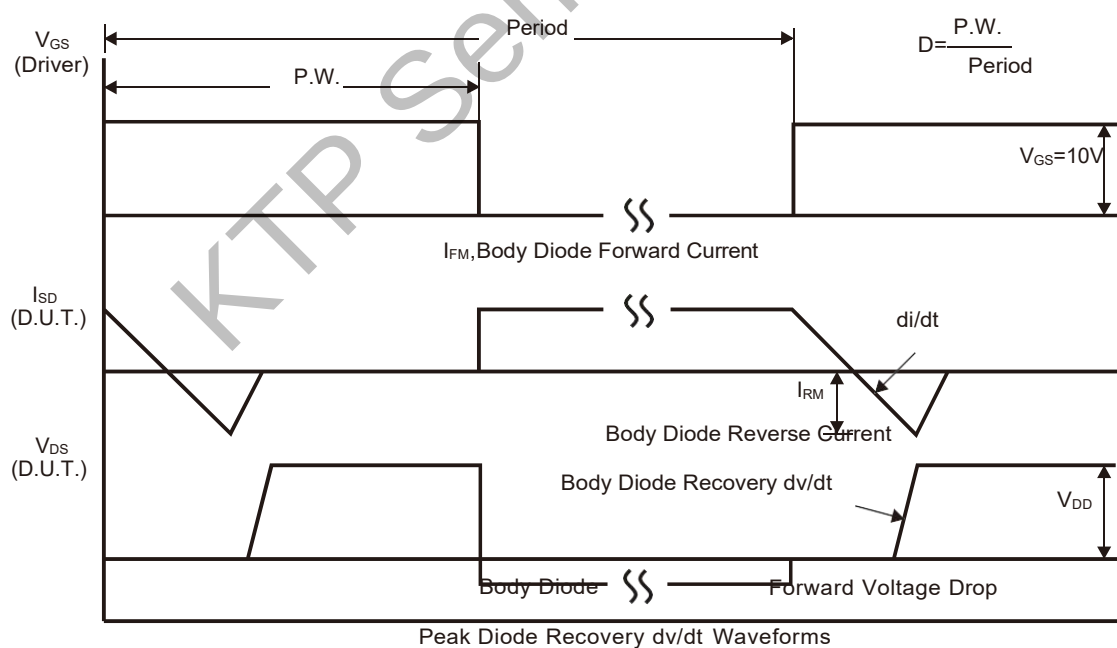
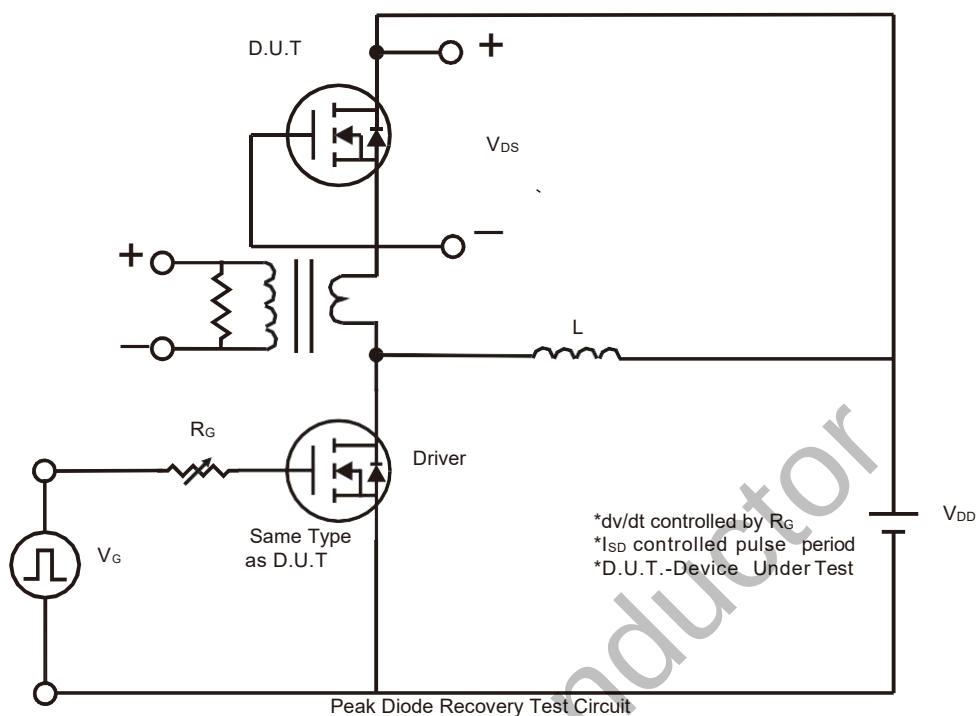
Gate Charge Waveform



Unclamped Inductive Switching Test Circuit

Unclamped Inductive Switching Waveforms

Peak Diode Recovery dv/dt Test Circuit & Waveform



Package Dimension

TO-252

Unit:mm

