

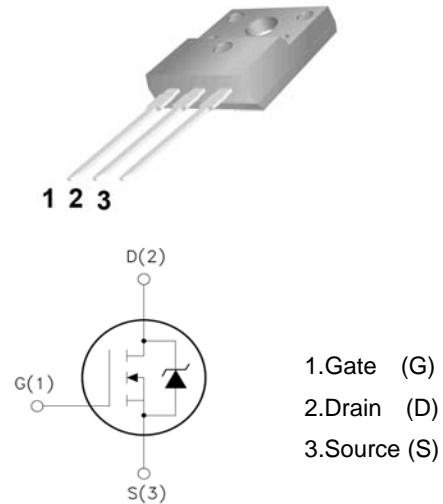
85N06

60V N-Channel MOSFET

Features:

- Low Intrinsic Capacitances.
- Excellent Switching Characteristics.
- Extended Safe Operating Area.
- Unrivalled Gate Charge : $Q_g=72\text{nC}$ (Typ.).
- $BVDSS=60\text{V}, I_D=85\text{A}$
- $R_{DS(on)} : 8.5\text{m}\Omega$ (Max) @ $V_G=10\text{V}$
- 100% Avalanche Tested

TO-220F 



Absolute Maximum Ratings* ($T_c=25^\circ\text{C}$ Unless otherwise noted)

Symbol	PARAMETER	Value	Unit
V_{DSS}	Drain-Source Voltage	60	V
I_D	Drain Current	$T_c=25^\circ\text{C}$	85
		$T_c=100^\circ\text{C}$	65
$V_{GS(TH)}$	Gate Threshold Voltage	± 25	V
E_{AS}	Single Pulse Avalanche Energy (note1)	100	mJ
I_{AR}	Avalanche Current (note2)	85	A
P_D	Power Dissipation ($T_c=25^\circ\text{C}$)	65	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

Symbol	PARAMETER	Typ.	MAX.	Unit
$R_{\theta JC}$	Thermal Resistance, Junction to Case	-	1.92	$^\circ\text{C}/\text{W}$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	-	62.5	$^\circ\text{C}/\text{W}$

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

Parameter	Symbol	Condition	Min	Typ	Max	Unit
On/off states						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V I _D =250μA	60	-	-	V
Zero Gate Voltage Drain Current(T _C =25°C)	I _{DSS}	V _{DS} =60V, V _{GS} =0V	-	-	1	μA
Zero Gate Voltage Drain Current(T _C =125°C)	I _{DSS}	V _{DS} =48V, V _{GS} =0V	-	-	10	μA
Gate-Body Leakage Current	I _{GSS}	V _{GS} =±30V, V _{DS} =0V	-	-	±100	nA
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	2	-	4	V
Drain-Source On-State Resistance	R _{DS(on)}	V _{GS} =10V, I _D =40A	-	7.5	8.5	mΩ
Dynamic Characteristics						
Forward Transconductance	g _{FS}	V _{DS} =5V, I _D =40A	-	105	-	S
Input Capacitance	C _{iss}	V _{DS} =35V, V _{GS} =0V, F=1.0MHz	-	3091	-	PF
Output Capacitance	C _{oss}		-	292	-	PF
Reverse Transfer Capacitance	C _{rss}		-	219	-	PF
Total Gate Charge	Q _g	V _{DS} =32V, I _D =40A , V _{GS} =10V	-	72	-	nC
Gate-Source Charge	Q _{gs}		-	17	-	nC
Gate-Drain Charge	Q _{gd}		-	26	-	nC
Switching times						
Turn-on Delay Time	t _{d(on)}	V _{DD} =32V, I _D =40A, R _L =15 Ω V _{GS} =10V, R _G =2.7Ω	-	13	-	nS
Turn-on Rise Time	t _r		-	75	-	nS
Turn-Off Delay Time	t _{d(off)}		-	46	-	nS
Turn-Off Fall Time	t _f		-	73	-	nS
Source- Drain Diode Characteristics						
Source-drain current(Body Diode)	I _{SD}		-	-	85	A
Pulsed Source-drain current(Body Diode)	I _{SDM}		-	-	300	A
Forward on voltage ^(Note 1)	V _{SD}	T _J =25°C, I _{SD} =85A, V _{GS} =0V	-	-	1.5	V
Reverse Recovery Time ^(Note 1)	t _{rr}	T _J =25°C, I _F =85A, di/dt=100A/μs	-	36	-	nS
Reverse Recovery Charge ^(Note 1)	Q _{rr}		-	43	-	nC
Forward Turn-on Time	t _{on}	Intrinsic turn-on time is negligible(turn-on is dominated by L _S +L _D)				

Notes 1. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 1.5%, R_G=25Ω, Starting T_J=25°C

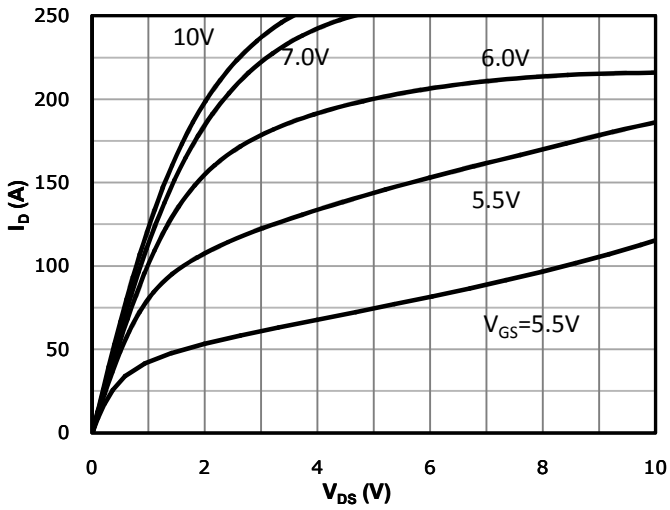
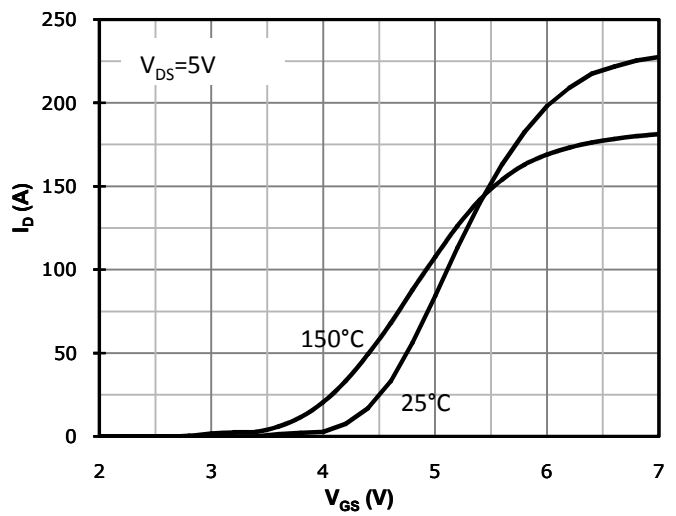
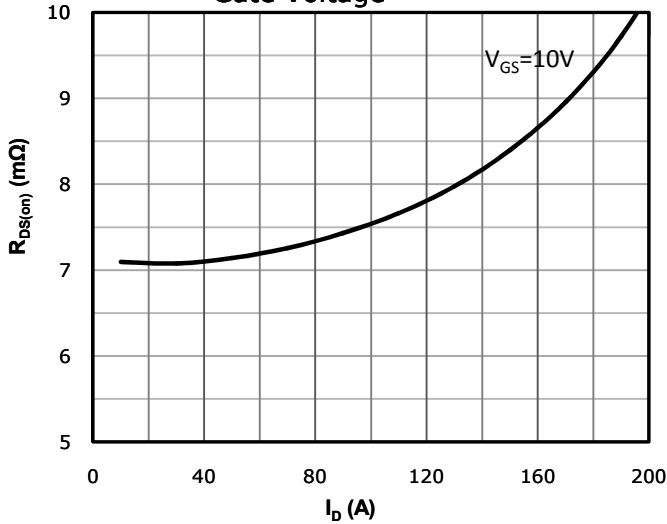
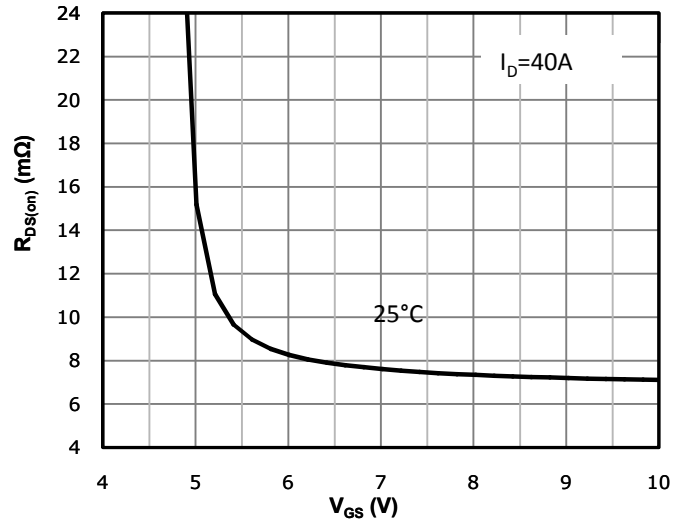
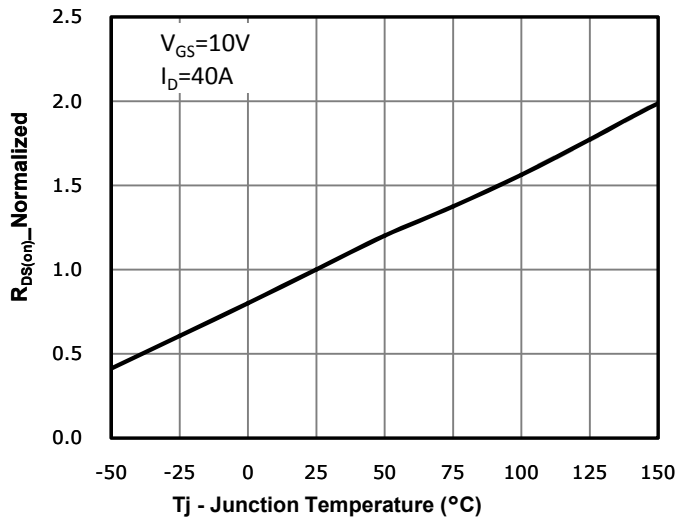
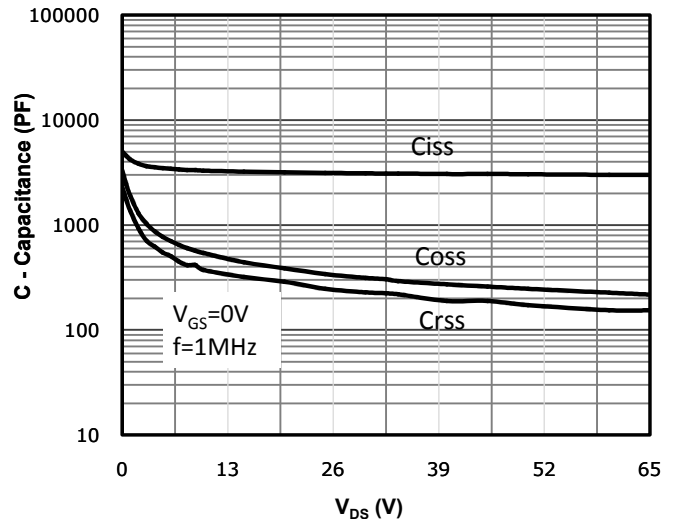
Typical Electrical and Thermal Characteristics (curves)
Fig 1: Output Characteristics

Fig 2: Transfer Characteristics

Fig 3: Rds(on) vs Drain Current and Gate Voltage

Fig 4: Rds(on) vs Gate Voltage

Fig 5: Rds(on) vs. Temperature

Fig 6: Capacitance Characteristics


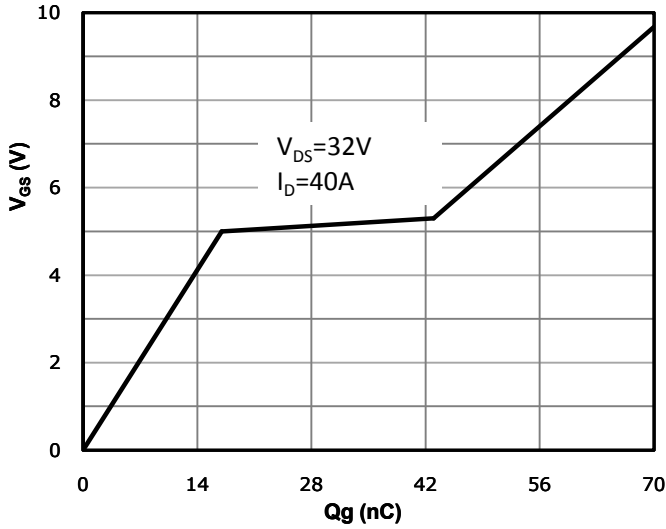
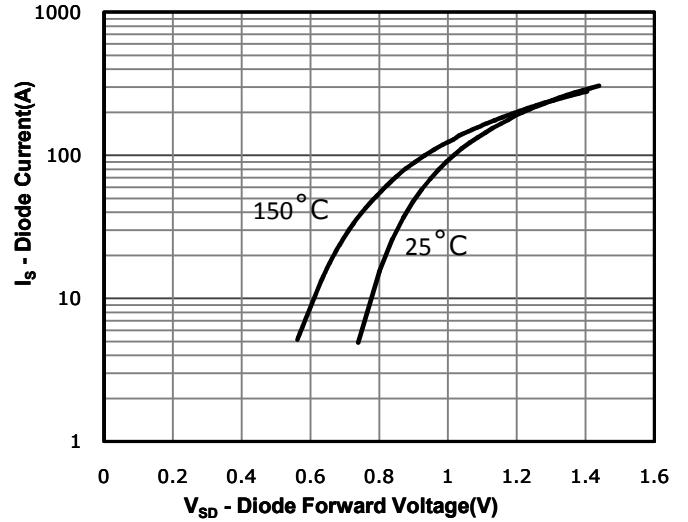
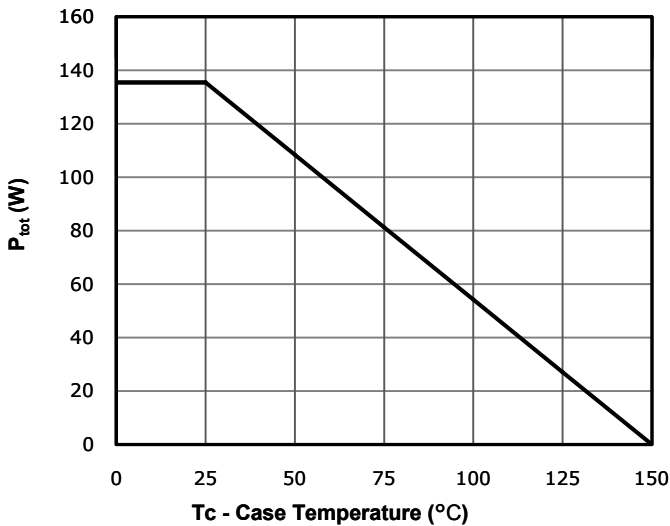
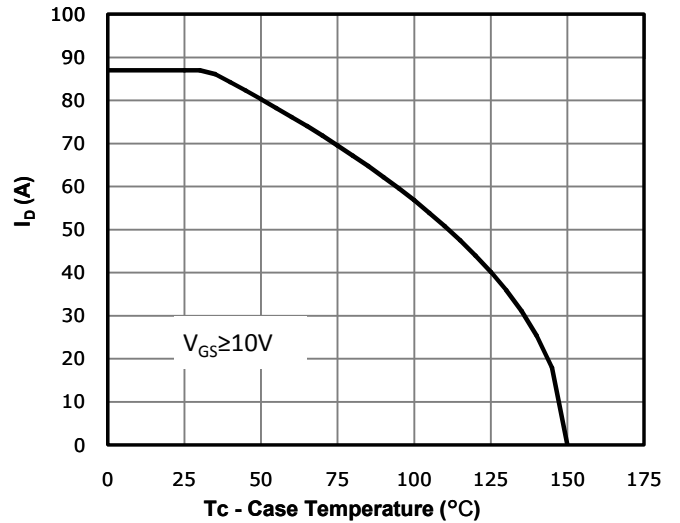
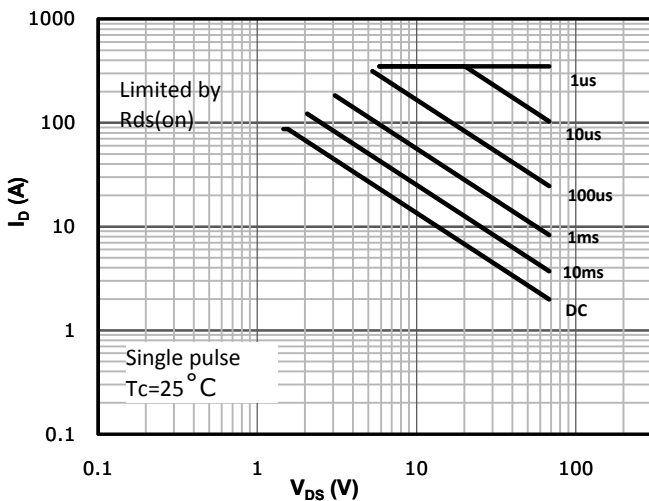
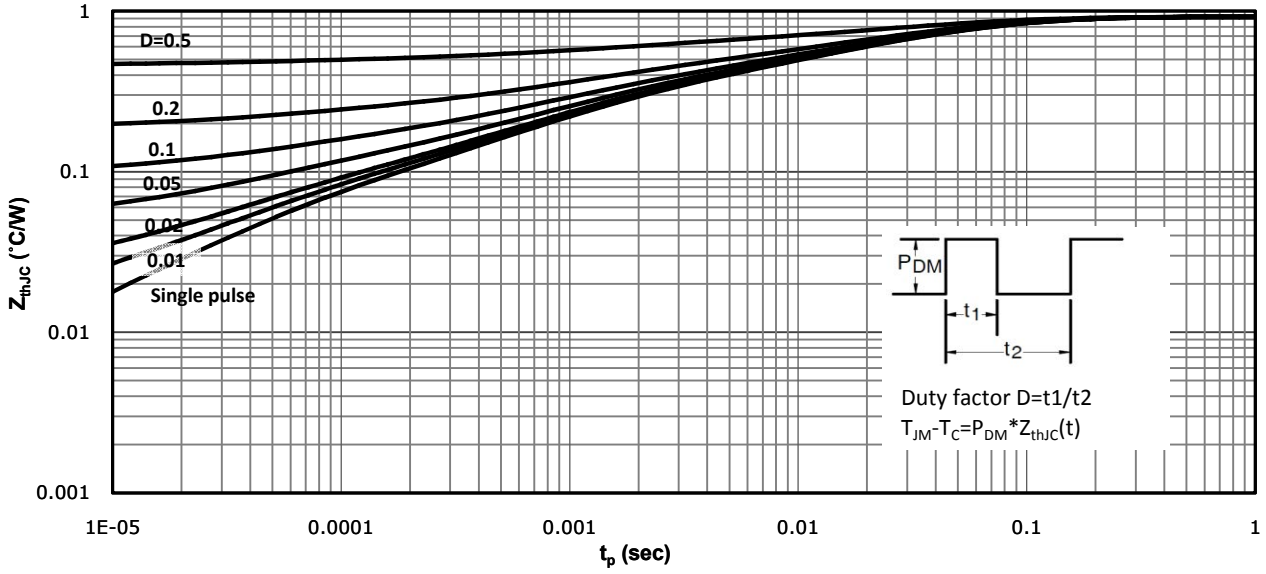
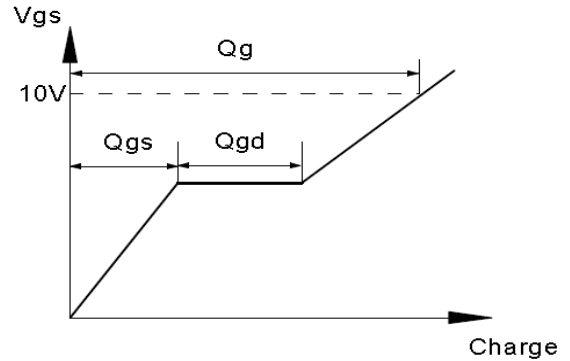
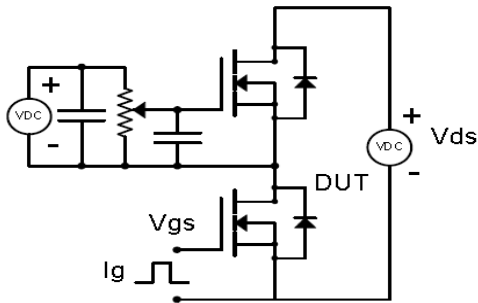
Fig 7: Gate Charge Characteristics

Fig 8: Body-diode Forward Characteristics

Fig 9: Power Dissipation

Fig 10: Drain Current Derating

Fig 11: Safe Operating Area


Fig 12: Max. Transient Thermal Impedance

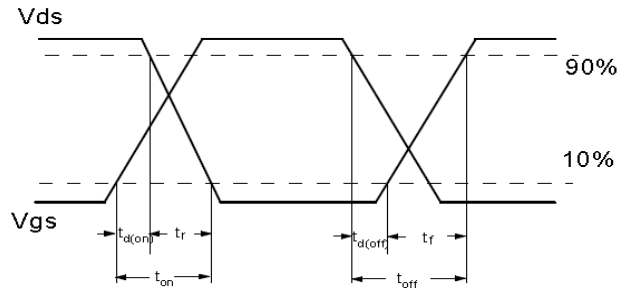
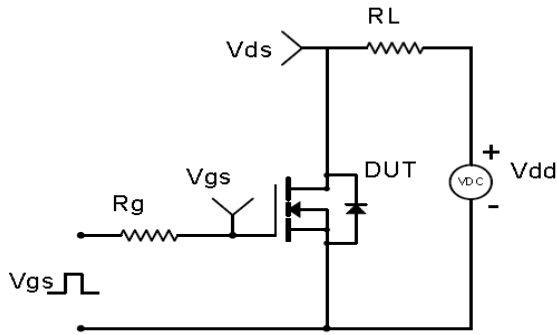


Test Circuit & Waveform

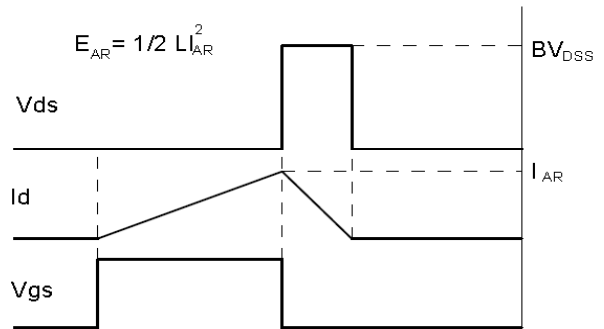
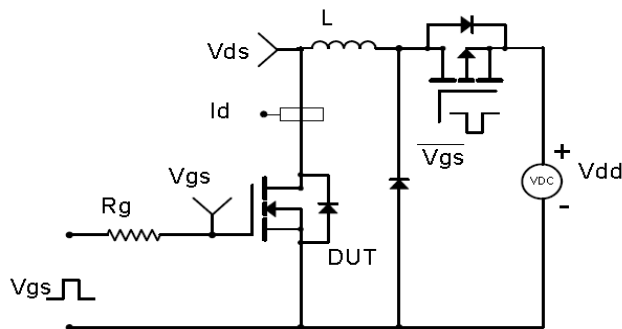
Gate Charge Test Circuit & Waveform



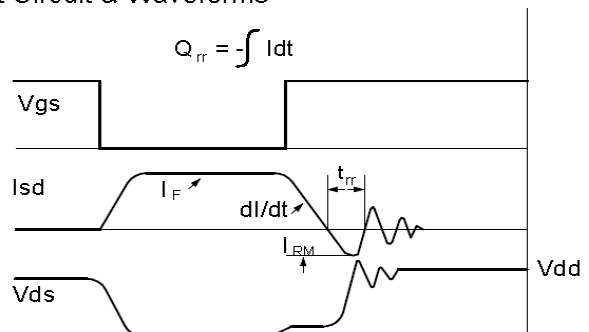
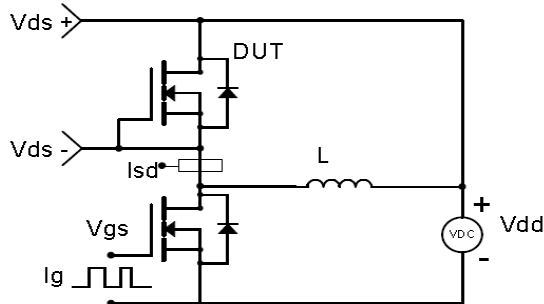
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



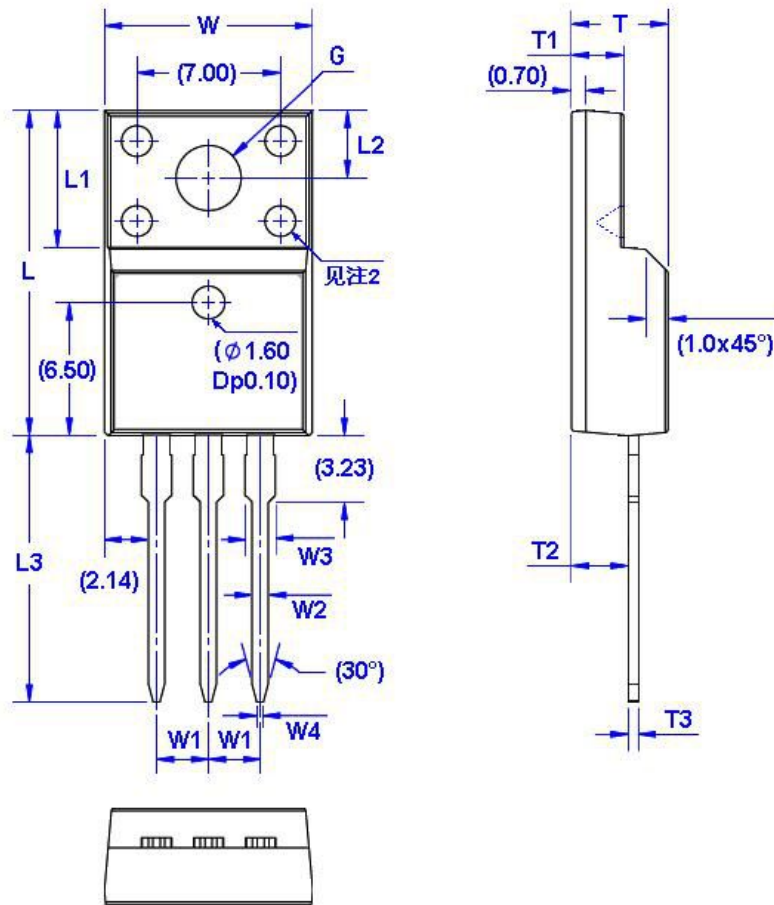
Diode Recovery Test Circuit & Waveforms



Package Dimension

TO-220F

Unit: mm



Symbol	Size		Symbol	Size		Symbol	Size		Symbol	Size	
	Min	Max		Min	Max		Min	Max		Min	Max
W	9.96	10.36	W4	0.25	0.45	L3	12.78	13.18	T3	0.45	0.60
W1	2.54 (TYP)		L	15.67	16.07	T	4.50	4.90	G(ϕ)	3.08	3.28
W2	0.70	0.90	L1	6.48	6.88	T1	2.34	2.74			
W3	1.24	1.47	L2	3.20	3.40	T2	2.56	2.96			