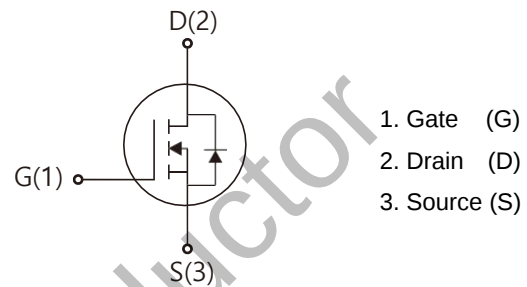
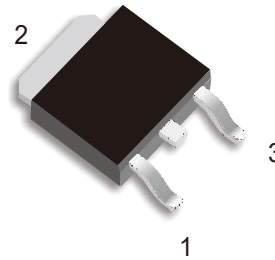


FQD10N60SE**Features:**

- ☐ Low Intrinsic Capacitances.
- ☐ Excellent Switching Characteristics.
- ☐ Extended Safe Operating Area.
- ☐ Unrivalled Gate Charge :Qg=35nC (Typ.).
- ☐ $V_{DS}=650V, I_D=10A$
- ☐ $R_{DS(on)} : 0.9 \Omega$ (Max) @ $V_G=10V$
- ☐ 100% Avalanche Tested

TO-252

**Absolute Maximum Ratings** ($T_a=25^\circ\text{C}$ 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)	380	mJ
I_{AR}	Avalanche Current (note2)	10	A
P_D	Power Dissipation ($T_j=25^\circ\text{C}$)	45	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	$^\circ\text{C}/\text{W}$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	-	62.5	$^\circ\text{C}/\text{W}$

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/ △TJ	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, Tj=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 =5.0A,V _{GS} =10V	-	0.8	0.9	Ω
Dynamic Characteristics						
Ciss	Input Capacitance	V _{DS} =25V , V _{GS} =0 , f=1.0MHz	-	1500	-	pF
Coss	Output Capacitance		-	194	-	
Crss	Reverse Transfer Capacitance		-	18	-	
Sw itching Characteristics						
Td(on)	Turn-On Delay Time	V _{DD} =325V , I _D =10A R _G =25Ω (Note 3,4)	-	23		nS
Tr	Turn-On Rise Time			15		
Td(of f)	Turn-Off Delay Time		-	90		
Tf	Turn-Off Rise Time		-	30		
Qg	Total Gate Charge	V _{DS} =520V,V _{GS} =10V , I _D =10A (Note3,4)	-	35		nC
Qgs	Gate-Source Charge			7	-	
Qgd	Gate-Drain Charge			18	-	
Drain-Source Diode Characteristics and Maximum Ratings						
Is	Max. Diode Forward Current	-		- -	10	A
ISM	Max. Pulsed Forward Current	-		- -	40	
VSD	Diode Forward Voltage	I _D =10A	-	-	1.4	V
Trr	Reverse Recovery Time	Is=10A,V _{GS} =0V diF/dt=100A/ μs	-	320	-	nS
Qrr	Reverse Recovery Charge	(Note3)	-	4.2	-	μC

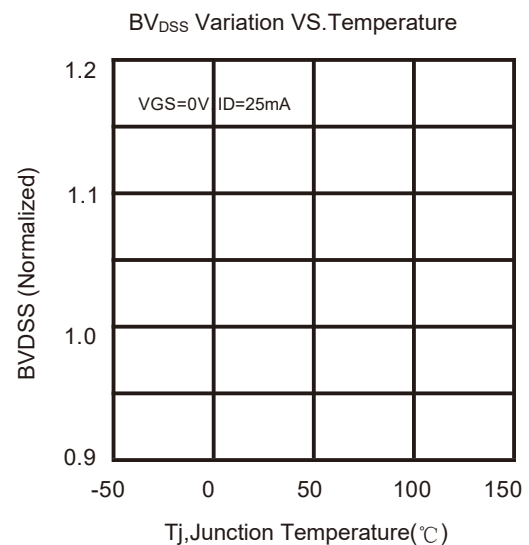
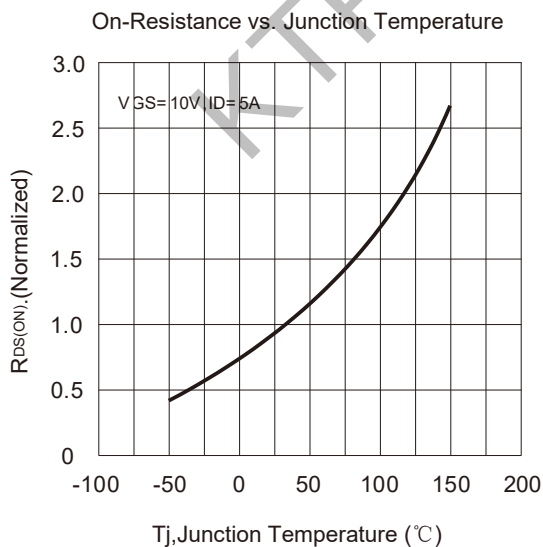
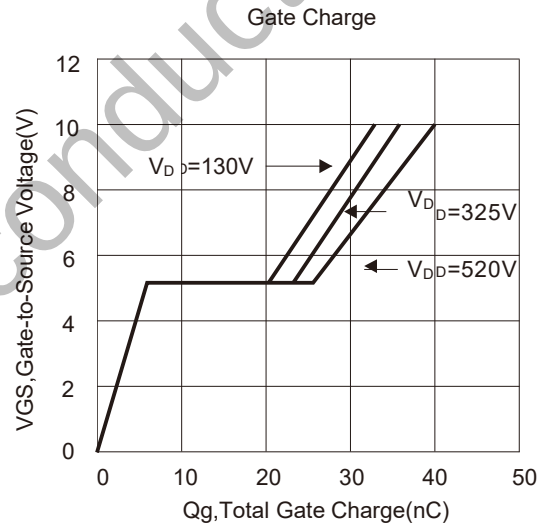
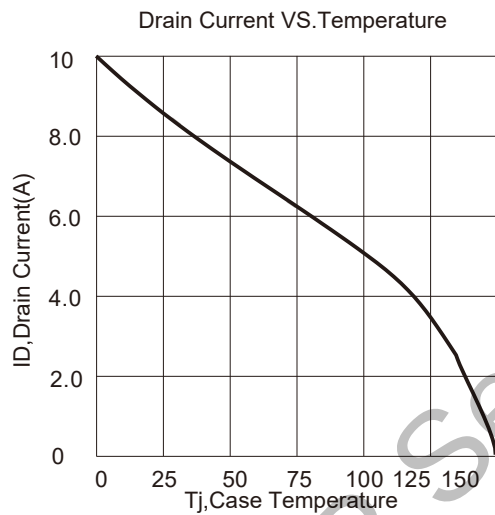
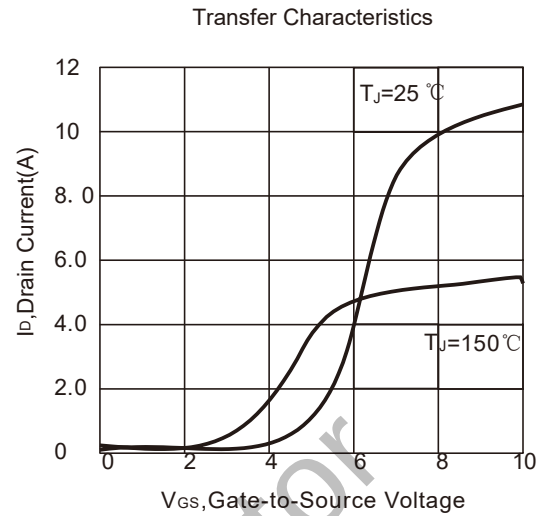
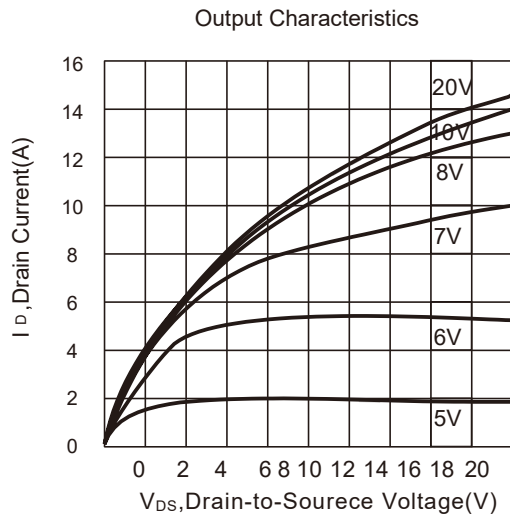
Notes : 1, L=0.5mH, IAS= 10A, VDD=50V, RG=25 Ω , Starting T_J =25°C

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

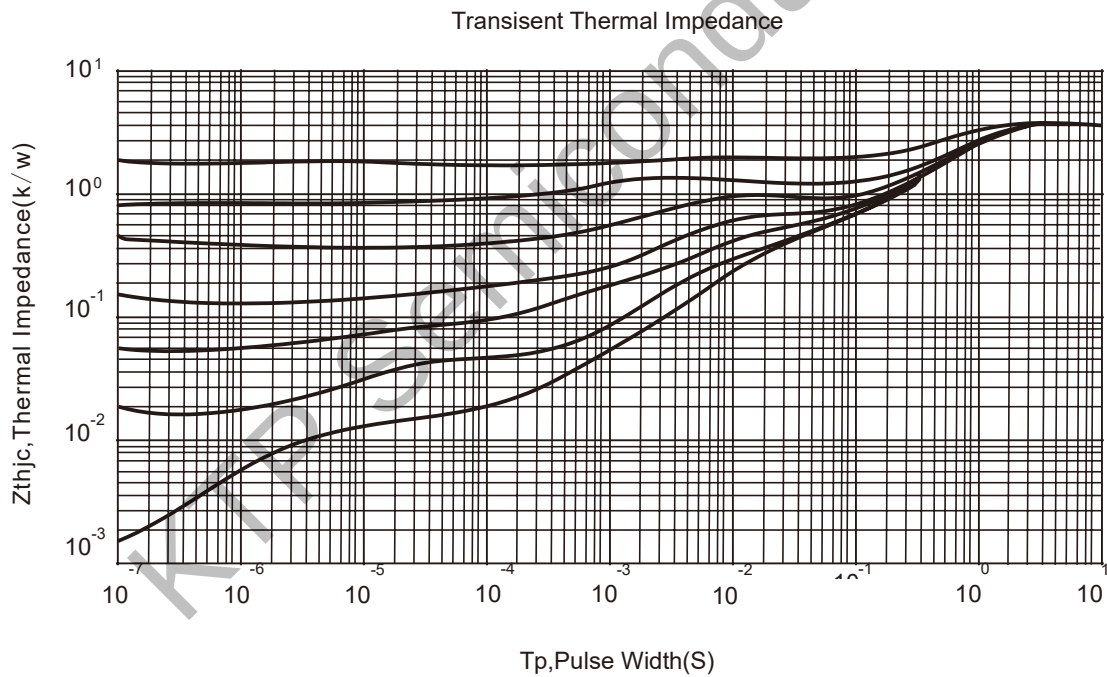
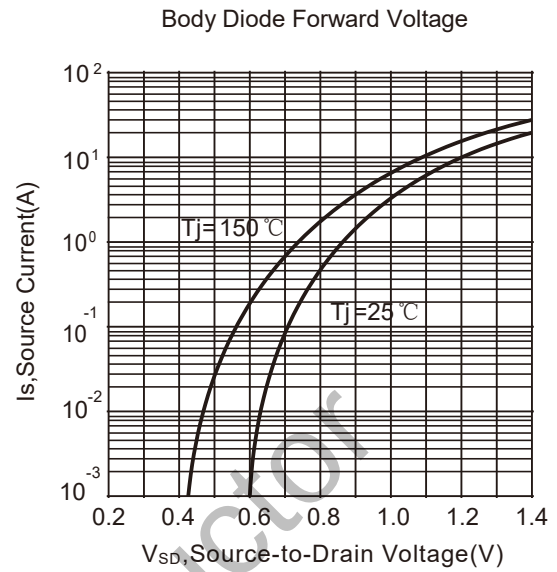
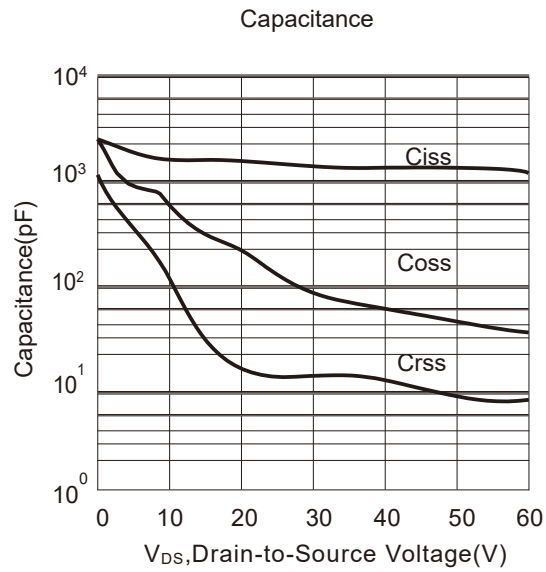
3, Pulse Test : Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$

4, Essentially Independent of Operating Temperature

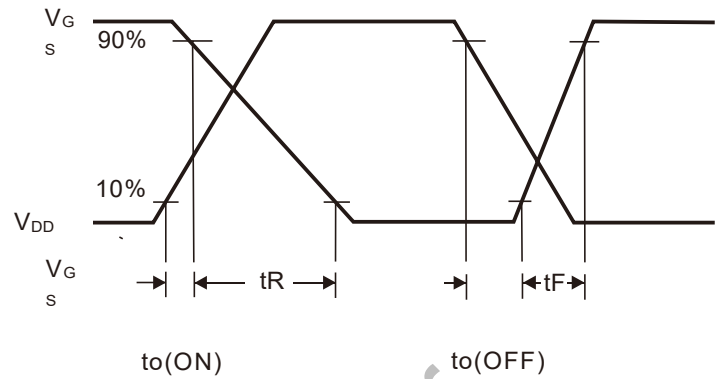
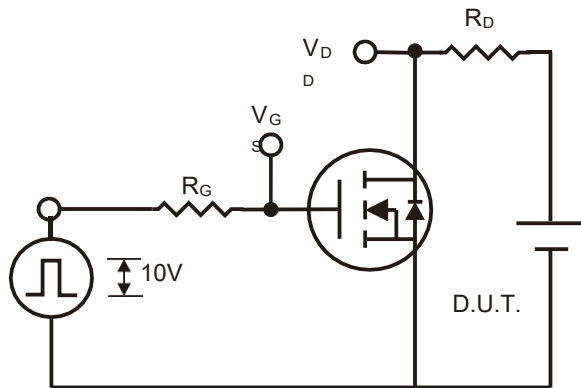
Typical Characteristics



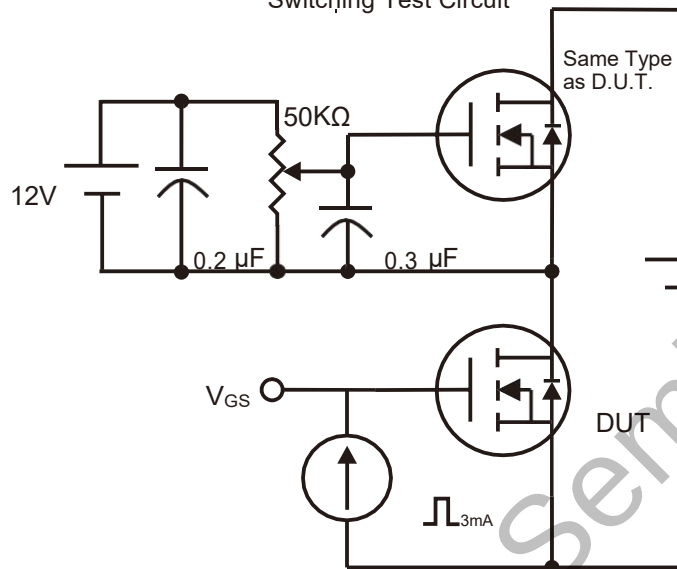
Typical Characteristics (Continued)



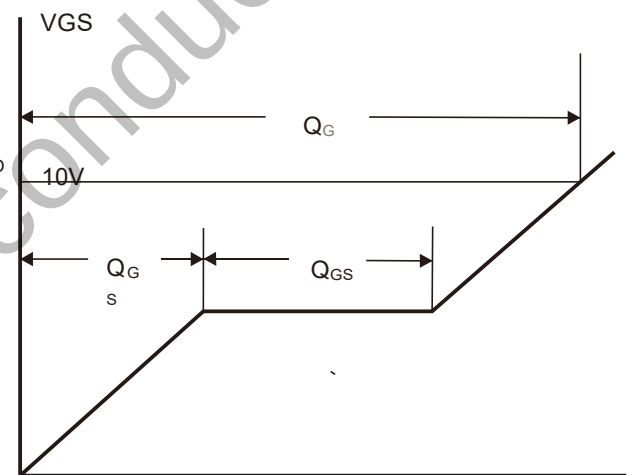
Gate Charge Test Circuit & Waveform



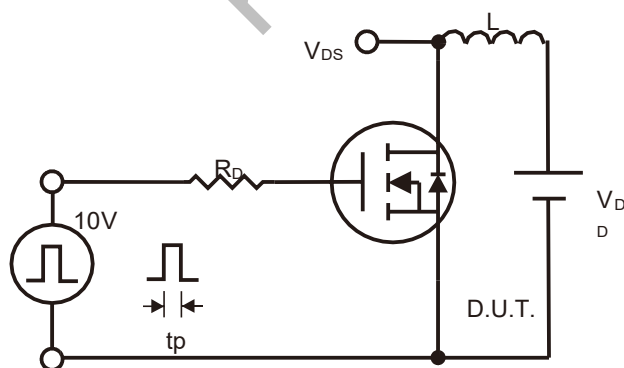
Switching Test Circuit



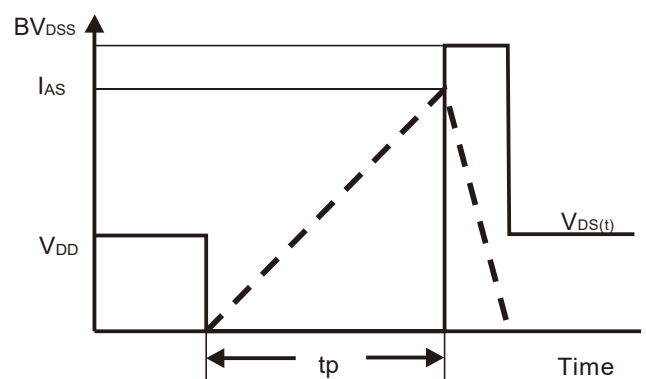
Switching Waveforms



Gate Charge Test Circuit



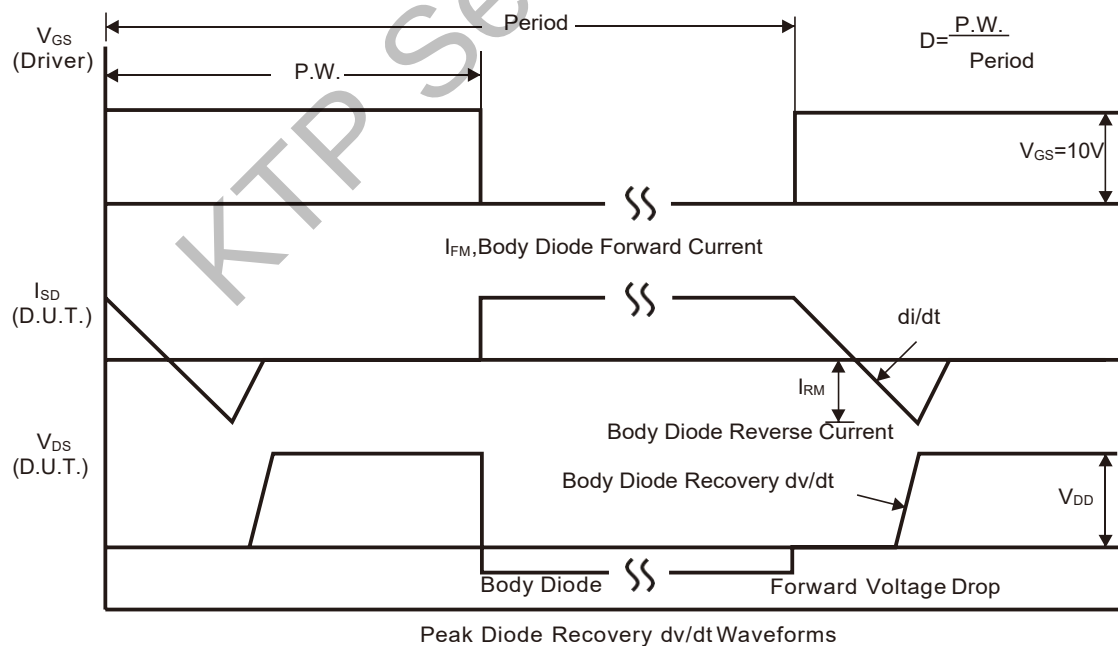
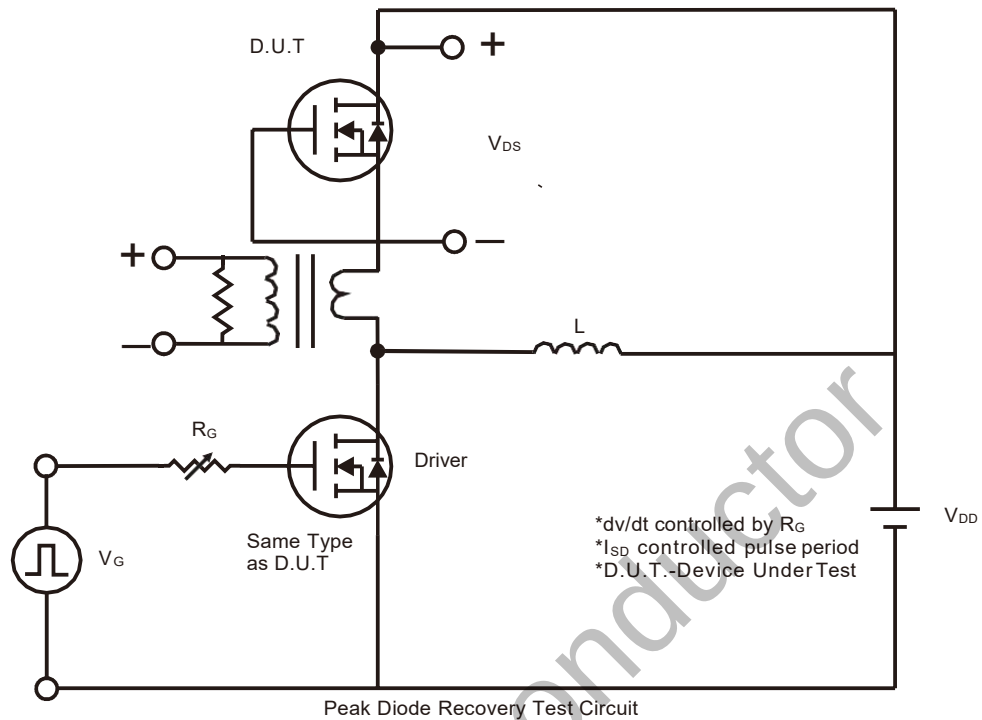
Gate Charge Waveform



Unclamped Inductive Switching Test Circuit

Unclamped Inductive Switching Waveforms

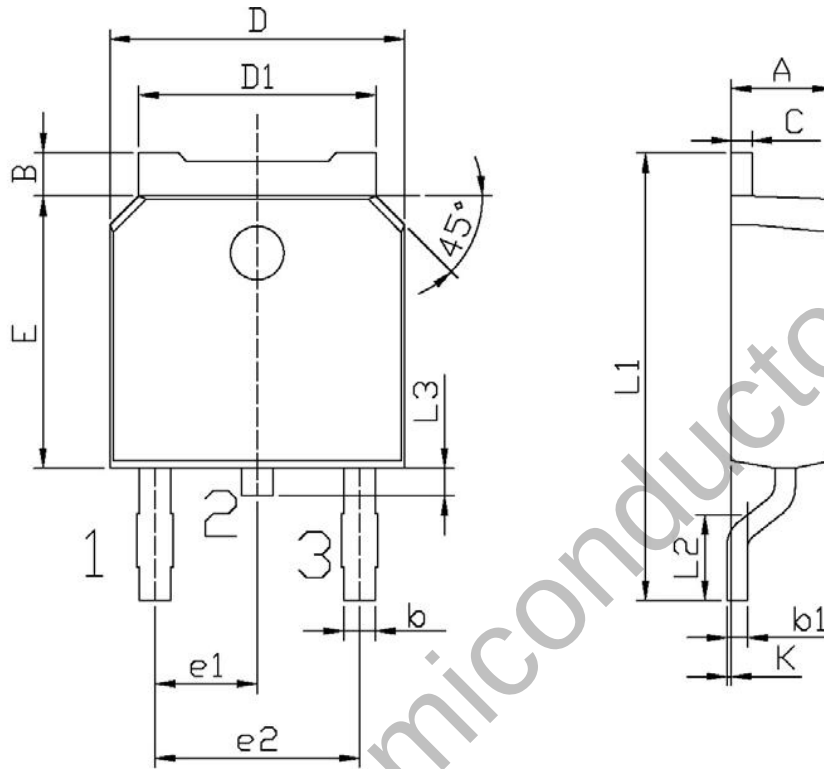
Peak Diode Recovery dv/dt Test Circuit & Waveform



Package Dimension

TO-252

Unit: mm



Symbol	Dimensions In Millimeters		Symbol	Dimensions In Millimeters	
	Min	Max		Min	Max
A	2.20	2.40	E	5.95	6.25
B	0.95	1.25	e1	2.24	2.34
b	0.70	0.90	e2	4.43	4.73
b1	0.45	0.55	L1	9.85	10.35
C	0.45	0.55	L2	1.25	1.75
D	6.45	6.75	L3	0.60	0.90
D1	5.20	5.40	K	0.00	0.10