

SJMOS N-MOSFET 650V, 0.27Ω, 20A

Features

- Much lower Ron*A performance for On-state efficiency
- Better efficiency due to very low FOM
- Qualified for industrial grade applications according to JEDEC

Product Summary

V _{DS,min}	650V
R _{DS(on),typ}	145mΩ
I _D	20A

Applications

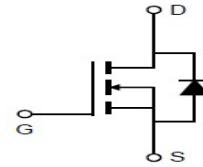
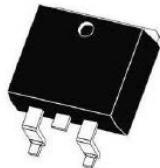
- LED/LCD/PDP TV and monitor Lighting
- Solar/Renewable/UPS-Micro Inverter System
- Charger
- Power Supply

100% DVDS Tested

100% Avalanche Tested



TO-263



Package Marking and Ordering Information

Part #	Marking	Package	Packing	Reel Size	Tape Width	Qty
HMS20N65D	-	TO-263	Tube	N/A	N/A	50pcs

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-source voltage	V _{DS}	650	V
Continuous drain current ¹⁾	I _D	20	A
T _C = 25°C		-	
T _C = 100°C			
Pulsed drain current ²⁾ (T _C = 25°C, t _p limited by T _{j,max})	I _{D,pulse}	60	A
Avalanche energy, single pulse (L=30mH)	E _{AS}	120	mJ
MOSFET dv/dt ruggedness	dv/dt	50	V/ns
Gate-Source voltage	V _{GS}	±30	V
Power dissipation (T _C = 25°C)	P _{tot}	21	W
Continuous diode forward current(T _C = 25°C)	I _S	20	A
Diode pulse current ²⁾ (T _C = 25°C)	I _{S,pulse}	60	A
Recovery diode dv/dt ³⁾	dv/dt	50	V/ns
Operating junction and storage temperature	T _j , T _{stg}	-55...+150	°C

1) Limited by T_{j,max}. Maximum Duty Cycle D = 0.50; TO-252 equivalent

2) Pulse width t_p limited by T_{j,max}

3) Identical low side and high side switch with identical R_g

Thermal Resistance

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Thermal resistance, junction – case	R _{thJC}	-	4.17	5.84	°C/W	
Thermal resistance, junction – ambient	R _{thJA}	-	-	64	°C/W	

Electrical Characteristic (at T_j=25°C, unless otherwise specified)

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		

Static Characteristic

Drain-source breakdown voltage	BV _{DSS}	650	-	-	V	V _{GS} =0V, I _D =250μA
Gate threshold voltage	V _{GS(th)}	3	-	4	V	V _{DS} =V _{GS} , I _D =250μA
Zero gate voltage drain current	I _{DSS}	-	-	1	μA	V _{DS} =650V, V _{GS} =0V T _j =25°C T _j =150°C
-	-	-	5	-	-	
Gate-source leakage current	I _{GSS}	-	-	±100	nA	V _{GS} =±30V, V _{DS} =0V
Drain-source on-state resistance	R _{DS(on)}	-	145	180	mΩ	V _{GS} =10V, I _D =7.5A T _j =25°C T _j =150°C
-	-	-	-	-	-	
Transconductance	g _f	-	11	-	S	V _{DS} =20V, I _D =7.5A

Dynamic Characteristic

Input Capacitance	C _{iss}	-	750	-	pF	V _{GS} =0V, V _{DS} =100V, f=1MHz
Output Capacitance	C _{oss}	-	40	-		
Reverse Transfer Capacitance	C _{rss}	-	1.4	-		
Gate Total Charge	Q _g	-	23.5	-	nC	V _{GS} =10V, V _{DS} =480V, I _D =7.5A
Gate-Source charge	Q _{gs}	-	5	-		
Gate-Drain charge	Q _{gd}	-	10	-		
Gate plateau voltage	V _{plateau}	-	5.6	-		
Turn-on delay time	t _{d(on)}	-	14	-		
Rise time	t _r	-	24	-	ns	V _{GS} =10V, I _D =7.5A, V _{DS} =400V, R _g =25Ω
Turn-off delay time	t _{d(off)}	-	97	-		
Fall time	t _f	-	22	-		
Gate resistance	R _{g,int}	-	6.5	-	Ω	f=1MHz

Body Diode Characteristic

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Body Diode Forward Voltage	V_{SD}	0.6	0.86	1.1	V	$V_{GS}=0V, I_{SD}=7.5A$
Body Diode Reverse Recovery Time	t_{rr}	-	250	-	ns	
Body Diode Reverse Recovery Charge	Q_{rr}	-	2.94	-	μC	$I_{SD}=7.5A$ $di_F/dt=100A/\mu s$ $V_{DS}=100V$
Body Diode Reverse Recovery Peak Current	I_{rrm}	-	21	-	A	

Typical Performance Characteristics

Fig 1. Output Characteristics ($T_j=25^\circ\text{C}$)

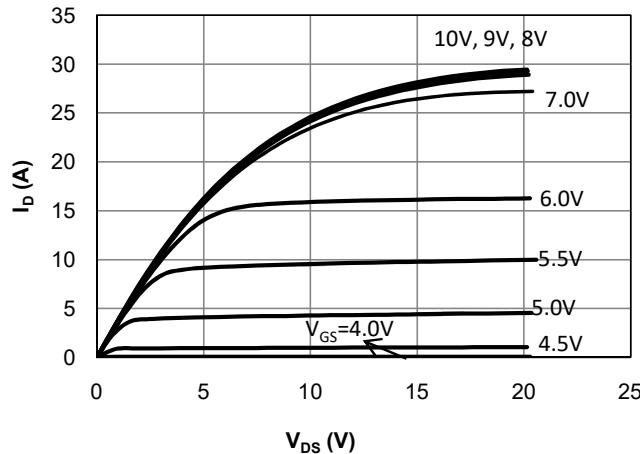


Fig 2. Output Characteristics ($T_j=150^\circ\text{C}$)

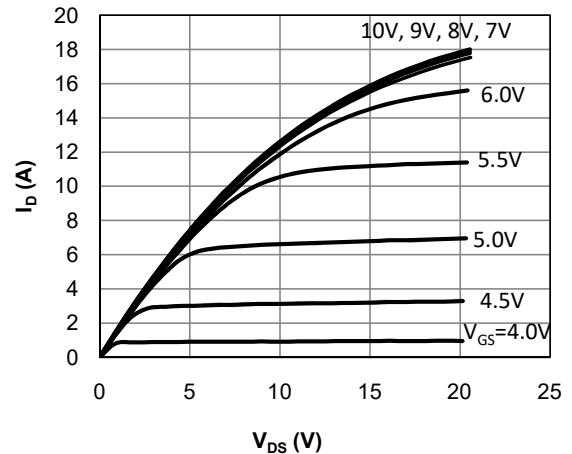


Fig 3: Transfer Characteristics

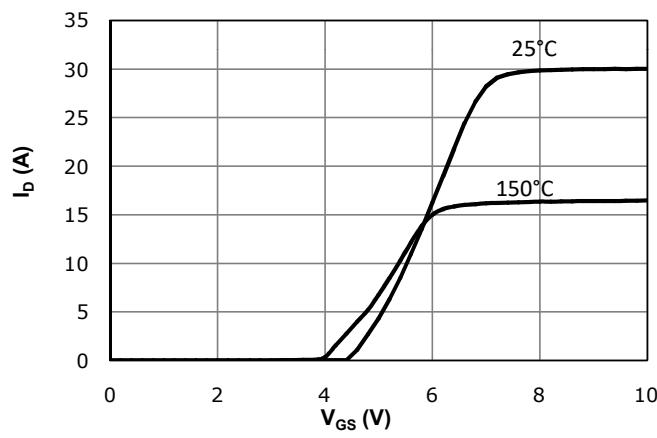


Fig 4: V_{TH} vs. T_j Temperature Characteristics

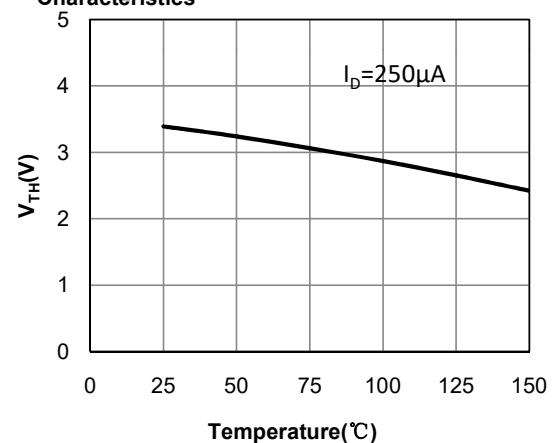


Fig 5: $R_{DS(on)}$ vs. I_{DS} Characteristics($T_j=25^\circ\text{C}$)

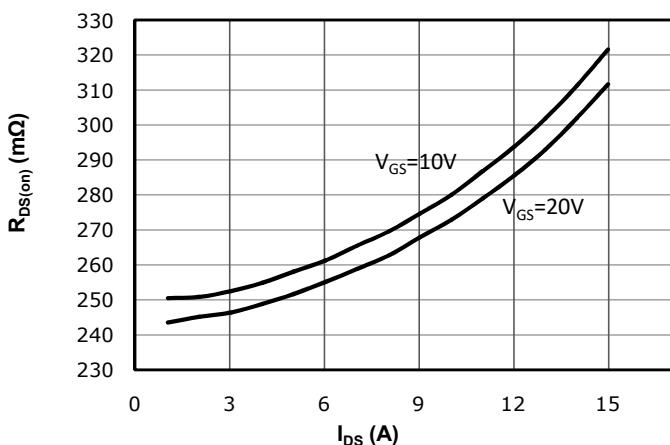


Fig 6: $R_{DS(on)}$ vs. Temperature

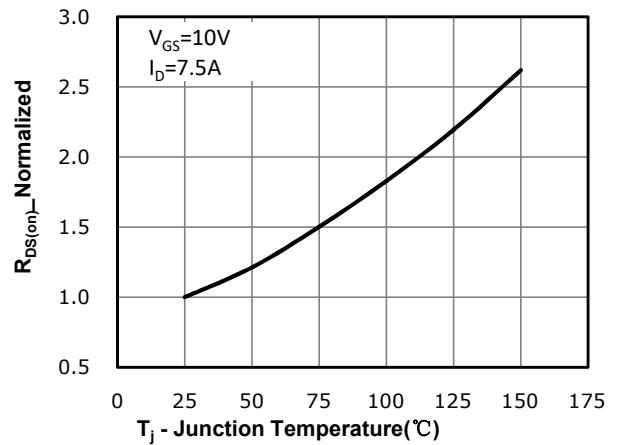


Fig 7: BV_{DSS} vs. Temperature

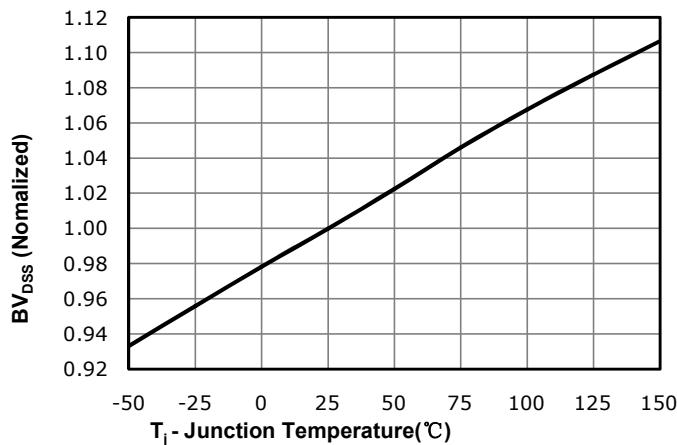


Fig 8: $R_{DS(on)}$ vs. Gate Voltage

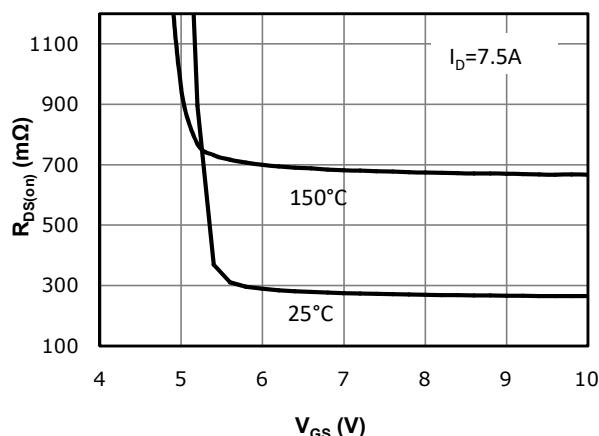


Fig 9: Body-diode Forward Characteristics

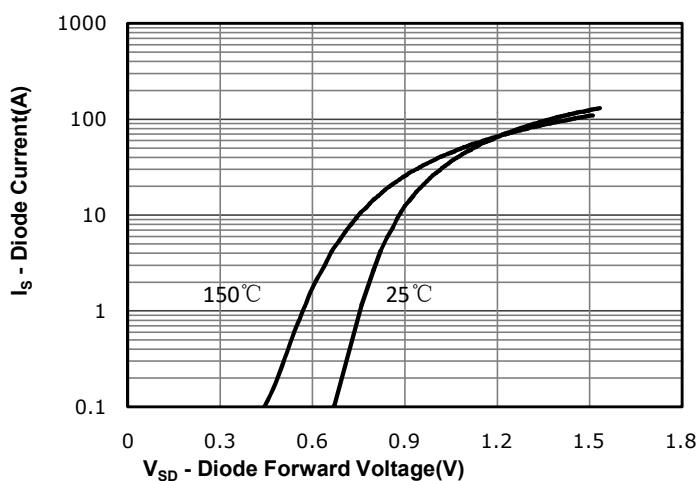


Fig 10: Gate Charge Characteristics

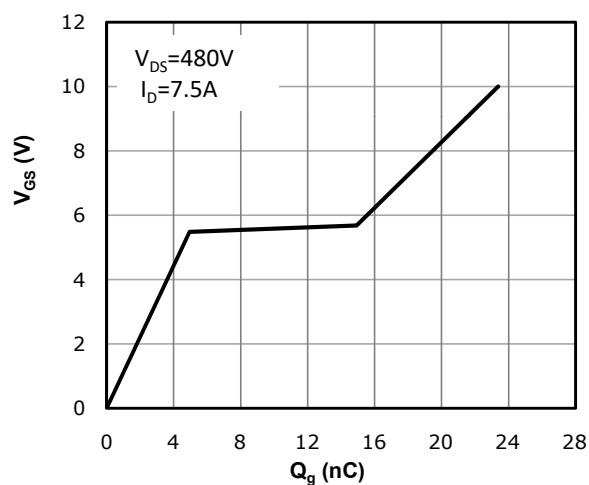


Fig 11: Capacitance Characteristics

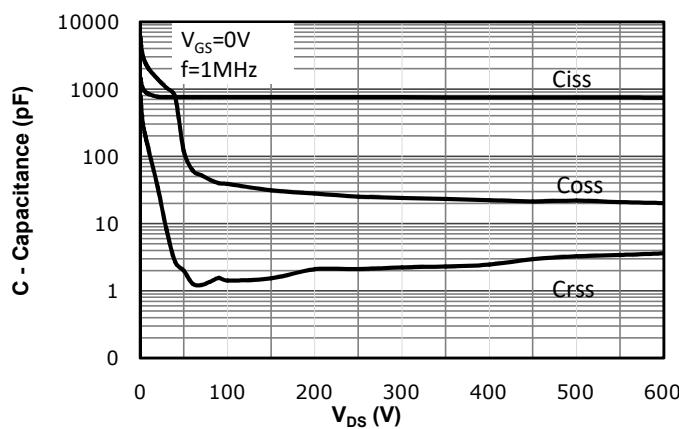


Fig 12: Safe Operating Area

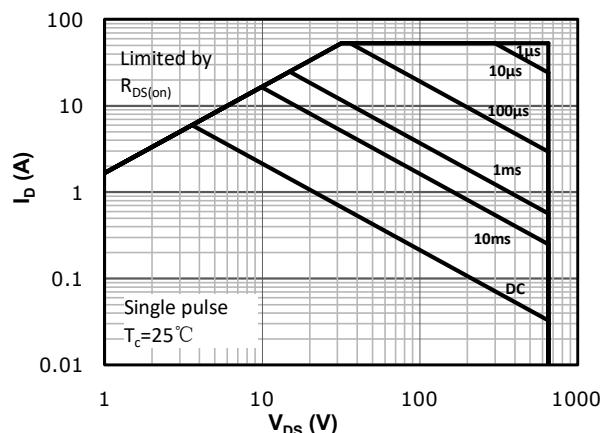
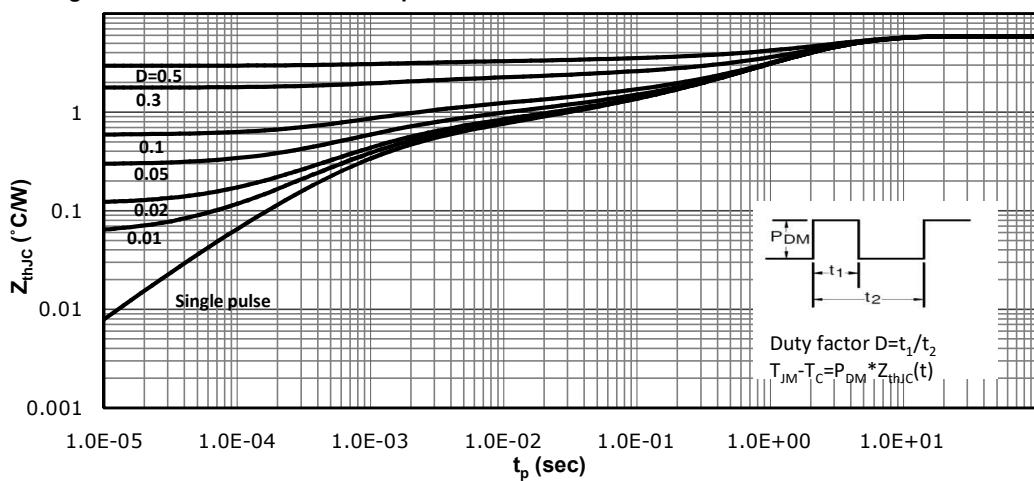
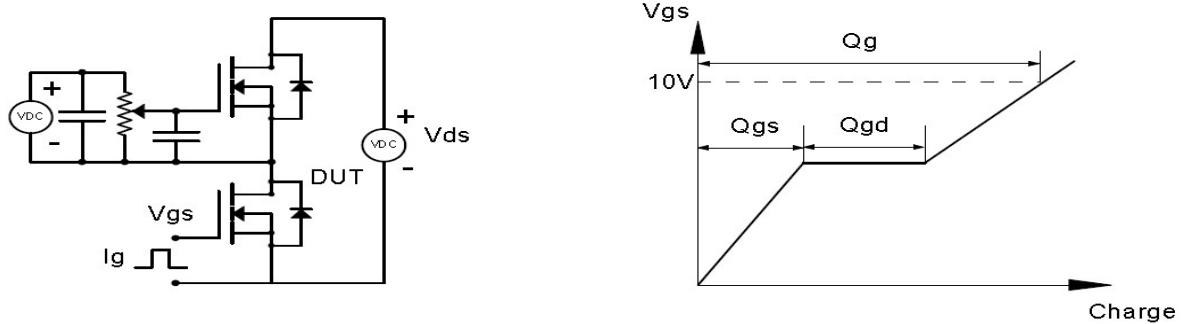


Fig 13: Max. Transient Thermal Impedance

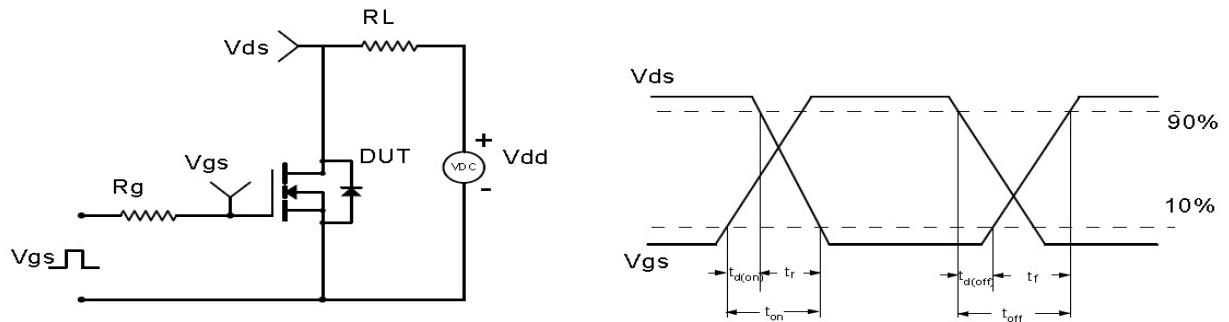


Test Circuit & Waveform

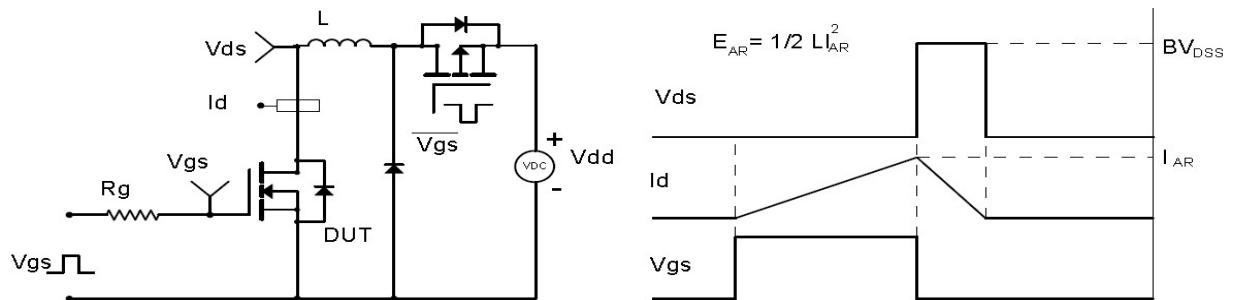
Gate Charge Test Circuit & Waveform



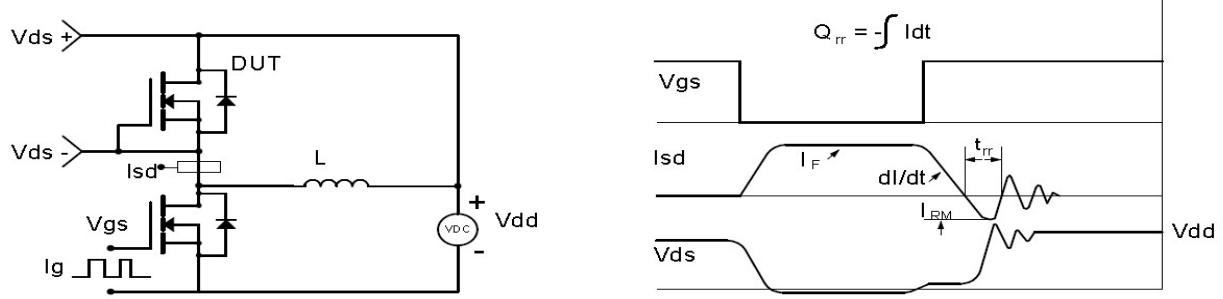
Resistive Switching Test Circuit & Waveforms



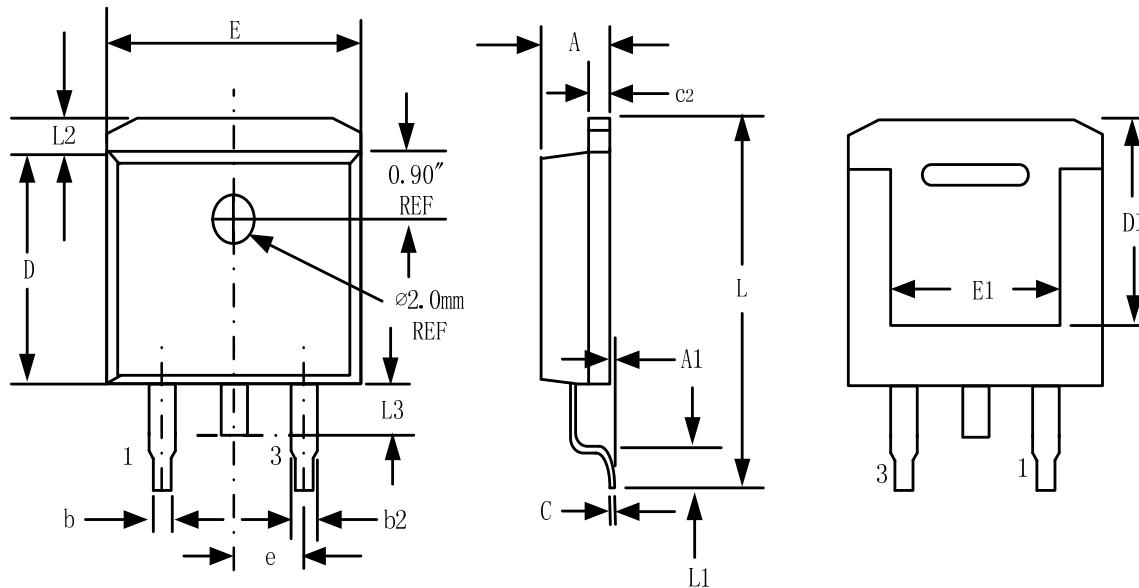
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



TO-263-3L Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.32	4.57	0.170	0.180
A1	-	0.25		0.010
b	0.71	0.94	0.028	0.037
b2	1.15	1.40	0.045	0.055
c	0.46	0.61	0.018	0.024
c2	1.22	1.40	0.048	0.055
D	8.89	9.40	0.350	0.370
D1	8.01	8.23	0.315	0.324
E	10.04	10.28	0.395	0.405
E1	7.88	8.08	0.310	0.318
e	2.54 BSC		0.100 BSC	
L	14.73	15.75	0.580	0.620
L1	2.29	2.79	0.090	0.110
L2	1.15	1.39	0.045	0.055
L3	1.27	1.77	0.050	0.070