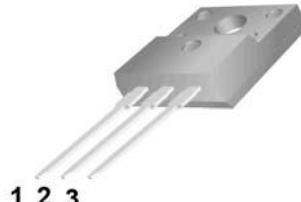
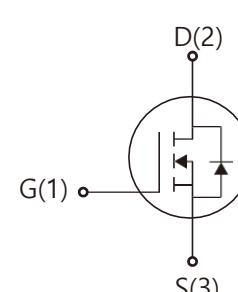


<p>Features:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Low Intrinsic Capacitances. <input type="checkbox"/> Excellent Switching Characteristics. <input type="checkbox"/> Extended Safe Operating Area. <input type="checkbox"/> Unrivalled Gate Charge :$Q_g=8.7\text{nC}(\text{Typ.})$. <input type="checkbox"/> $V_{DSS}=650\text{ V}, I_D=8\text{A}$ <input type="checkbox"/> $R_{DS(on)} : 0.58 \Omega (\text{Max}) @ V_G=10\text{V}$ <input type="checkbox"/> 100% Avalanche Tested 	 TO-220F  1.Gate (G) 2.Drain (D) 3.Source (S)
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Absolute Maximum Ratings (Ta=25°C unless otherwise noted)

Symbol	Parameter	Value	Unit
V_{DSS}	Drain-Source Voltage	650	V
I_D	Drain Current	$T_j=25^\circ\text{C}$	8.0
		$T_j=100^\circ\text{C}$	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 ($T_j=25^\circ\text{C}$)	26	W
T_j	Junction Temperature(Max)	150	$^\circ\text{C}$
T_{stg}	Storage Temperature	-55~+150	$^\circ\text{C}$
dv/dt	MOSFET dv/dt ruggedness, $V_{DS}=0\text{V}...480\text{V}$	50	V/ns

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JC}$	Thermal Resistance Junction to Case	-	4.8	$^\circ\text{C}/\text{W}$
$R_{\theta JA}$	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
△BV _{DSS} / △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 =4.0A,V _{GS} =10V	-	0.50	0.58	Ω
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} =25V , V _{GS} =0 , f=1.0MHz	-	410.8	-	pF
C _{oss}	Output Capacitance		-	41.7	-	
C _{rss}	Reverse Transfer Capacitance			3.1	-	
Switching Characteristics						
T _{d(on)}	Turn-On Delay Time	V _{DD} =400V , I _D =4A R _G =25Ω (Note 3,4)	-	26.4		nS
T _r	Turn-on Rise Time		-	17.9		
T _{d(of f)}	Turn-Off Delay Time		-	56.2		
T _f	Turn-Off Rise Time		-	14.0		
Q _g	Total Gate Charge	V _{DS} =400V,V _{GS} =10V , I _D =5A (Note3,4)	-	8.6		nC
Q _{gs}	Gate-Source Charge		-	2.2	-	
Q _{gd}	Gate-Drain Charge		-	3.8	-	
Drain-Source Diode Characteristics and Maximum Ratings						
I _s	Max. Diode Forward Current	-		--	8	A
I _{SM}	Max. Pulsed Forward Current	-		--	24	
V _{SD}	Diode Forward Voltage	I _D =8A	-	-	1.3	V
T _{rr}	Reverse Recovery Time	I _s =4A,V _{GS} =0V diF/dt=100A/μs (Note3)	-	214.3	-	nS
Q _{rr}	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_{θJA} 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.

Typical Characteristics

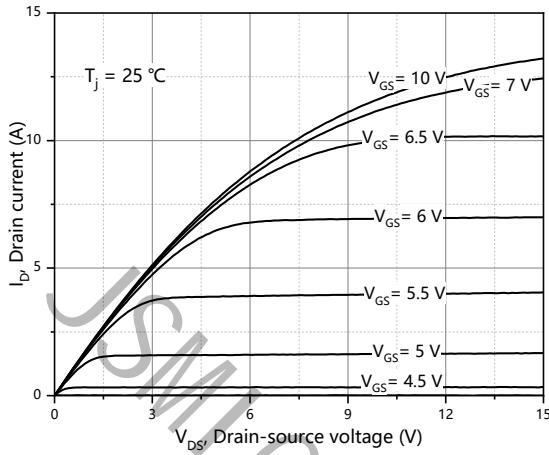


Figure 1. Typ. output characteristics

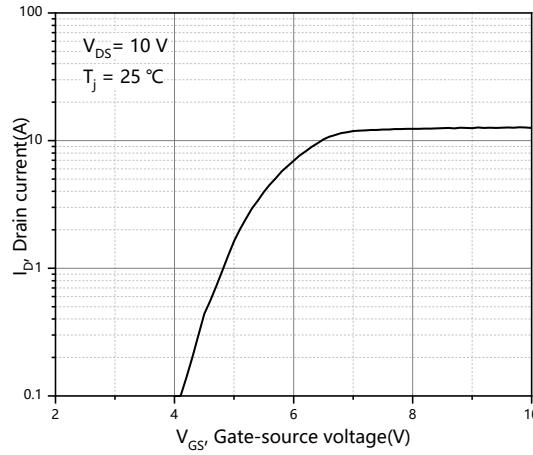


Figure 2. Typ. transfer characteristics

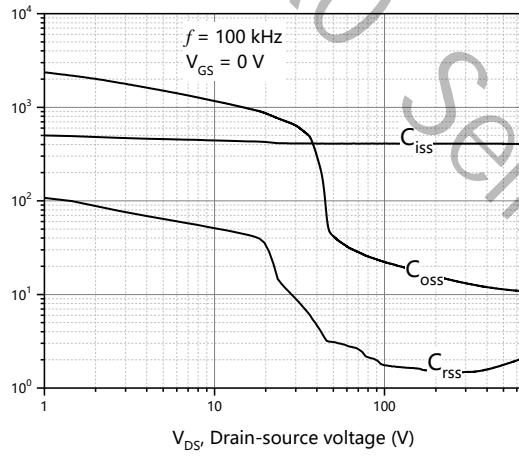


Figure 3. Typ. capacitances

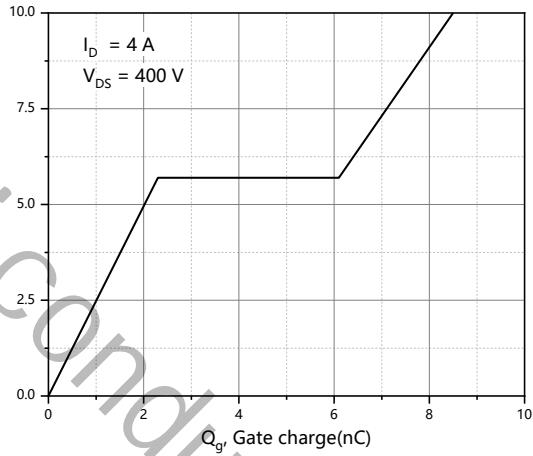


Figure 4. Typ. gate charge

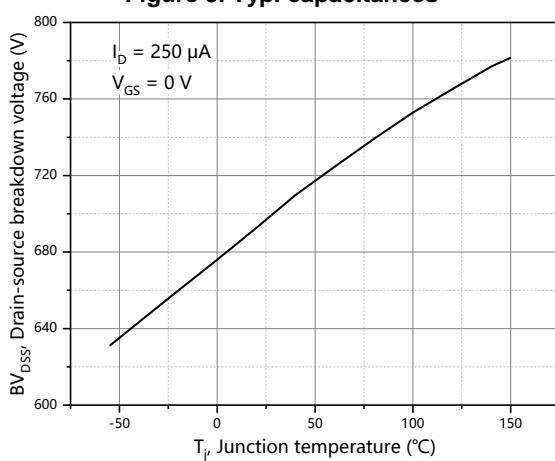


Figure 5. Drain-source breakdown voltage

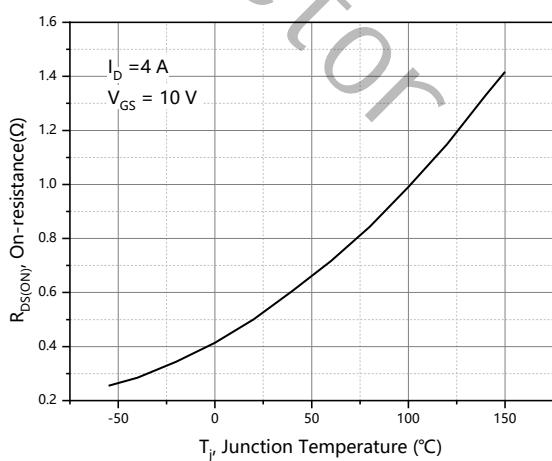
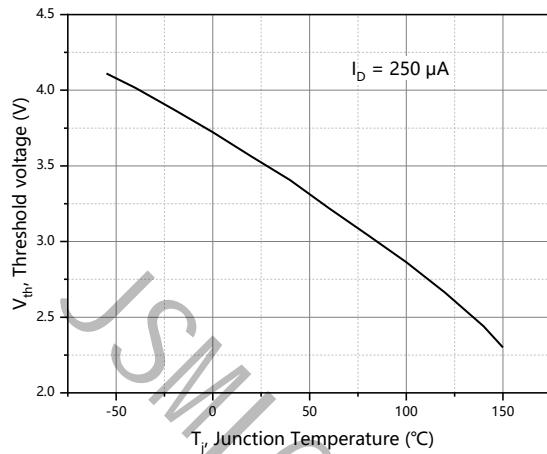
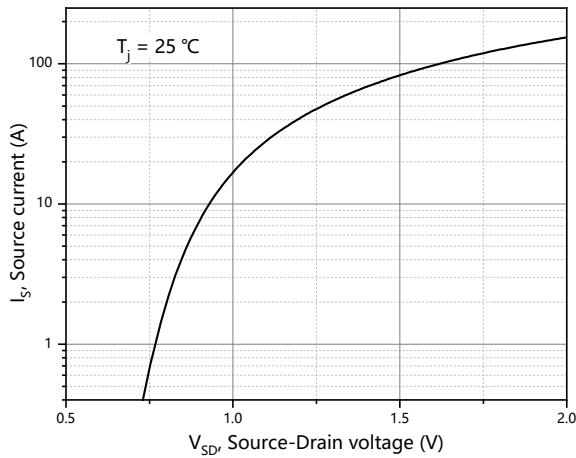
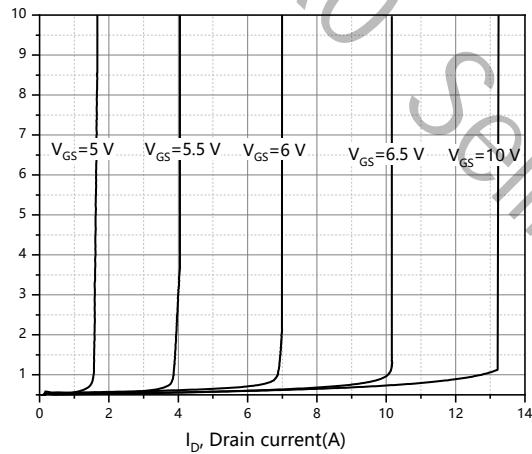
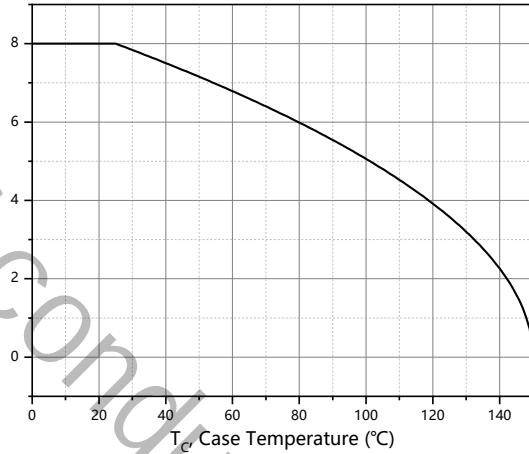
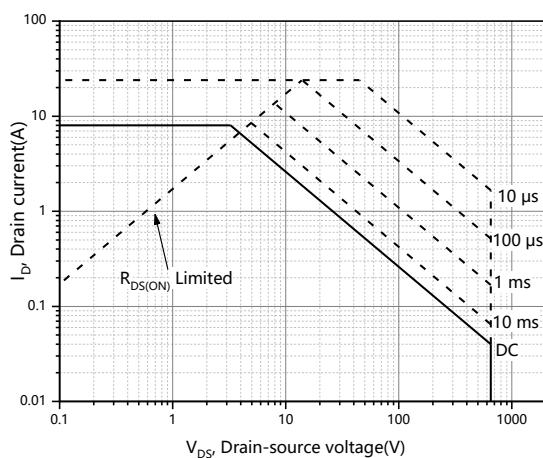
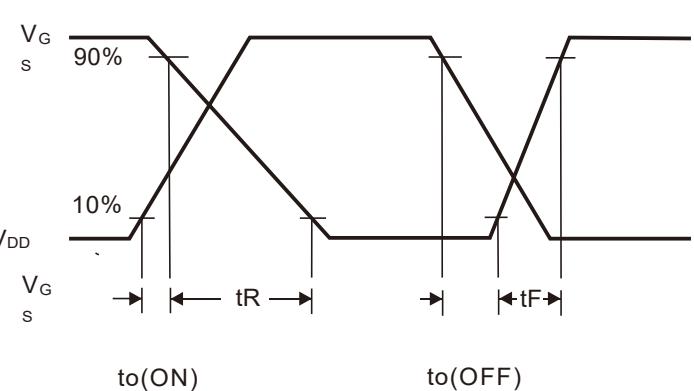
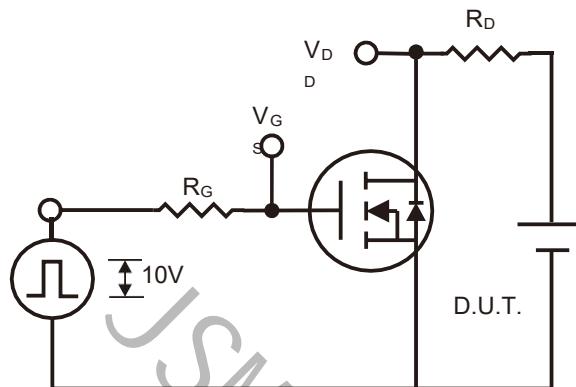
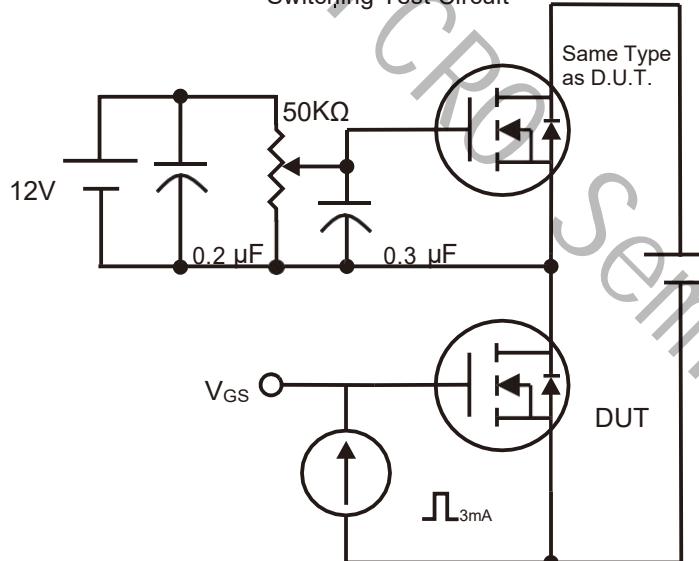
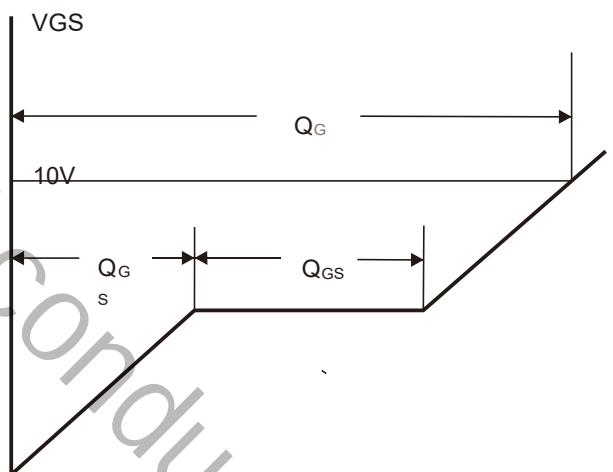
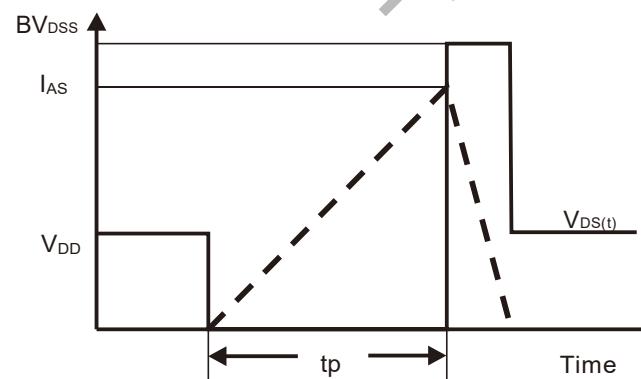
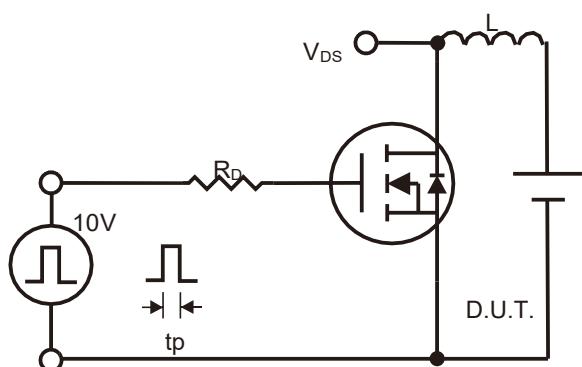


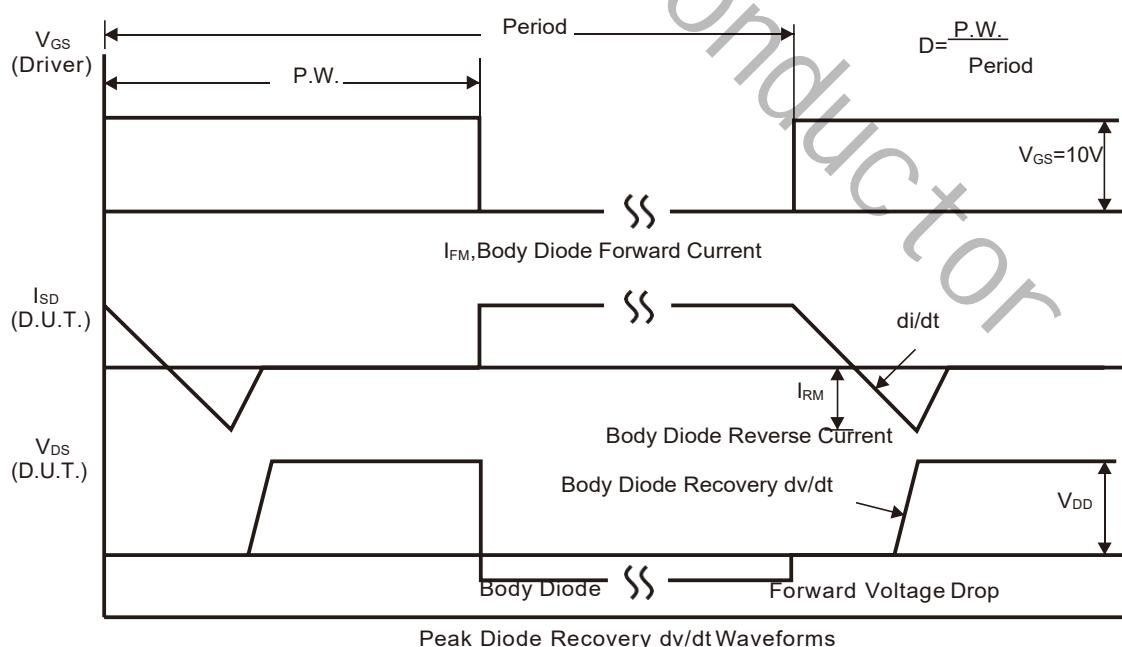
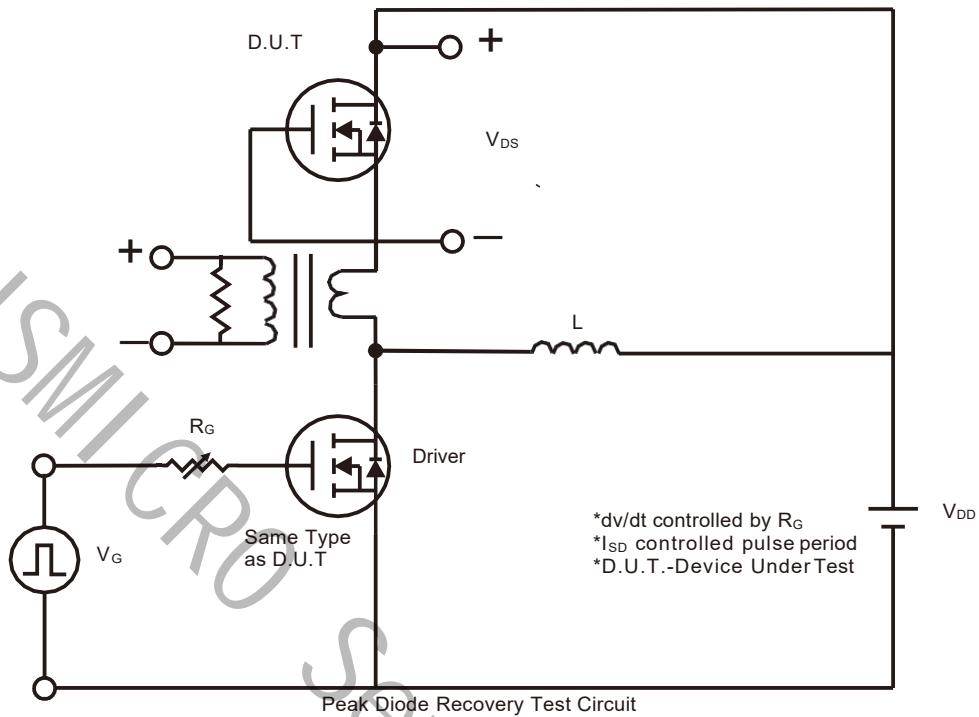
Figure 6. Drain-source on-state resistance

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 $T_C=25^\circ\text{C}$

Gate Charge Test Circuit & Waveform

Switching Test Circuit

Switching Waveforms

Gate Charge Test Circuit

Unclamped Inductive Switching Test Circuit
Unclamped Inductive Switching Waveforms

Peak Diode Recovery dv/dt Test Circuit & Waveform



Package Dimension

TO-220F

Unit: mm

