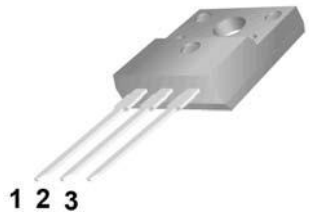
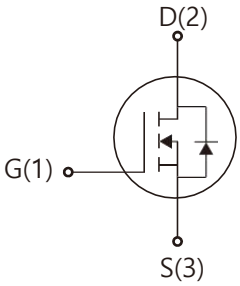
Features:

- ☐ Low Intrinsic Capacitances.
- ☐ Excellent Switching Characteristics.
- ☐ Extended Safe Operating Area.
- ☐ Unrivalled Gate Charge :Qg=8.7nC(Typ.).
- ☐ V_{DSS}=650 V,I_D=8A
- ☐ R_{DS}(on) : 0.58 Ω (Max) @V_G=10V
- ☐ 100% Avalanche Tested

RoHS COMPLIANT

TO-220F





1.Gate (G)
2.Drain (D)
3.Source (S)

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Absolute Maximum Ratings (Ta=25℃ unless otherwise noted)

Symbol	Parameter		Value	Unit
V_{DSS}	Drain-Source Voltage		650	V
I_D	Drain Current	T_j=25℃	8.0	A
		T_j=100℃	5.0	
V_{GSS}	Gate-Source Voltage		±30	V
E_{AS}	Single Pulse Avalanche Energy (note1)		140	mJ
I_{DM}	Pulsed Drain Current (note2)		24	A
P_D	Power Dissipation (Tj=25℃)		26	W
T_j	Junction Temperature(Max)		150	℃
T_{stg}	Storage Temperature		-55~+150	℃
dv/dt	MOSFET dv/dt ruggeness,VDS=0V...480V		50	V/nS

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JC}$	Thermal Resistance Junction to Case	-	4.8	℃/W
$R_{\theta JA}$	Thermal Resistance Junction to Ambient	-	62.5	℃/W

Electrical Characteristics (Ta=25℃ unless otherwise noted)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
Off Chara cteristics						
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℃	-	0.67	-	V/℃
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=650V, V_{GS} =0V	-	-	10	μA
		V_{DS}=520V, Tj=125℃			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=4.0A,V_{GS} =10V	-	0.50	0.58	Ω
Dynamic Characteristics						
Ciss	Input Capacitance	V_{DS}=25V , V_{GS} =0 , f=1.0MHz	-	410.8	-	pF
Coss	Output Capacitance		-	41.7	-	
Crss	Reverse Transfer Capacitance			3.1	-	
Sw itching Characteristics						
Td(on)	Turn-On Delay Time	V_{DD}=400V , I_D=4A R_G =25Ω (Note 3,4)	-	26.4		nS
Tr	Turn-on Rise Time		-	17.9		
Td(of f)	Turn-Off Delay Time		-	56.2		
Tf	Turn-Off Rise Time		-	14.0		
Qg	Total Gate Charge	V_{DS}=400V,V_{GS} =10V , I_D=5A (Note3,4)	-	8.6		nC
Qgs	Gate-Source Charge		-	2.2	-	
Qgd	Gate-Drain Charge		-	3.8	-	
Drain-Source Diode Characteristics and Maximum Ratings						
Is	Max. Diode Forward Current	-		- -	8	A
I_{SM}	Max. Pulsed Forward Current	-		- -	24	
V_{SD}	Diode Forward Voltage	I_D=8A	-	-	1.3	V
Trr	Reverse Recovery Time	Is=4A,V_{GS} =0V diF/dt=100A/μs (Note3)	-	214.3	-	nS
Qrr	Reverse Recovery Charge		-	1.7	-	μC

Note

1) Calculated continuous current based on maximum allowable junction temperature.
2) Repetitive rating; pulse width limited by max. junction temperature.
3) Pd is based on max. junction temperature, using junction-case thermal resistance.
4) The value of $R_{\theta JA}$ is measured with the device mounted on 1 in 2 FR-4 board with 2oz. Copper, in a still air environment with T_a=25 °C.
5) V_{DD}=100 V, V_{GS}=10 V, L=79.9 mH, starting T_j=25 °C.

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Typical Characteristics

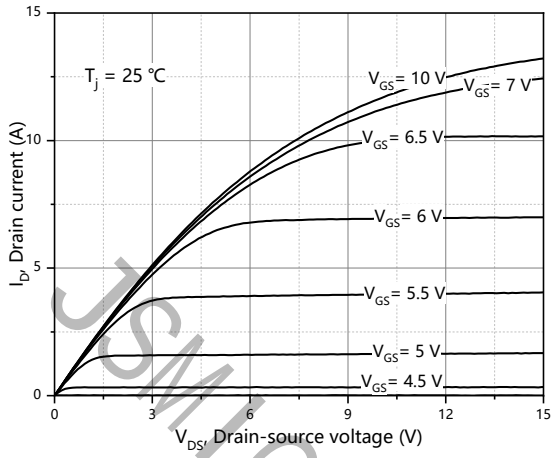

Figure 1. Typ. output characteristics

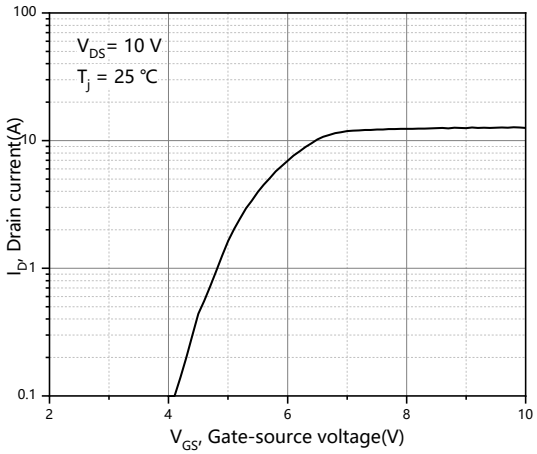

Figure 2. Typ. transfer characteristics

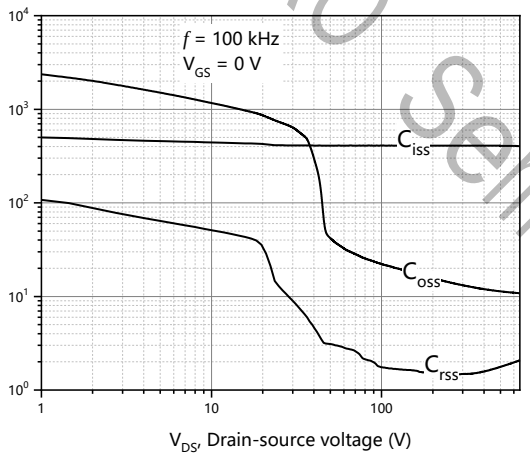

Figure 3. Typ. capacitances

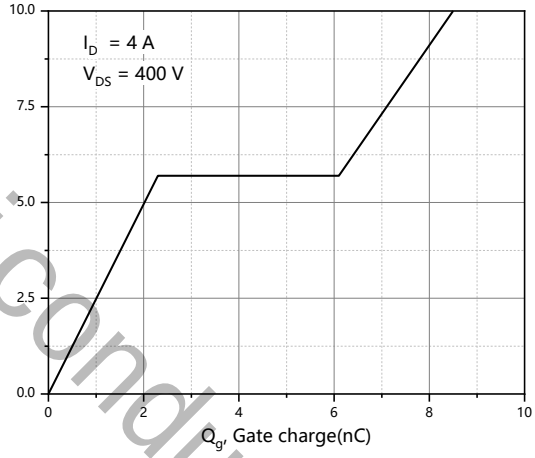

Figure 4. Typ. gate charge

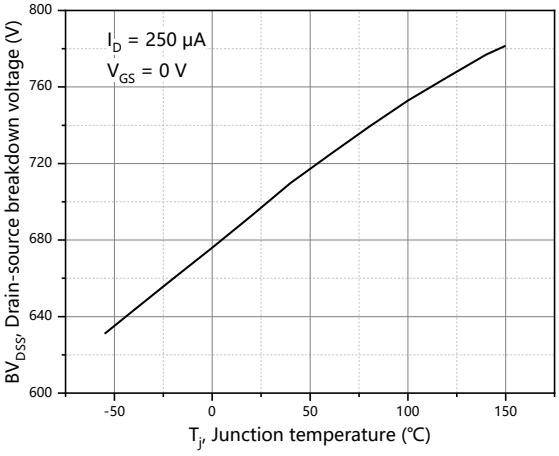

Figure 5. Drain-source breakdown voltage

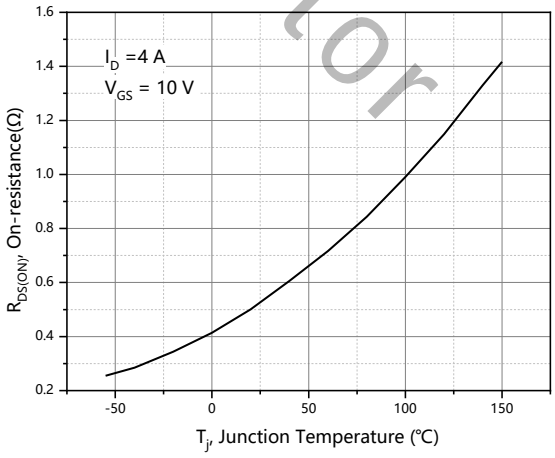

Figure 6. Drain-source on-state resistance

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Typical Characteristics (Continued)

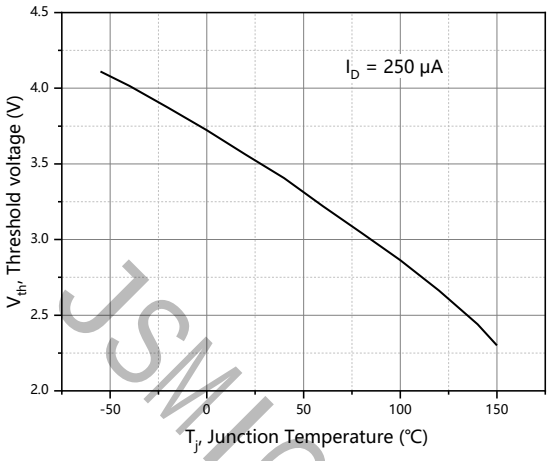

Figure 7. Threshold voltage

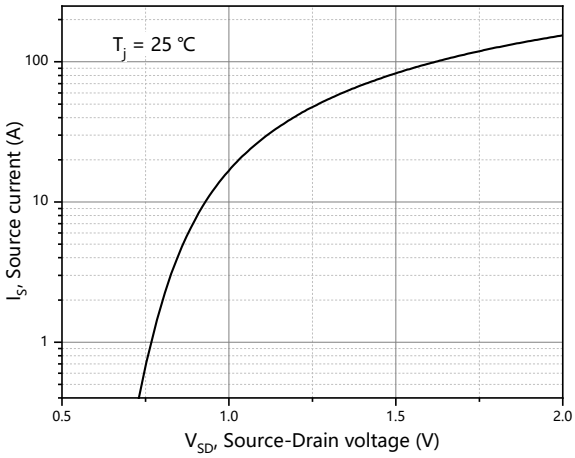

Figure 8. Forward characteristic of body diode

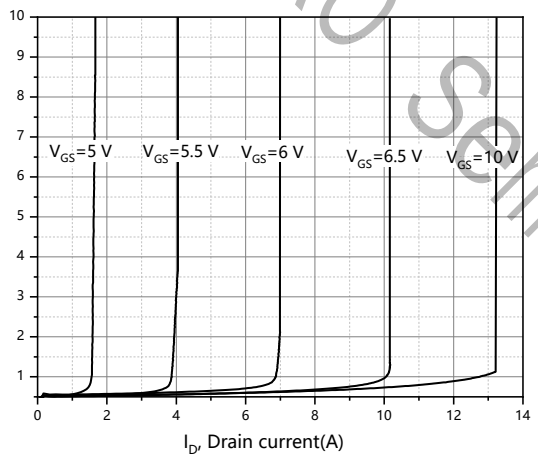

Figure 9. Drain-source on-state resistance

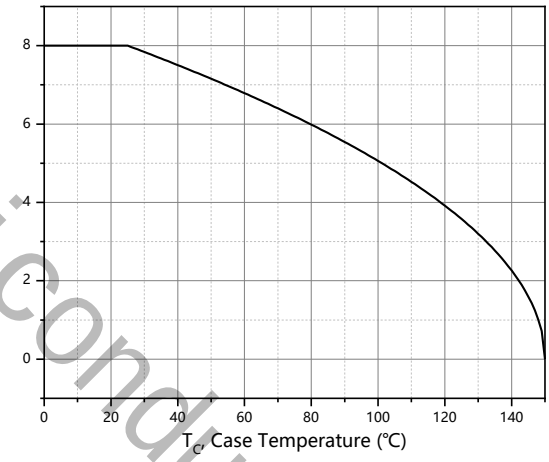

Figure 10. Drain current

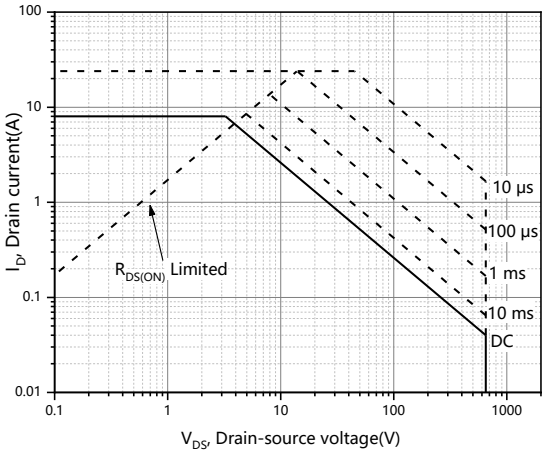

Figure 11. Safe operation area T_C=25 °C

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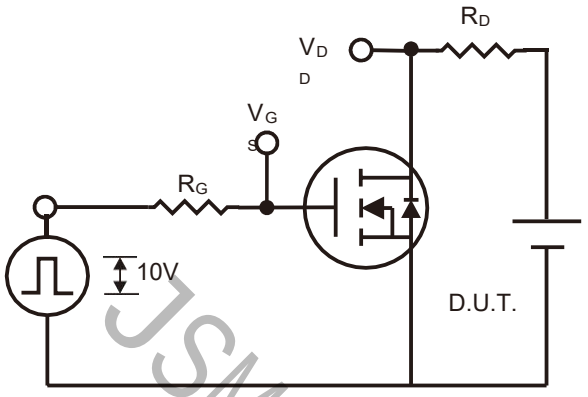
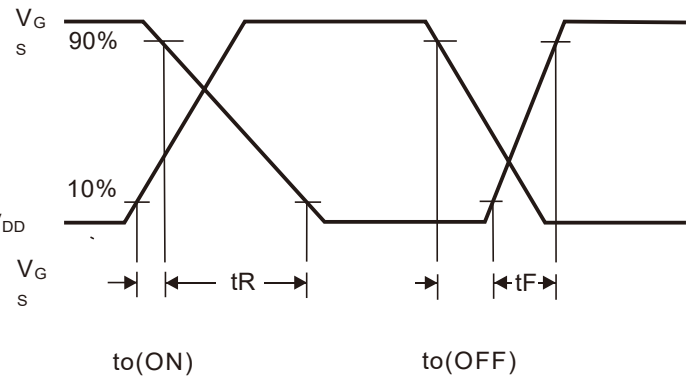
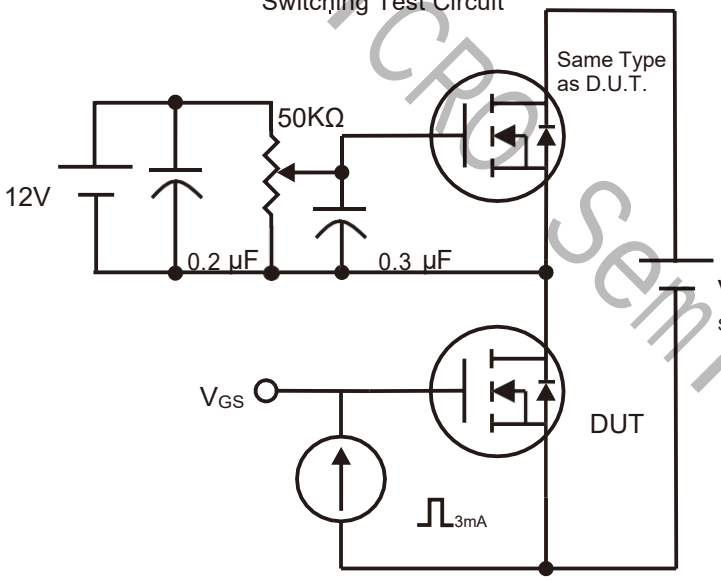
Gate Charge Test Circuit & Waveform



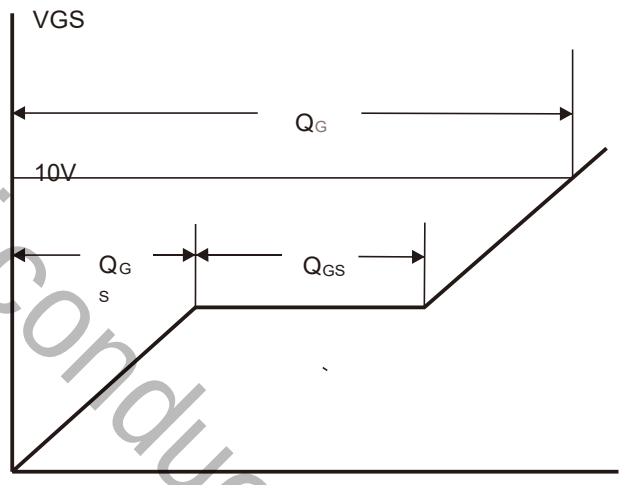
Switching Test Circuit



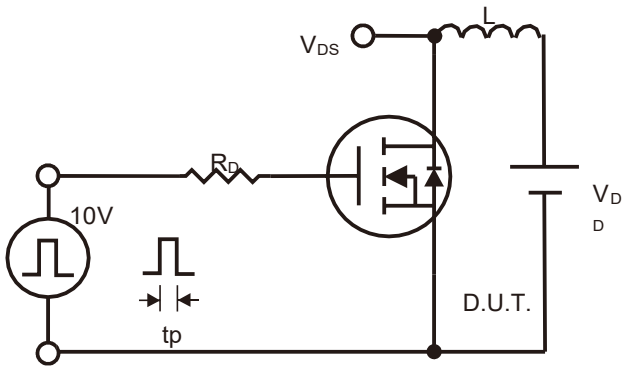
Switching Waveforms



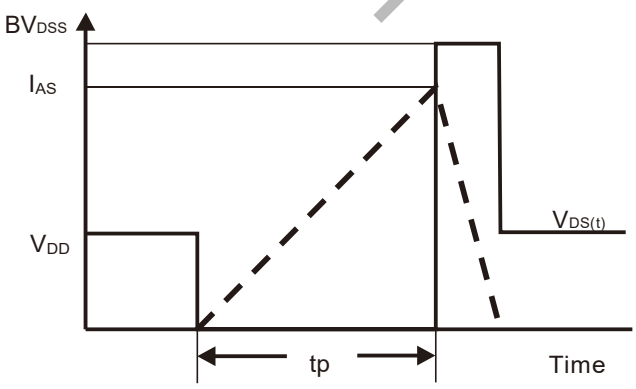
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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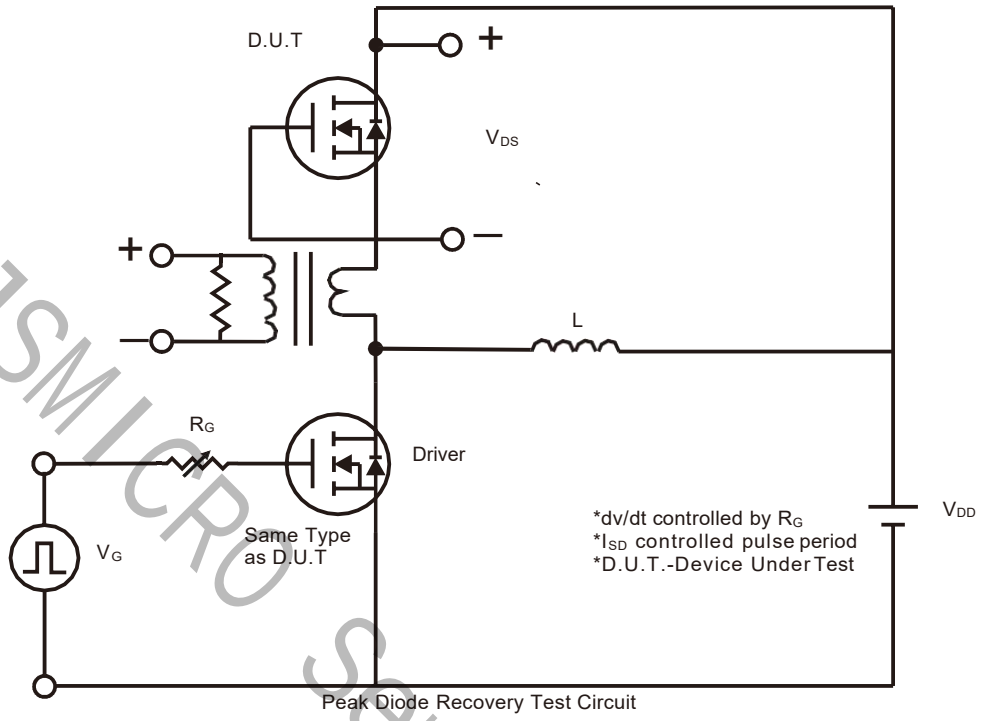
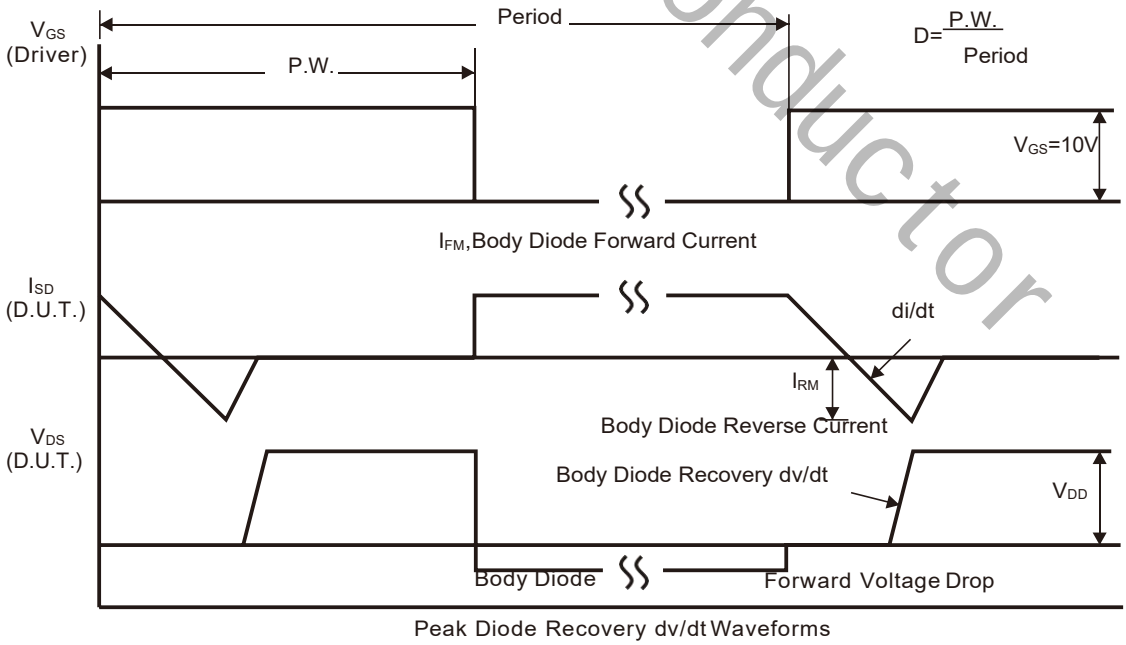
Peak Diode Recovery dv/dt Test Circuit & Waveform



Peak Diode Recovery Test Circuit



Peak Diode Recovery dv/dt Waveforms

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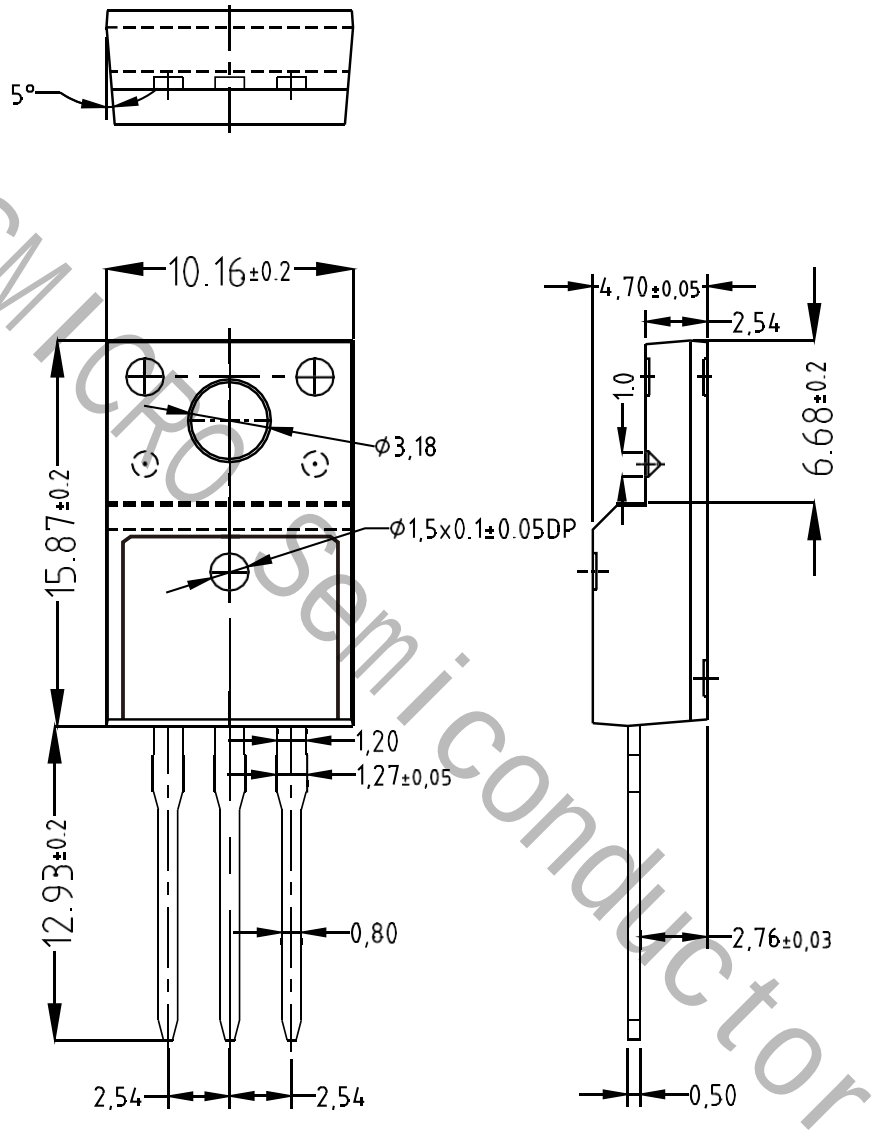
Package Dimension

TO-220F

Unit: mm



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