

BMF65R190

N-channel Super Junction MOSFET

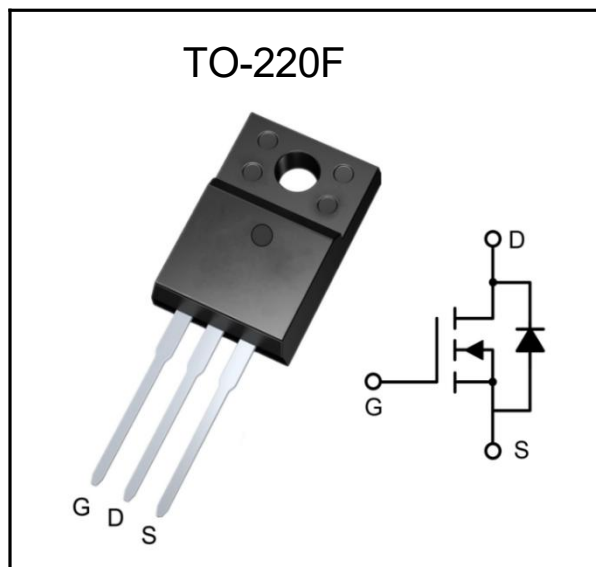
Features

- $V_{(BR)DSS}=650V$, $I_D=20A$
- $R_{DS(on)}@V_{GS}=10V$, TYP=160m Ω
- 100% avalanche tested
- Fast Switching
- Low Gate Charge
- Low $R_{DS(on)}$ per chip area(Low FOM)

Applications

- Switch Mode Power Supply(SMPS)
- TV and Lighting

Package



General Description

BMF65R190 is a N-channel power MOSFET designed according to super junction technology. This device has very low on-resistance and hard ruggedness for switching applications. It's very low conduction loss and fast switching can make applications more efficient and faster.

Absolute Maximum Ratings ($T_J=25^{\circ}C$ unless otherwise specified)

Symbol	Parameter		Value	Units
V_{DS}	Drain-Source Voltage		650	V
V_{GS}	Gate - Source Voltage		± 30	
I_D	Drain Current	$T_C=25^{\circ}C$	20	A
		$T_C=100^{\circ}C$	13	
I_{DM}	Drain Current-Pulse ¹	$T_C=25^{\circ}C$	60	
E_{AS}	Avalanche Energy ²		320	mJ
P_D	Power Dissipation	$T_C=25^{\circ}C$	34	W
T_J, T_{stg}	Operating Junction and Storage Temperature Range		-55 to +150	$^{\circ}C$
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case		3.7	$^{\circ}C/W$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient		80	



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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Off Characteristics						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} = 0V, I _D =250uA	650	–	–	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =650V, V _{GS} =0V	–	–	1	uA
Gate- Source Leakage Current	I _{GSS}	V _{GS} = ±30V, V _{DS} =0V	–	–	±100	nA
On Characteristics						
Gate Threshold Voltage	V _{GS(TH)}	V _{GS} = V _{DS} , I _{DS} =250uA	2	3	4	V
Static Drain-source On Resistance	R _{DS(on)}	VGS =10V, ID =10A	–	160	190	mΩ
Dynamic Characteristics						
Gate Resistance	R _g	f = 1 MHz	–	3	–	Ω
Input capacitance	C _{iSS}	V _{DS} =50V, V _{GS} =0V, f = 400kHz	–	1480	–	pF
Output capacitance	C _{oss}		–	102	–	
Reverse transfer capacitance	C _{rss}		–	2.5	–	
Switching Characteristics						
Turn-on delay time	T _{d(on)}	V _{DD} =325V, V _{GS} =10V, I _D =20A, R _G =25Ω	–	24	–	ns
Turn-on Rise time	T _r		–	35	–	
Turn -Off Delay Time	T _{d(off)}		–	110	–	
Turn -Off Fall time	T _f		–	28	–	
Gate to Source Charge	Q _{gs}	V _{DS} =520V, V _{GS} =10V, I _D =20A	–	7.2	–	nC
Gate to Drain Charge	Q _{gd}		–	16	–	
Gate to Drain Charge	Q _g		–	36	–	
Source - Drain Diode Characteristics						
Diode Forward Voltage	V _{SD}	V _{GS} =0V, I _S =20A	–	–	1.4	V
Reverse Recovery Time	t _{rr}	I _{SD} =20A, dI/dt=100A/us	–	345	–	ns
Reverse Recovery Current	I _{rr}		–	35.5	–	A
Reverse Recovery Charge	Q _{rr}		–	5	–	uC

Notes:

(1) Calculated continuous current based on maximum allowable junction temperature. Note that current limitations arising from heating of the device leads may occur with some lead mounting arrangements.

(2) $L=10\text{ mH}$, $R_G=25\Omega$, Start $T_J=25^{\circ}\text{C}$.



Typical Performance Characteristics

Figure 1: Output Characteristics

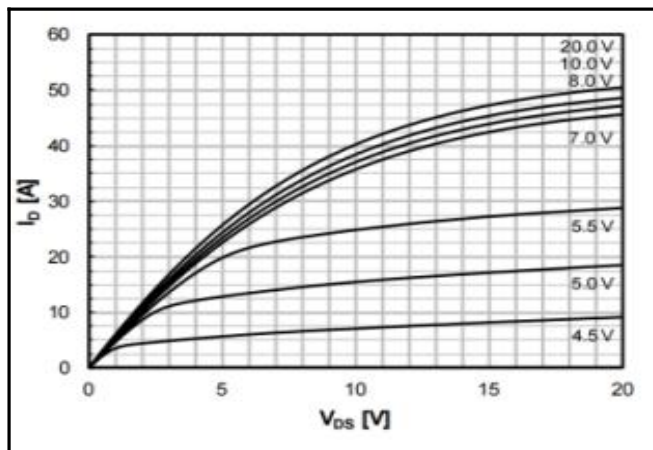


Figure 2: Capacitances

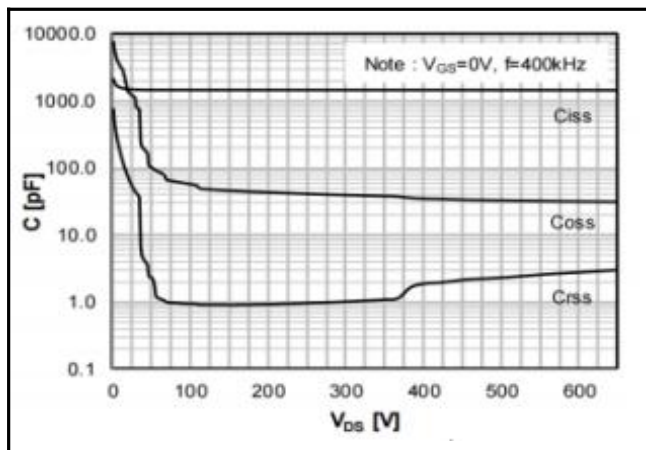


Figure 3: On-state Resistance

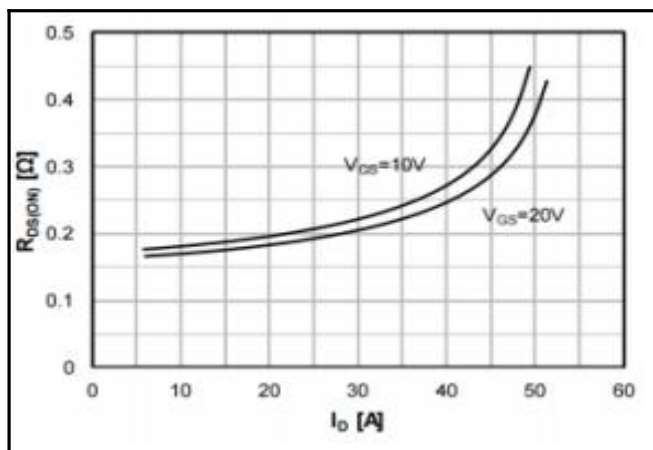


Figure 4: On-state Resistance with Temperature

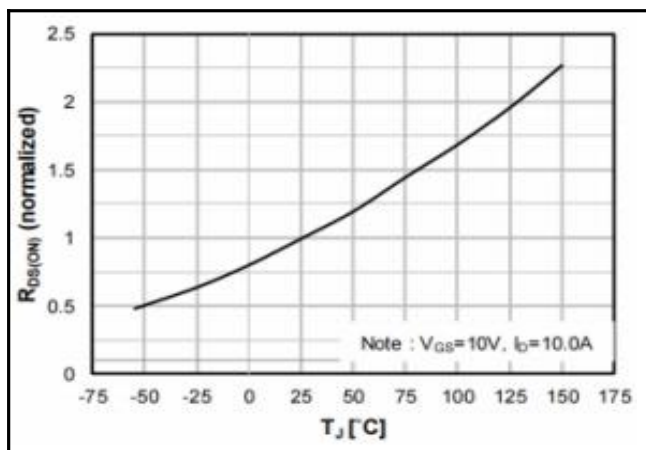


Figure 5: Transfer Characteristics

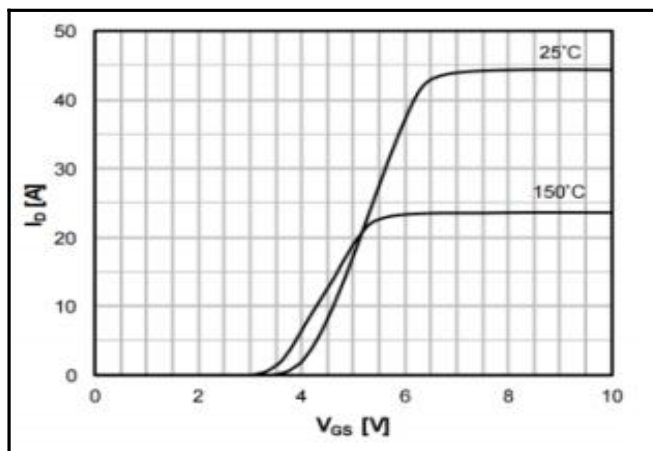
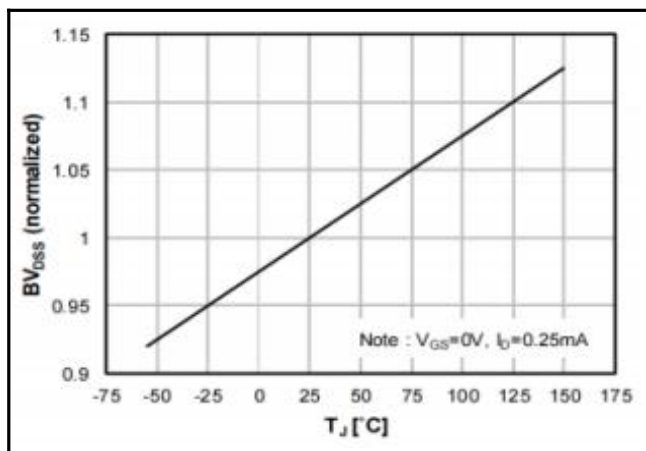


Figure 6: Breakdown Voltage with Temperature



Typical Performance Characteristics

Figure 7: Gate Charge

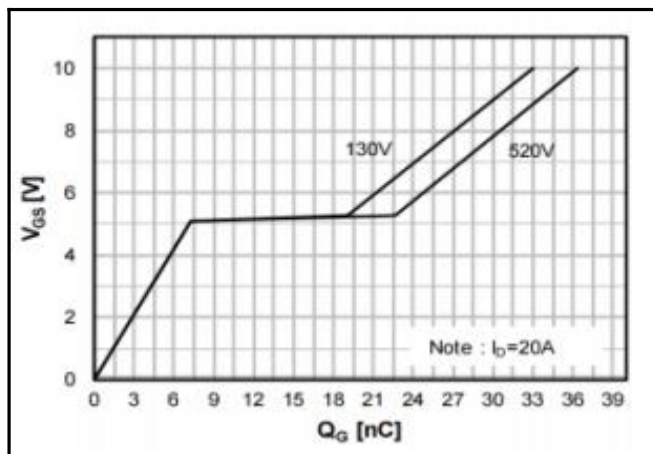


Figure 8: Maximum Drain Current

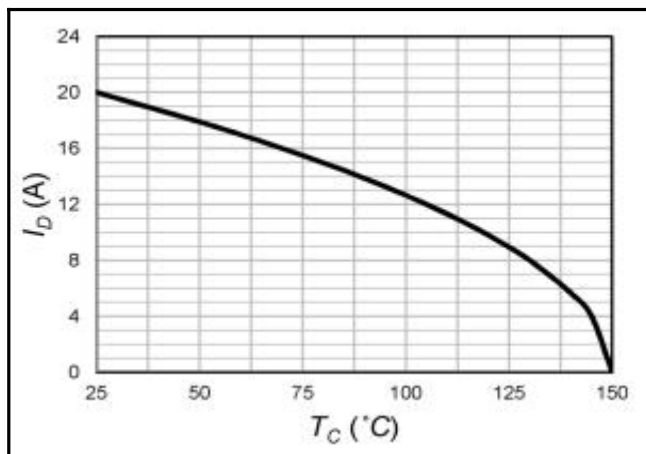


Figure 9: Maximum Transient Thermal Characteristics

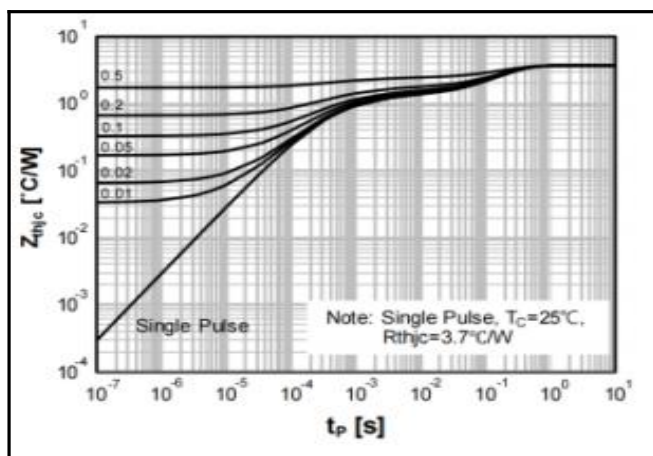


Figure 10: Body Diode Characteristics

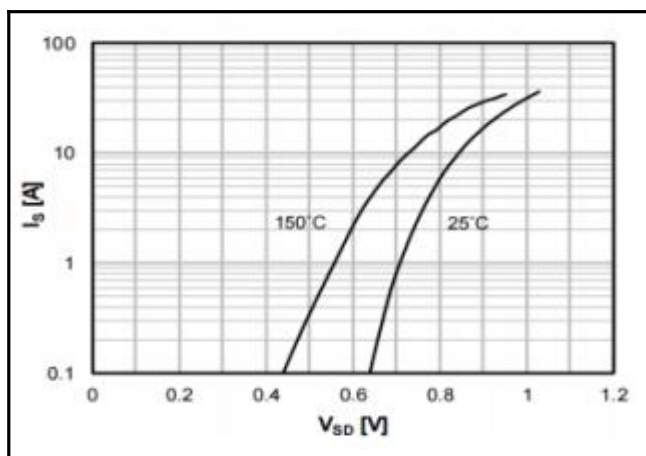


Figure 11: Power Dissipation

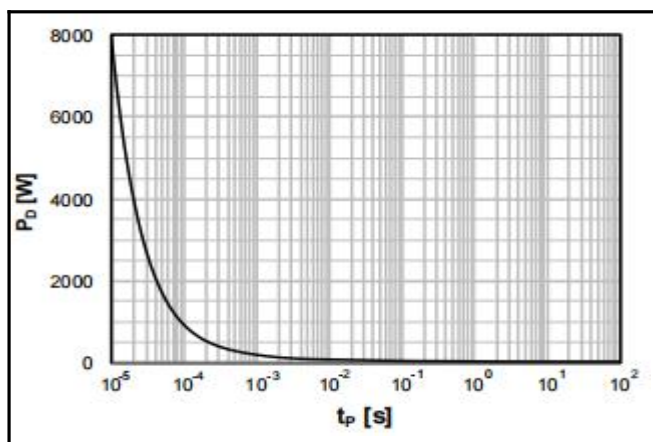
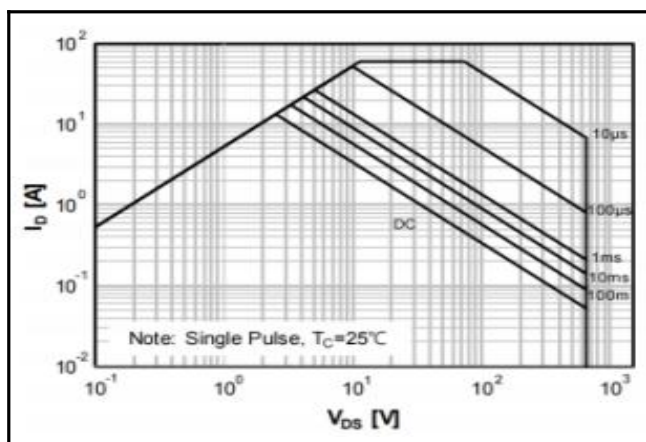


Figure 12: Safe Operating Area



Test Circuit and Waveform

Figure 13: Resistive Switching Test Circuit and Waveforms

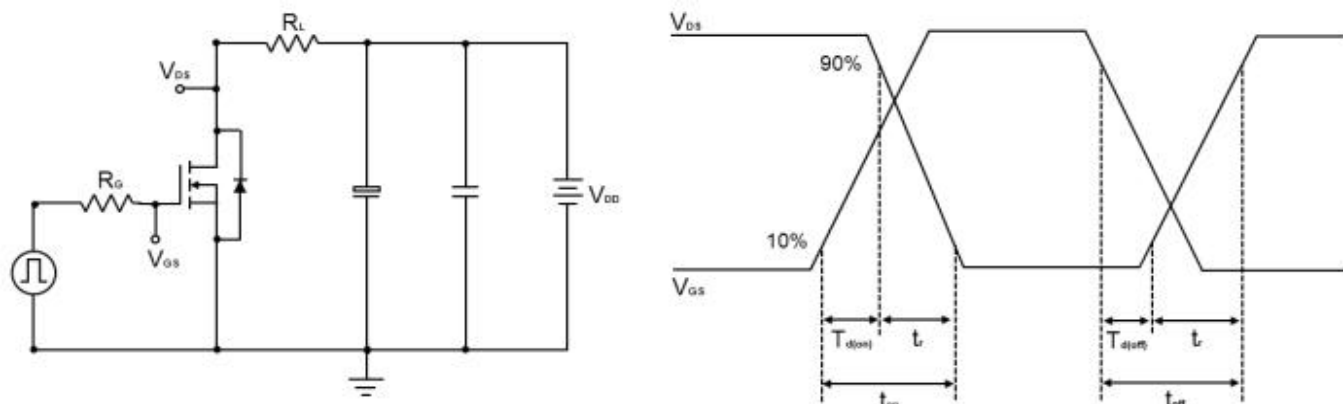


Figure 14: Diode Reverse Recovery Test Circuit and Waveforms

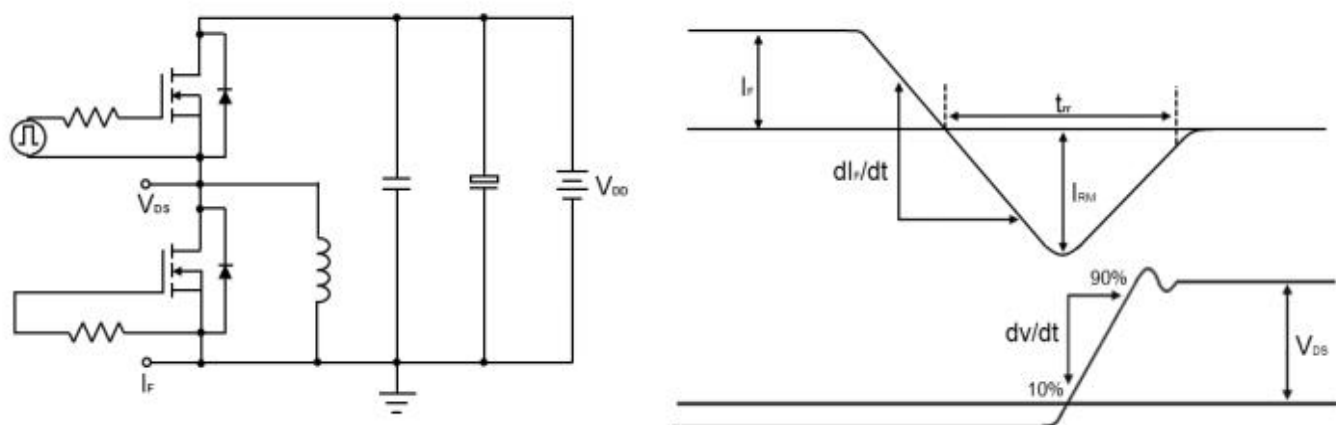
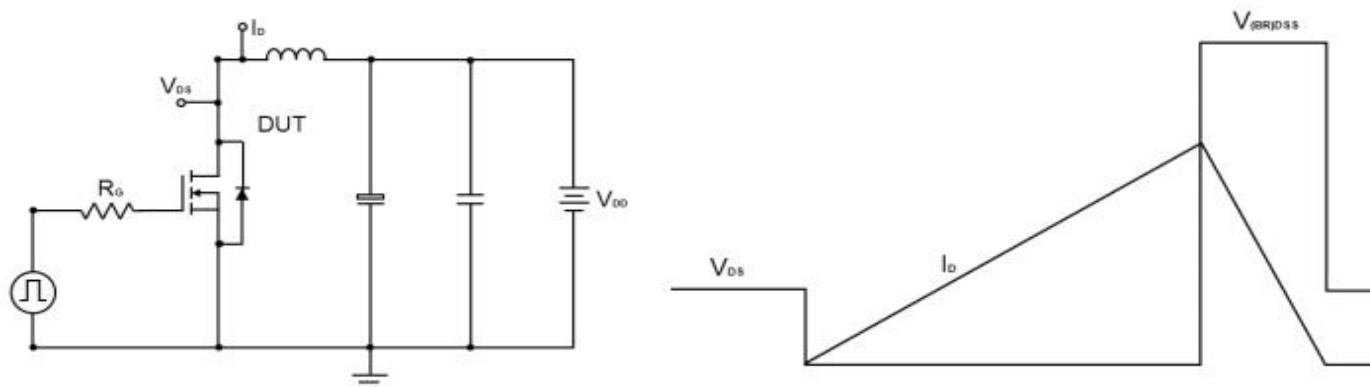
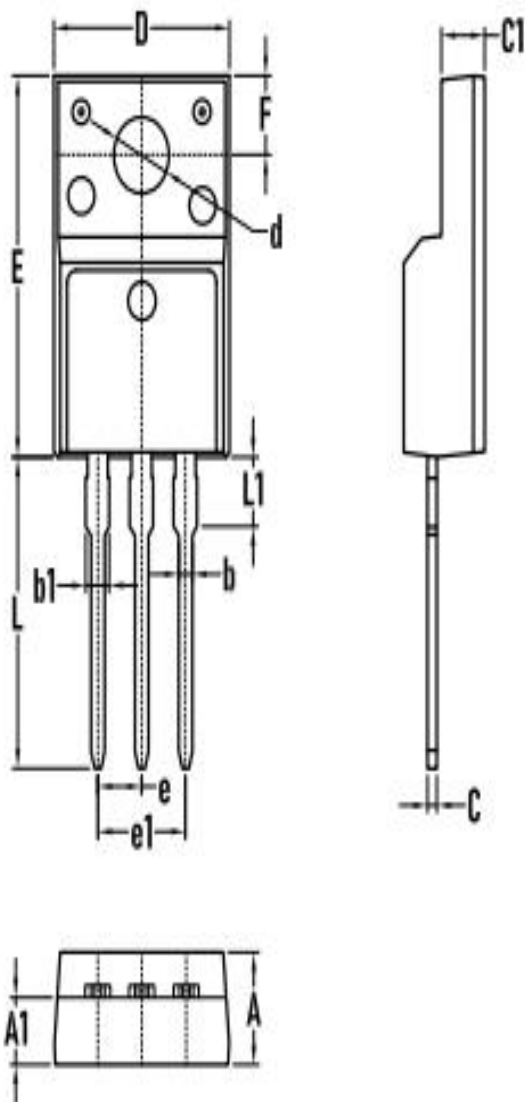


Figure 15: Unclamped Inductive Switching Test Circuit and Waveforms





Symbol	Millimeters		
	MIN.	TYP.	MAX.
A	4.30	4.60	4.80
A1	2.70	2.80	2.90
b	0.70	0.80	0.90
b1	1.20	1.30	1.40
C	0.40	0.50	0.60
C1	2.40	2.60	2.80
D	9.90	10.00	10.20
E	15.20	15.60	16.00
e	2.44	2.54	2.64
e1	4.88	5.08	5.26
F	3.00	3.30	3.60
L	12.70	13.20	13.70
L1	2.70	2.90	3.10
d	3.10	3.20	3.30

