

85A 80V N-channel Enhancement Mode Power MOSFET

1 Description

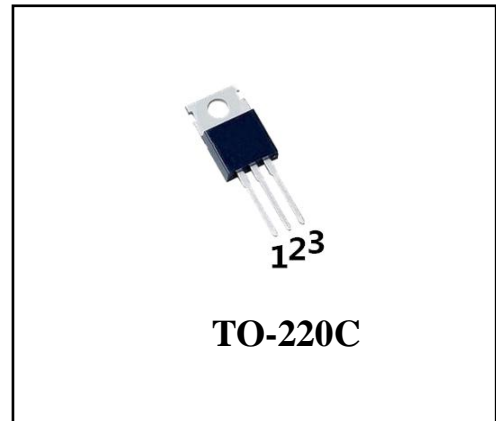
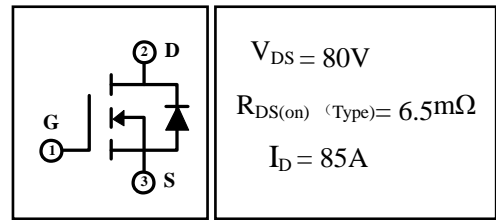
These N-channel enhancement mode power MOSFETS Used advanced trench technology design, provided excellent RDSON and low gate charge. Which accords with the RoHS standard.

2 Features

- Low On Resistance
- Low Gate Charge
- High avalanche Current
- Fast Switching
- Low Reverse Transfer Capacitances
- 100% Single Pulse Avalanche Energy Test
- 100% ΔV_{DS} Test

3 Applications

- Power switching applications
- DC-DC converters
- UPS power supply



4 Electrical Characteristics

4.1 Absolute Maximum Ratings (Tc=25°C, unless otherwise noted)

Parameter	Symbol	Value	Unit	
Drain-Source Voltage	V_{DSS}	80	V	
Gate-Source Voltage	V_{GS}	± 25	V	
Drain Current(continuous) ⁽³⁾	I_D	85	A	
Drain Current(continuous)(T=100°C) ⁽³⁾	$I_D(100^\circ C)$	70	A	
Drain Current(Pulsed) ⁽⁴⁾	I_{DM}	340	A	
Avalanche Current ⁽⁵⁾	I_{AS}	20	A	
Single Pulse Avalanche Energy ⁽⁵⁾	E_{AS}	410	mJ	
Maximum Power Dissipation	T _a =25°C	P _D	2	W
	T _c =25°C	P _D	240	W
Operating Junction Temperature Range	T _J	-55~175	°C	
Storage Temperature Range	T _{stg}	-55~175	°C	
High Temperature(tin solder)	T _L	300	°C	

4.2 Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal Resistance Junction-to-Case	$R_{\theta JC}$	0.63	$^{\circ}\text{C}/\text{W}$
Thermal Resistance Junction-to-Ambient	$R_{\theta JA}$	75	$^{\circ}\text{C}/\text{W}$

4.3 Electrical Characteristics ($T_C=25^{\circ}\text{C}$, unless otherwise noted)

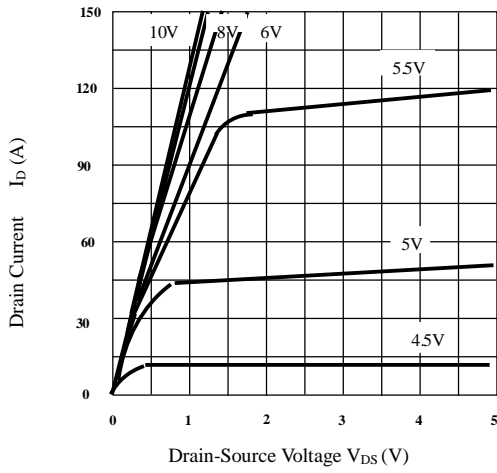
Parameter	Symbol	Test Condition	Value			Unit
			Min.	Typ.	Max.	
Off Characteristics						
Drain-source Breakdown Voltage	V_{DSS}	$I_D=250\mu\text{A}, V_{GS}=0\text{V}$	80	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=80\text{V}, V_{GS}=0\text{V}, T_C=25^{\circ}\text{C}$	--	--	1	μA
		$V_{DS}=64\text{V}, V_{GS}=0\text{V}, T_C=125^{\circ}\text{C}$	--	--	100	μA
Gate-to-Body Leakage Current	I_{GSS}	$V_{GS}=\pm 25\text{V}, V_{DS}=0\text{V}$	--	--	± 100	nA
On Characteristics ⁽³⁾						
Gate threshold voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu\text{A}$	2	3	4	V
Drain-Source on Resistance	$R_{DS(on)}$	$V_{GS}=10\text{V}, I_D=40\text{A}$	--	6.5	7.8	$\text{m}\Omega$
Gate Resitance	R_G	$V_{DD}=0\text{V}, V_{GS}=0\text{V}, f=1\text{MHz}$	--	1.3	--	Ω
Dynamic Characteristics ⁽⁴⁾						
Input Capacitance	C_{iss}	$V_{GS}=0\text{V}, V_{DS}=25\text{V}, f=1\text{MHz}$	--	3110	--	pF
Output Capacitance	C_{oss}		--	445	--	
Reverse Transfer Capacitance	C_{rss}		--	270	--	
Switching Characteristics ⁽⁴⁾						
Turn-on Delay Time	$t_{d(on)}$	$I_D=40\text{A}, V_{DS}=40\text{V}, V_{GS}=10\text{V}, R_{GEN}=6.8\Omega$	--	20.4	--	nS
Turn-on Rise Time	t_r		--	63	--	
Turn-off Delay Time	$t_{d(off)}$		--	67	--	
Turn-off Fall Time	t_f		--	43	--	
Total Gate Charge	Q_g	$I_D=40\text{A}, V_{DS}=40\text{V}, V_{GS}=10\text{V}$	--	76	--	nC
Gate-to-Source Charge	Q_{gs}		--	9.5	--	
Gate-to-Drain("Miller")Charge	Q_{gd}		--	40	--	
Drain-Source Diode Characteristics						
Diode Forward Voltage ⁽³⁾	V_{SD}	$V_{GS}=0\text{V}, I_S=85\text{A}$	--	--	1.3	V
Diode Forward Current ⁽²⁾	I_S		--	--	85	A
Reverse Recovery Time	t_{rr}	$T_J=25^{\circ}\text{C}, I_F=40\text{A}, dI_F/dt=100\text{A}/\mu\text{S}, V_{GS}=0\text{V}$	--	25	--	nS
Reverse Recovery Charge	Q_{rr}		--	18.5	--	nC

Notes:

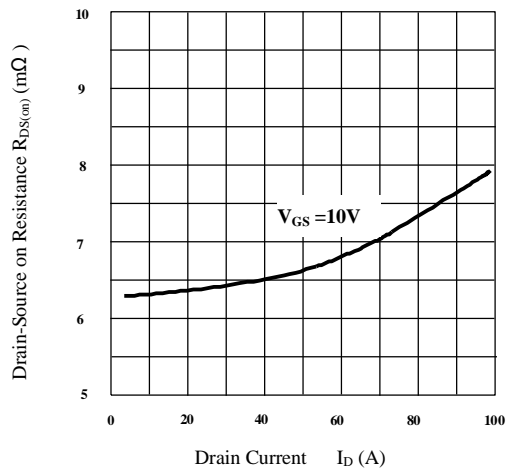
- 1: Repetitive rating, pulse width limited by maximum junction temperature.
 - 2: Surface mounted on FR4 Board, $t \leq 10\text{sec}$.
 - 3: Pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$.
 - 4: Guaranteed by design, not subject to production.
- 5: $L=0.5\text{mH}, I_D=40.5\text{A}, V_{DD}=50\text{V}, V_{GS}=10\text{V}, \text{Start } T_J=25^{\circ}\text{C}$.

5 Typical characteristics diagrams

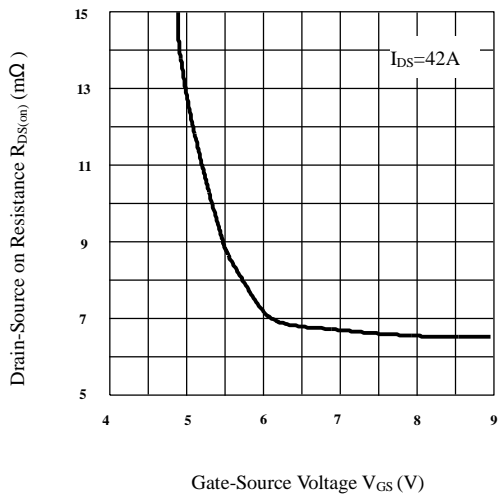
Output Characteristics



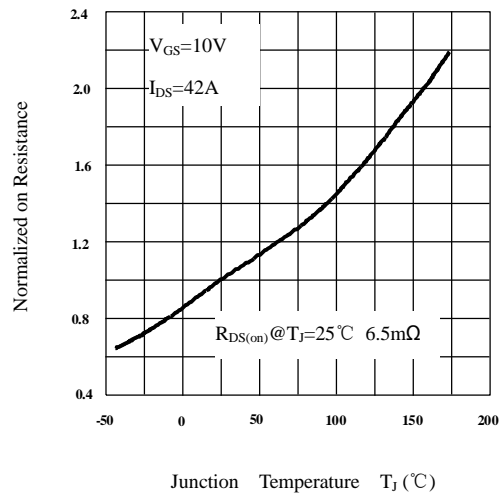
Drain-Source On Resistance vs. I_D



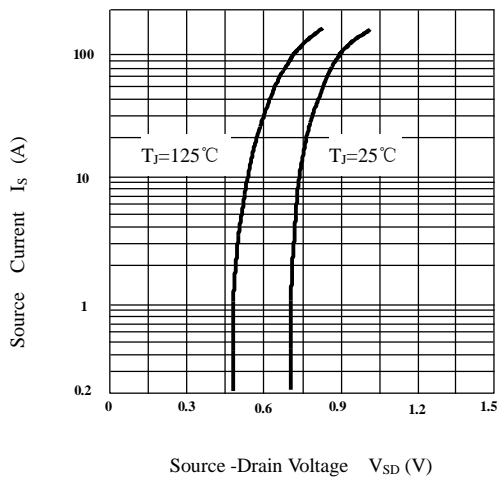
Drain-Source On Resistance vs. V_{GS}



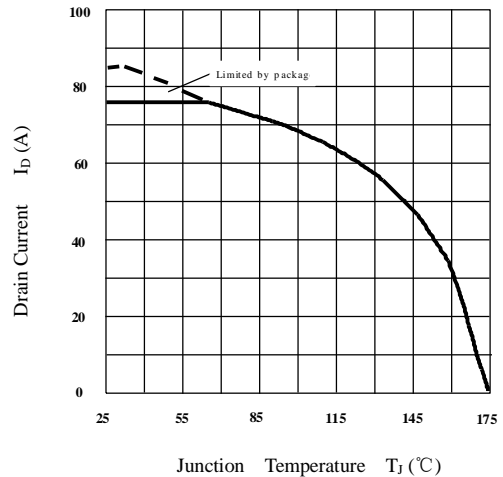
Drain-Source On Resistance vs. T_J



Drain-Source Diode Forward

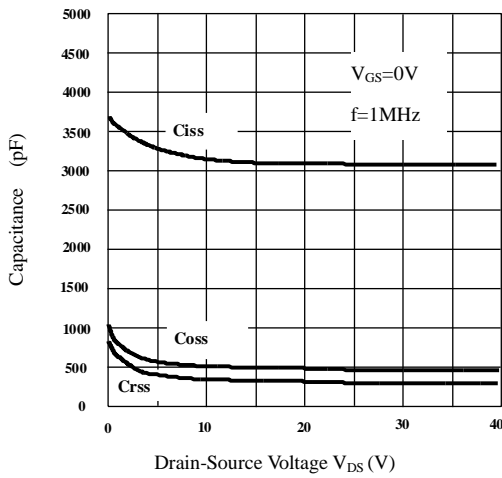


Maximum Drain Current vs. T_J

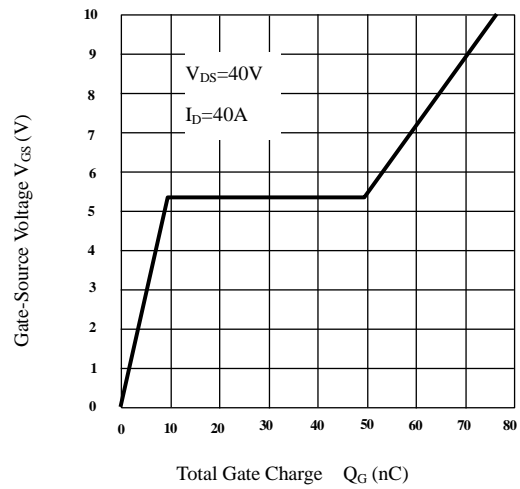


5 Typical characteristics diagrams(continues)

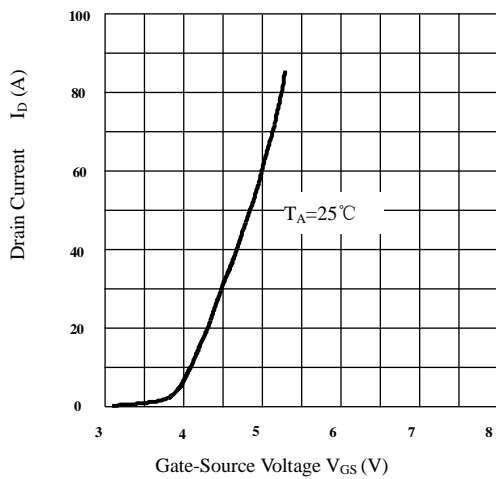
Capacitance vs. V_{DS}



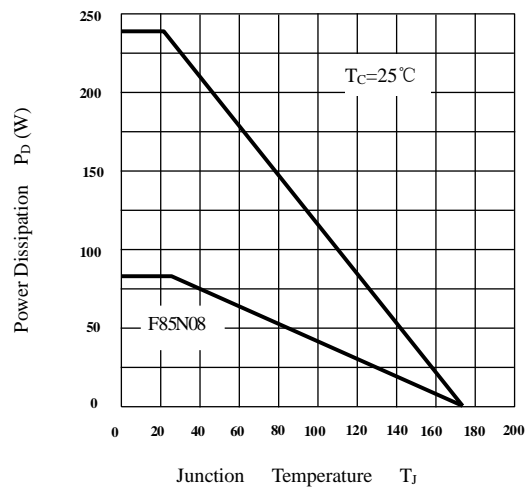
Gate Charge Characteristics



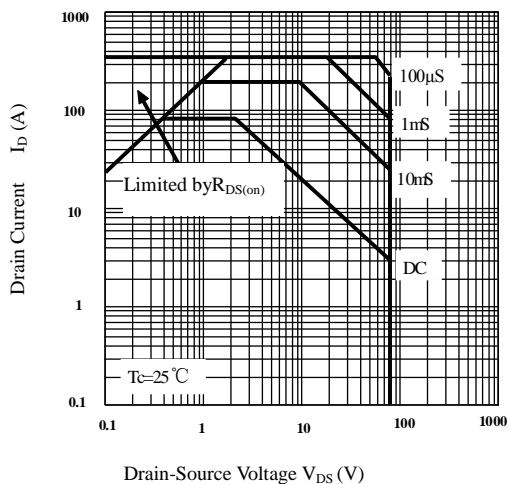
Transfer Characteristics



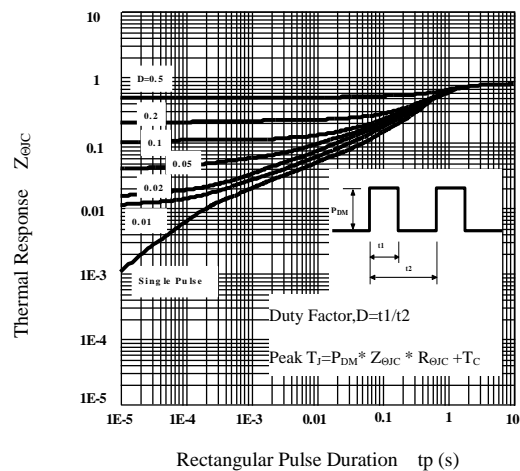
Power Dissipation



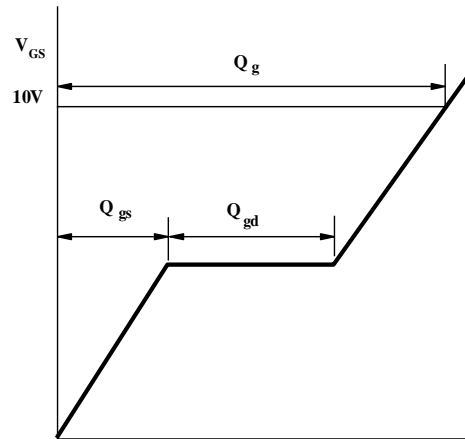
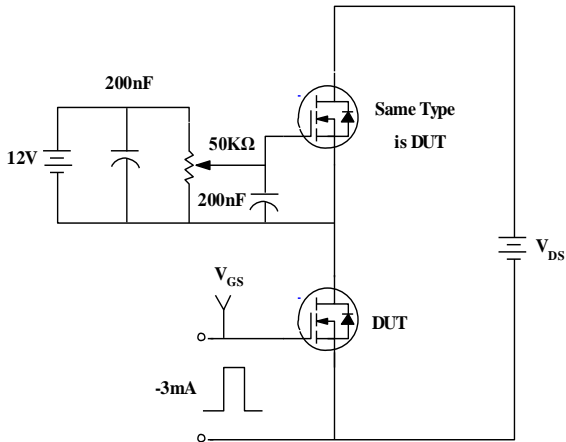
Safe Operation Area



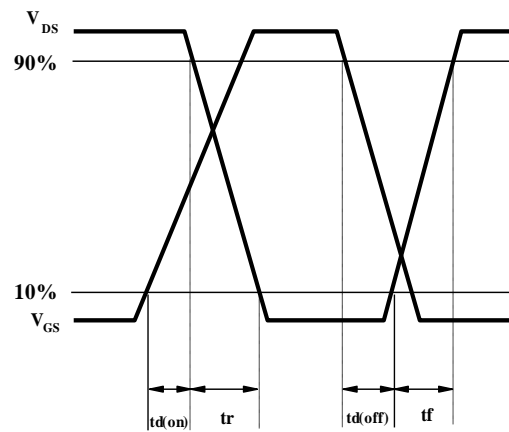
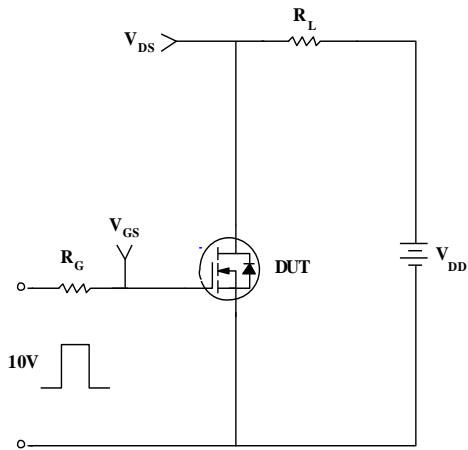
Transient Thermal Response Curve



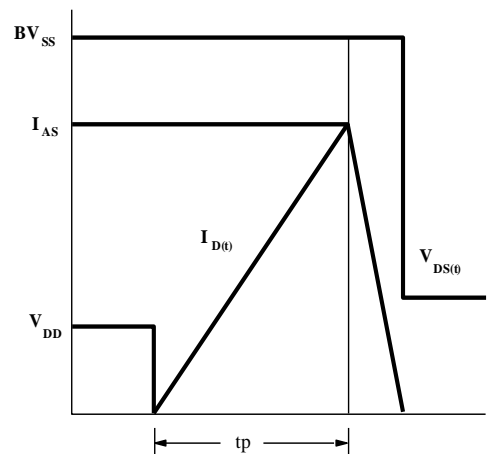
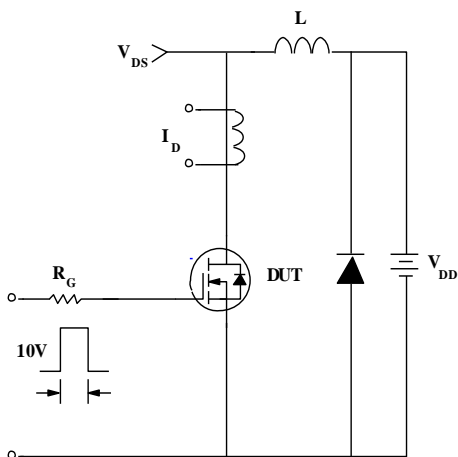
6 Typical Test Circuit and Waveform



1) Gate Charge Test Circuit & Waveform

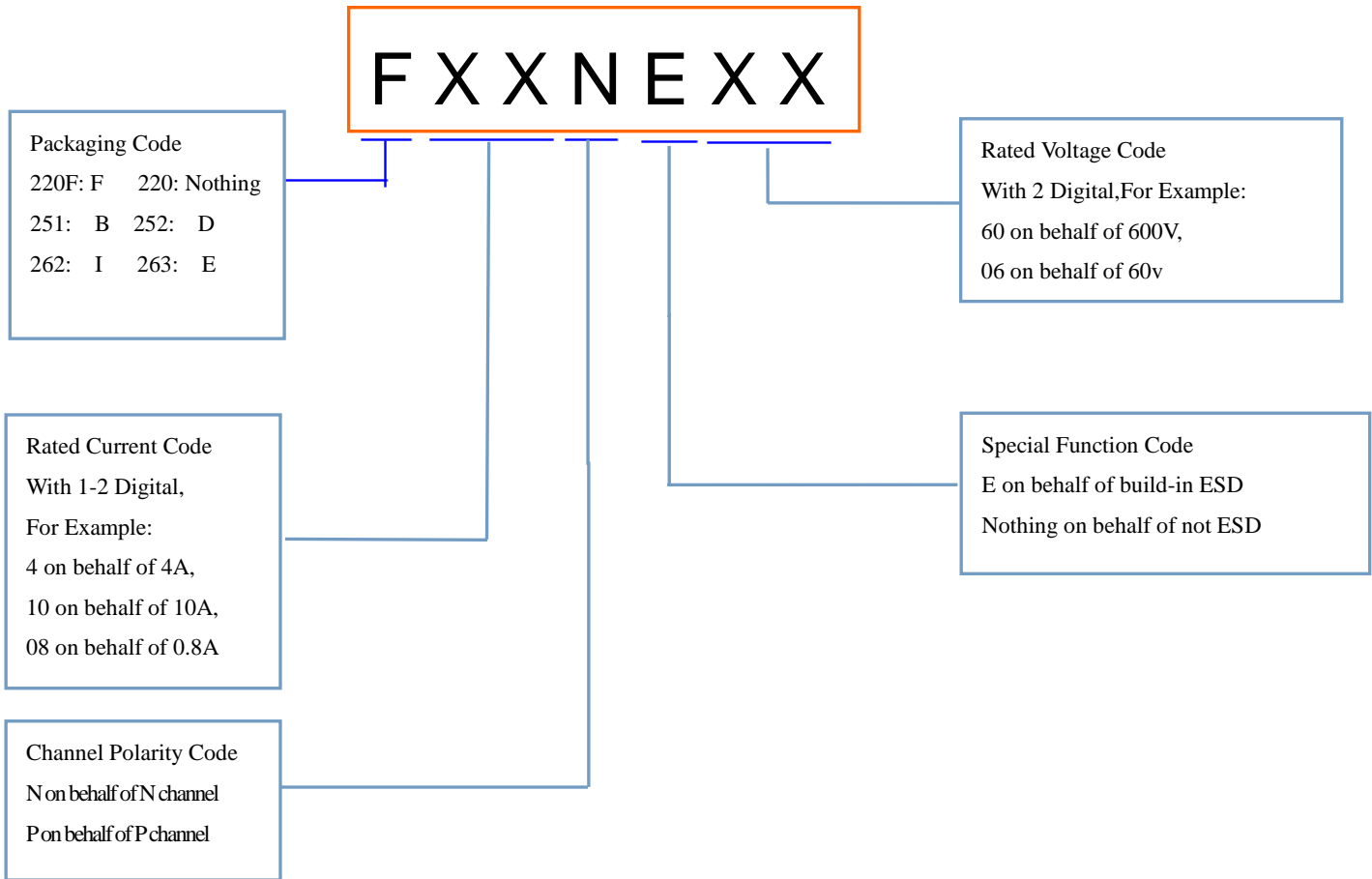


2) Switching Test Circuit & Waveforms



3) Unclamped Inductive Test Circuit & Waveforms

7 Product Names Rules

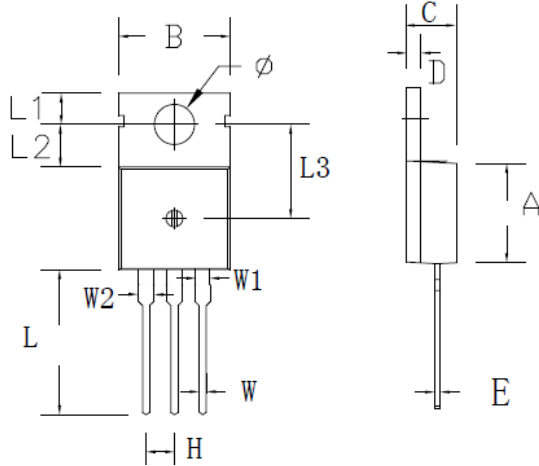


8 Product Specifications and Packaging Models

Product Model	Package Type	Mark Name	RoHS	Package	Quantity
85N08	TO-220C	85N08	Pb-free	Tube	1000/box
F85N08	TO-220F	F85N08	Pb-free	Tube	1000/box
I85N08	TO-262	I85N08	Pb-free	Tube	1000/box
E85N08	TO-263	E85N08	Pb-free	Tape & Reel	800/box

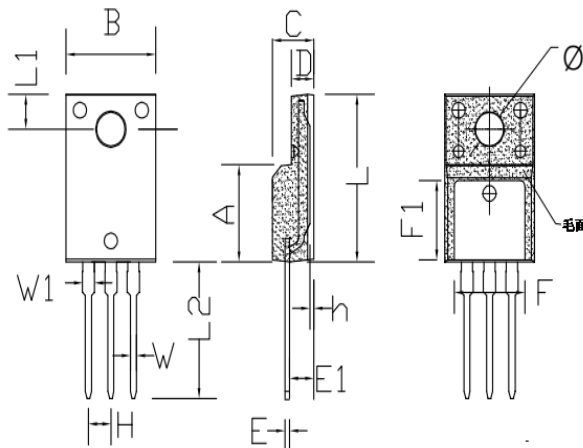
9 Dimensions

TO-220C PACKAGE OUTLINE DIMENSIONS



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	min.	max.	min.	max.
A	8.80	9.30	0.346	0.366
B	9.70	10.30	0.382	0.406
C	4.25	4.75	0.167	0.187
D	1.20	1.45	0.047	0.057
E	0.40	0.60	0.016	0.024
H	2.54 TYP		0.100 TYP	
W	0.60	0.95	0.024	0.037
W1	1.05	1.45	0.041	0.057
W2	1.20	1.60	0.047	0.063
L	12.60	13.40	0.496	0.528
L1	2.45	2.95	0.096	0.116
L2	3.45	3.95	0.136	0.156
L3	8.15	8.65	0.321	0.341
φ	3.50	3.90	0.138	0.154

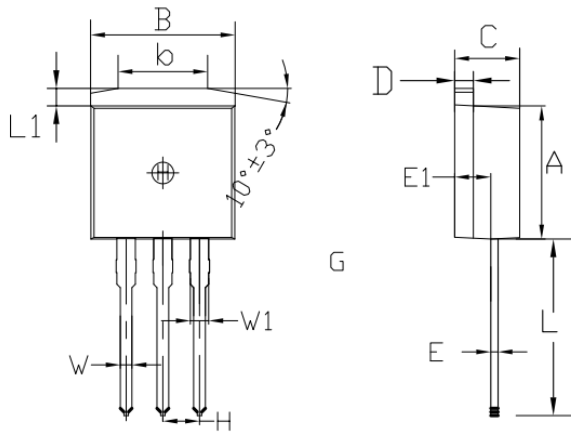
TO-220F PACKAGE OUTLINE DIMENSIONS



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	min.	max.	min.	max.
A	8.80	9.30	0.346	0.366
B	10.00	10.50	0.394	0.413
C	4.30	4.90	0.169	0.193
D	2.30	2.70	0.091	0.106
L	15.55	16.15	0.612	0.636
h	0.40	0.60	0.016	0.024
L1	3.15	3.55	0.124	0.140
L2	12.65	13.35	0.498	0.526
W	0.70	0.90	0.028	0.035
W1	1.15	1.55	0.045	0.061
H	2.54 TYP		0.100 TYP	
E	0.48	0.53	0.019	0.021
φ	2.90	3.40	0.114	0.134
E1	2.40	2.90	0.094	0.114
F	7.75	8.25	0.305	0.325
F1	7.35	7.85	0.289	0.309

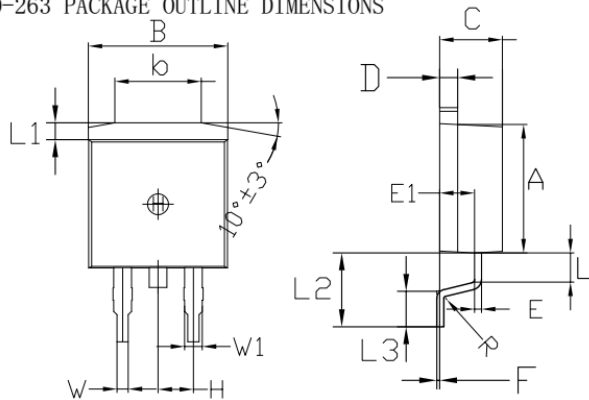
9 Dimensions(continues)

TO-262 PACKAGE OUTLINE DIMENSIONS



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	min.	max.	min.	max.
A	8.80	9.30	0.346	0.366
B	9.70	10.30	0.382	0.406
C	4.25	4.75	0.167	0.187
D	1.20	1.45	0.047	0.057
E	0.40	0.60	0.016	0.024
L	12.25	13.75	0.482	0.541
L1	1.15	1.45	0.045	0.057
E1	2.4	2.6	0.0945	0.1024
W	0.80	0.82	0.0315	0.034
W1	1.20	1.30	0.047	0.051
H	2.54 TYP		0.200 TYP	
b	5.50	6.50	0.216	0.256

TO-263 PACKAGE OUTLINE DIMENSIONS



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	min.	max.	min.	max.
A	8.80	9.30	0.346	0.366
B	9.70	10.30	0.382	0.406
C	4.25	4.75	0.167	0.187
D	1.20	1.45	0.047	0.057
E	0.40	0.60	0.016	0.024
L	1.90	2.30	0.075	0.091
L1	1.15	1.45	0.045	0.057
R	0.24	0.26	0.0095	0.0102
W	0.80	0.82	0.0315	0.0323
W1	1.20	1.30	0.047	0.051
H	2.54 TYP		0.200 TYP	
b	5.50	6.50	0.216	0.256
E1	2.4	2.6	0.0946	0.1024
L2	5.20	5.80	0.205	0.228
L3	2.20	3.20	0.087	0.126
F	0.03	0.23	0.0012	0.0091

10 Attentions

- ROUM Semiconductor Technology CO.,LTD. reserves the right to change the specification without prior notice! The customer should obtain the latest version of the information before making the order and verify that the information is complete and up to date.
- It is the responsibility of the purchaser for any failure or failure of any semiconductor product under certain conditions. It is the responsibility of the purchaser to comply with safety standards and to take safety measures in the system design and machine manufacturing of Roma products in order to avoid potential risk of failure. Injury or property damage.
- Product promotion is endless, our company will be dedicated to provide customers with better products.

11 Appendix

Revision history:

Date	REV.	Description	Page
2017.03.09	1.0	Original	