SC045N120H7-R

Silicon Carbide MOSFET 1200V, 45mΩ, 45A

重庆平伟半导体股份有限公司

Features

- Uses PingWei advanced PerfectMOS technology
- Extremely low on-resistance $R_{DS(on)}$
- Excellent $Q_g x R_{DS(on)}$ product(FOM)
- Excellent Low Ciss
- Qualified according to JEDEC criteria

100% DVDS Tested
100% AvalancheTested

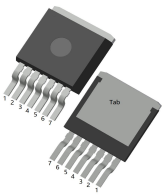
Applications

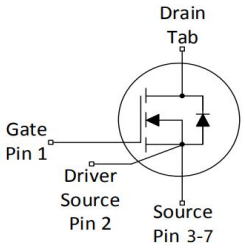
- PFC stages, hard switching PWM stages and resonant switching
- PWM stages for e.g. PC Silverbox, Adapter, LCD & PDP TV,
- Lighting, Server, Telecom and UPS

Product Summary

V_{DS}	1200V
$R_{DS(on)\ typ.}$	45mΩ
I_D	45A

TO-263-7H





Package Marking and Ordering Information

Part #	Marking	Package	Packing	Reel Size	Tape Width	Qty
SC045N120H7-R	SC045N120H7	TO-263-7H	Tape	13	24	800pcs

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-source voltage	V_{DS}	1200	V
Continuous drain current T_C = 25°C T_C = 100°C	I_D	 45 32	A
Pulsed drain current (T_C = 25°C)	$I_{D\ pulse}$	181	A
Avalanche energy, single pulse (L=5mH)	E_{AS}	391	mJ
Gate-Source voltage,max.transient voltage	V_{GSmax}	-13/+22	V
Recommended turn-on gate - source drive voltage	V_{GS-on}	+15 to +18	V
Recommended turn-off gate - source drive voltage	V_{GS-off}	0	V
Power dissipation T_C = 25°C	P_{tot}	 222	W
Operating junction and storage temperature	T_j , T_{stg}	-55...+175	°C
Soldering temperature, wave soldering only allowed at leads (1.6mm from case for 10s)	Tsold	260	°C

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Thermal Resistance

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Thermal resistance, junction – case.	RthJC	-	-	0.7	°C/W	-
Thermal resistance, junction - ambient(min. footprint)	RthJA	-	-	96.5	°C/W	-

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

Parameter	**Symbol**	**Value**			**Unit**	**Test Condition**
		min.	**typ.**	**max.**		
Static Characteristic						
Drain-source breakdown voltage	BV_{DSS}	1200	-	-	V	V_{GS}=0V, I_D=250uA
Gate threshold voltage	$V_{GS(th)}$	2.5	-	4.5	V	V_{DS}=V_{GS},I_D=10mA
Zero gate voltage drain current	I_{DSS}	- -	- -	1 100	μA	V_{DS}=1200V,V_{GS}=0V T_j=25°C T_j=175°C
Gate-source leakage current	I_{GSS}	-	-	200	nA	V_{GS}=20V,V_{DS}=0V
		-	-	-100	nA	V_{GS}=-5V,V_{DS}=0V
Drain-source on-state resistance	$R_{DS(on)}$	-	45	54	mΩ	Vgs=18V,Id=33A
Transconductance	g_{fs}	-	11	-	S	V_{DS}=20V,I_D=33A
Dynamic Characteristic						
Input Capacitance	C_{iss}	-	2419	-	pF	V_{GS}=0V, V_{DS}=50V, f=1MHz
Output Capacitance	C_{oss}	-	312	-		
Reverse Transfer Capacitance	C_{rss}	-	4.5	-		
Gate Total Charge	Q_G	-	100	-	nC	Vds=750V,Id=21A ,Vgs=-5/18V
Gate-Source charge	Q_{gs}	-	37	-		
Gate-Drain charge	Q_{gd}	-	28	-		
Turn-on delay time	$t_{d(on)}$	-	15	-	ns	V_{GS}=-5/18V, V_{DD}=400V, R_{G_ext}=5Ω,I_D=20A Timing relative to V_{DS}
Rise time	t_r	-	45	-		
Turn-off delay time	$t_{d(off)}$	-	13	-		
Fall time	t_f	-	10	-		
Gate resistance	R_G	-	1.0	-	Ω	V_{GS}=0V, V_{DS}=0V, f=1MHz

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Body Diode Characteristic

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Body Diode Forward Voltage	V_{SD}	- -	3.6 3.2	6.0	V	V_{GS}=0V,I_{SD}=33A T_j=25°C T_j=175°C
Body Diode Continuous Forward Current	Is	-	-	88	A	TC = 25°C
Body Diode Pulsed Current	Is pulse	-	-	352	A	TC = 25°C
Body Diode Reverse Recovery Time	t_{rr}	-	30	-	ns	VGS=-5V,I_{SD}=15A, V_R=400V dI/dt=1200A/μs
Body Diode Reverse Recovery Charge	Q_{rr}	-	120	-	nC	

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Typical Performance Characteristics

Fig 1: Output Characteristics Tj=25°C

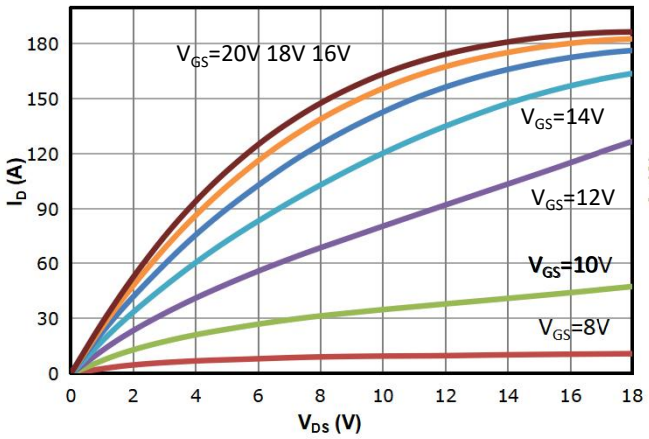


Fig 2: Output Characteristics Tj=175°C

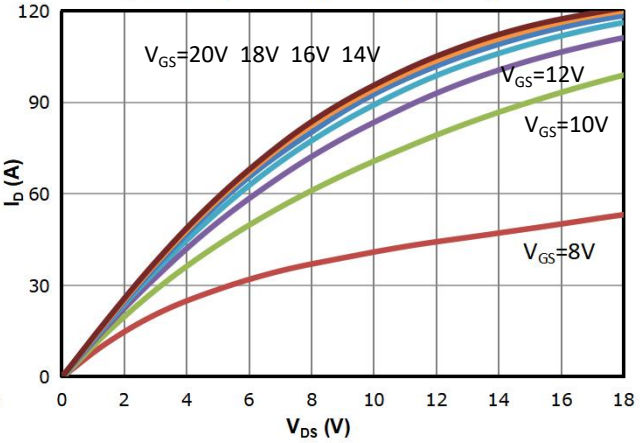


Fig 3: Transfer Characteristics

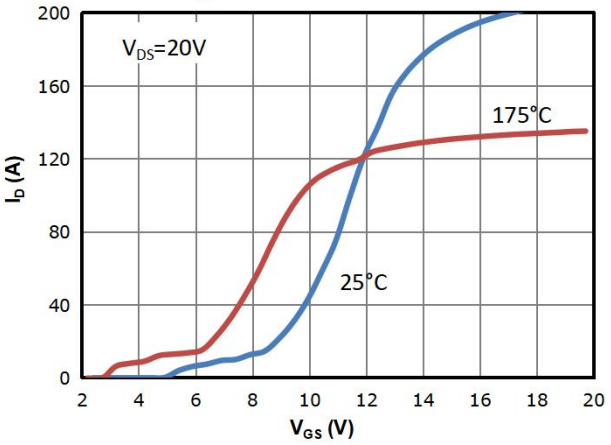


Fig 4: Rds(on) vs Drain Current and Gate Voltage

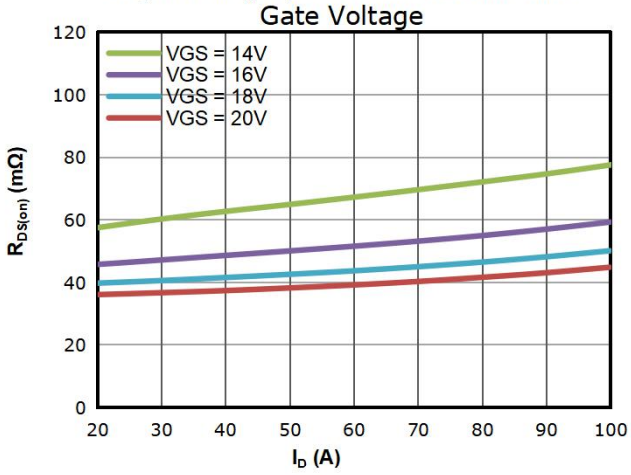


Fig 5: Rds(on) vs. Temperature

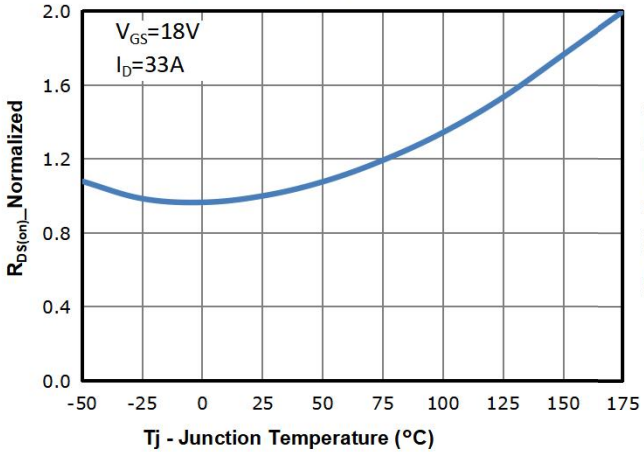
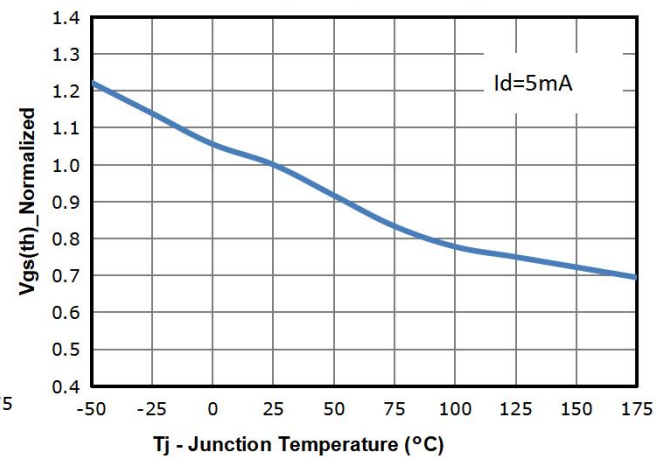


Fig 6: Vgs(th) vs. Temperature



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Fig 7: BVdss vs. Temperature

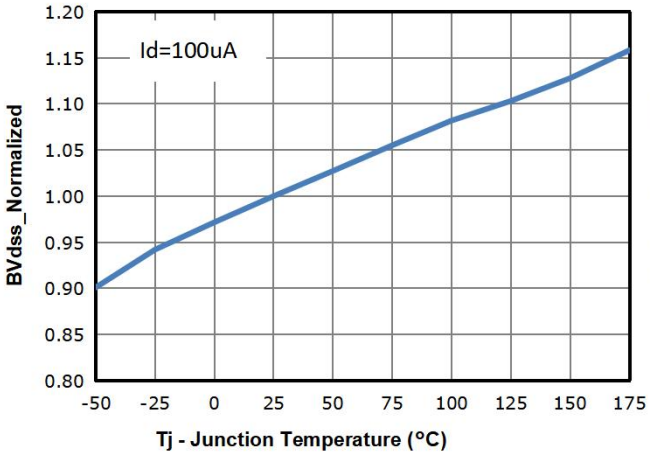


Fig 8: Capacitance Characteristics

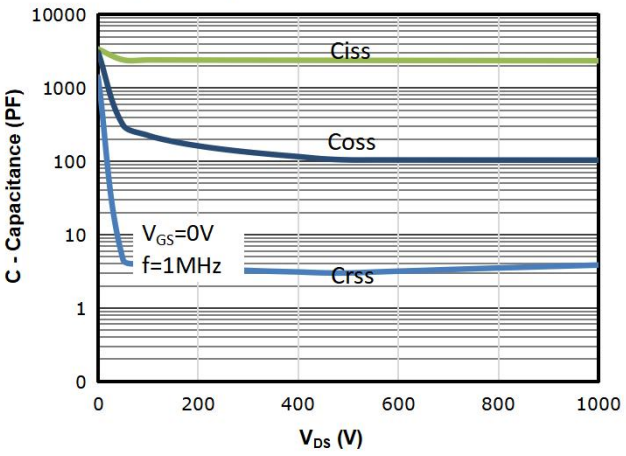


Fig 9: Gate ChargeCharacteristics

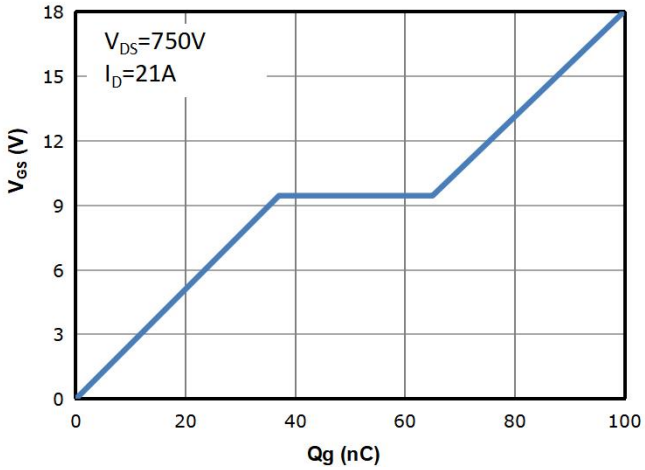


Fig 10: Body-diode Forward Characteristics

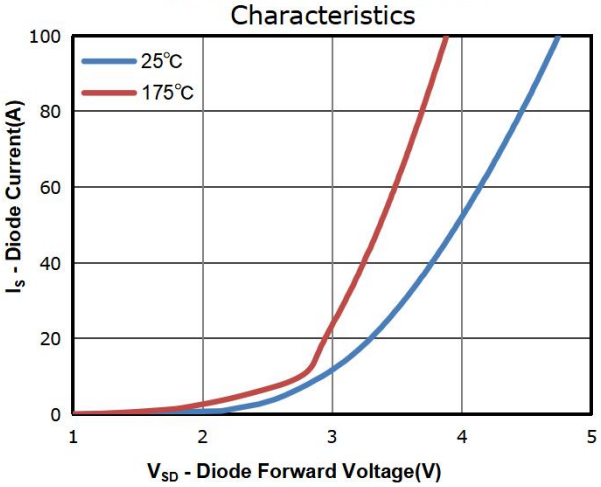


Fig 11: Power Dissipation

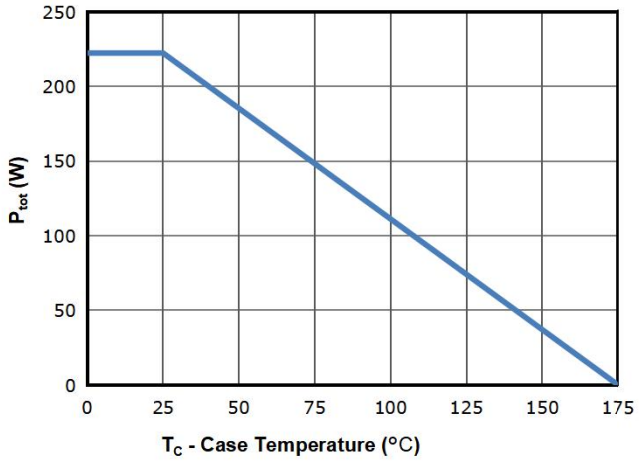
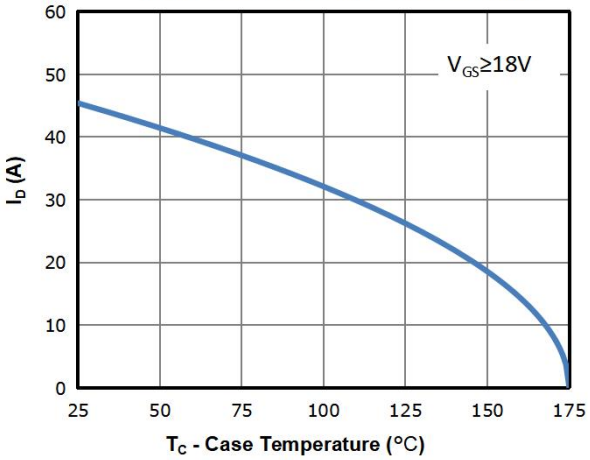


Fig 12: Drain Current Derating



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Fig 13: Safe Operating Area

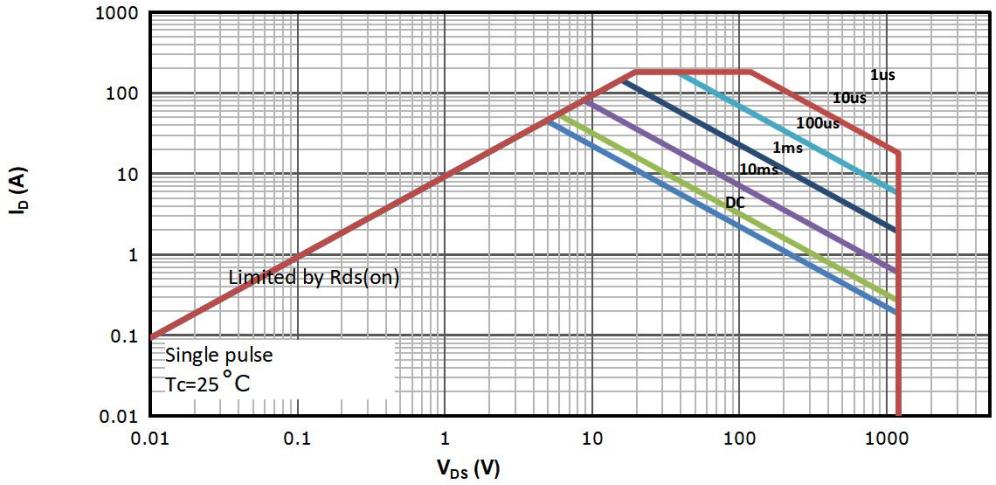
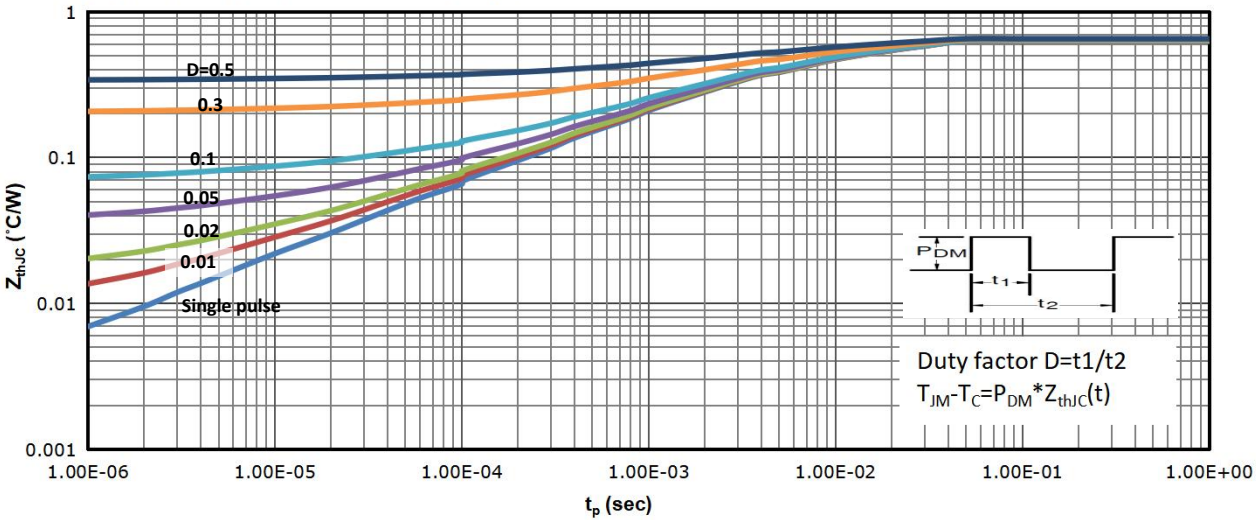


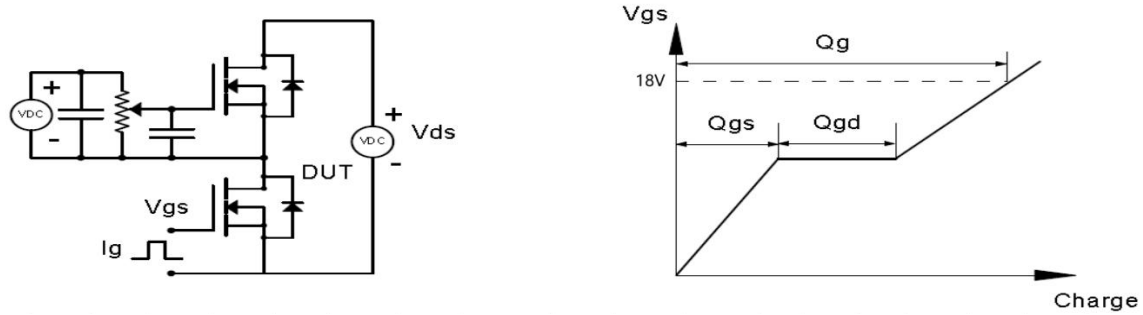
Fig 14: Max. Transient Thermal Impedance



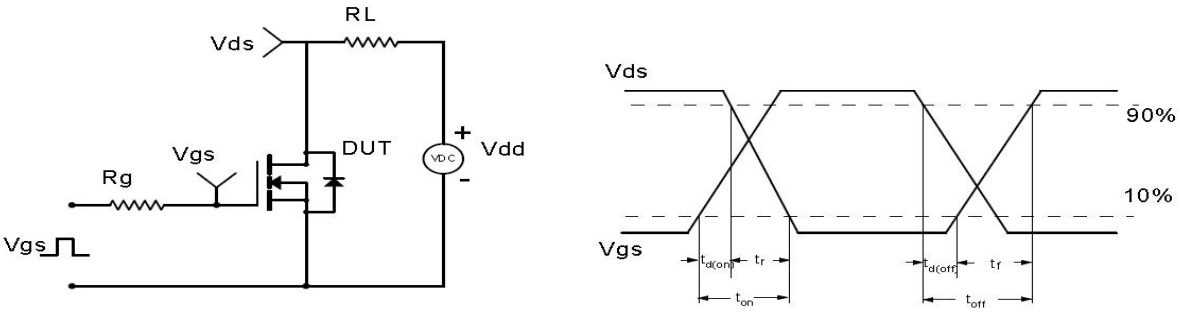
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Test Circuit & Waveform

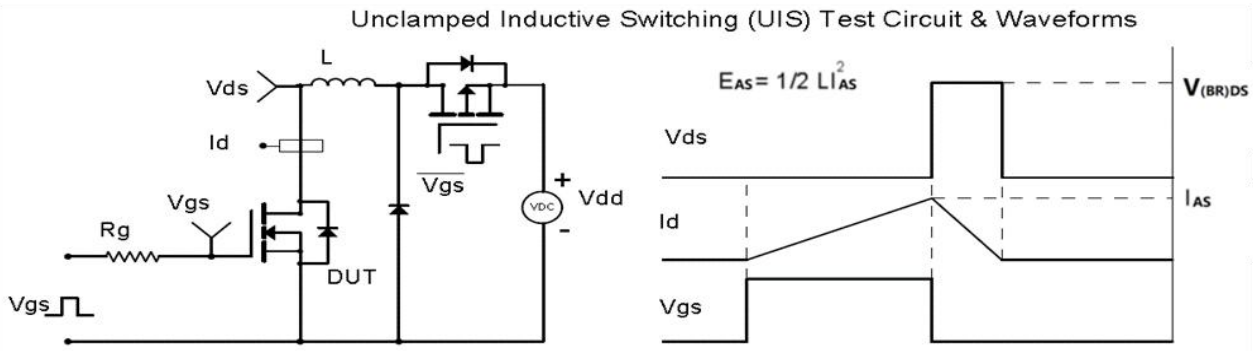
Gate Charge Test Circuit & Waveform



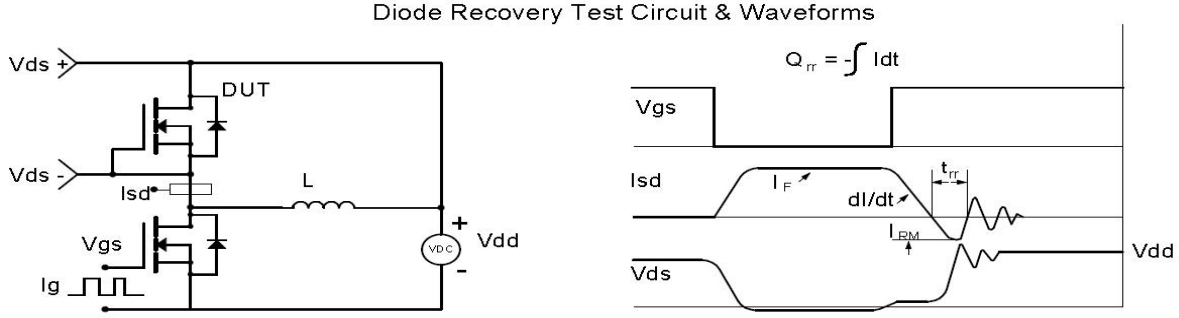
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

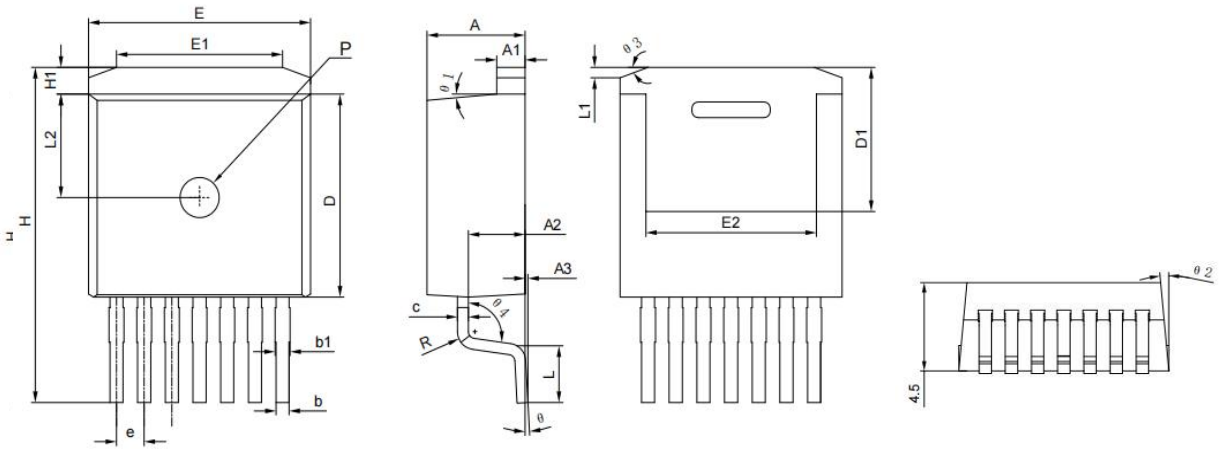


Diode Recovery Test Circuit & Waveforms



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Package Outline: TO-263-7H



SYMBOL	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.40	4.60	0.173	0.181
A1	1.25	1.40	0.049	0.055
A2	2.45	2.70	0.096	0.106
A3	0.05	0.20	0.002	0.008
b	0.50	0.70	0.020	0.028
b1	0.60	0.85	0.024	0.033
c	0.45	0.60	0.018	0.024
D	8.88	9.28	0.350	0.365
D1	5.80	6.40	0.228	0.252
E	9.18	10.28	0.361	0.405
E1	6.67	7.47	0.263	0.294
E2	6.90	7.60	0.272	0.299
e	1.27		0.050	
H	14.80	15.20	0.583	0.598
H1	1.10	1.30	0.043	0.051
L	2.35	2.75	0.093	0.108
L1	0.37	0.77	0.015	0.030
L2	4.48	4.78	0.176	0.188
θ	0°	5°	0°	5°
θ1	3°	7°	3°	7°
θ2	3°	7°	3°	7°
θ3	15°	25°	15°	25°
θ4	93°	100°	93°	100°
R	0.75	0.85	0.030	0.033
p	1.70	1.90	0.067	0.075

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