

SC060N120H7-R

Silicon Carbide MOSFET 1200V, 60mΩ, 48A



重庆平伟半导体股份有限公司

Features

- 1200V turn-off gate voltage can be applied
- High Blocking Voltage with Low RDS(on)
- High Speed Switching with Low Capacitances
- Easy to Parallel and Simple to Drive
- Qualified according to JEDEC criteria

Applications

- High Voltage DC/DC Converters
- EV Charging
- Online UPS / Industrial UPS
- String inverter
- Energy storage systems (ESS)

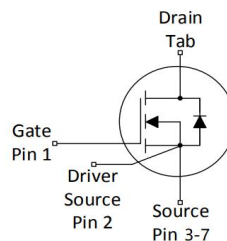
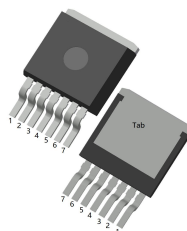


100% DVDS Tested
100%
Avalanche Tested

Product Summary

V_{DS}	1200V
$R_{DS(on)}$ typ.	60mΩ
I_D	48A

TO-263-7H



Package Marking and Ordering Information

Part #	Marking	Package	Packing	Reel Size	Tape Width	Qty
SC060N120H7-R	SC060N120H7	TO-263-7H	Tape&Reel	13 inches	24mm	800pcs

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-source voltage	V_{DS}	1200	V
Continuous drain current $T_C = 25^\circ\text{C}$ $T_C = 100^\circ\text{C}$	I_D	48 34	A
Pulsed drain current ($T_C = 25^\circ\text{C}$)	$I_{D \text{ pulse}}$	144	A
Avalanche energy, single pulse ($L=5\text{mH}$)	E_{AS}	123	mJ
Gate-Source voltage,max.transient voltage	$V_{GS\text{max}}$	-8/+22	V
Recommended operating values	$V_{GS\text{sop}}$	-5/+18	V
Power dissipation $T_C = 25^\circ\text{C}$	P_{tot}	156	W
Operating junction and storage temperature	T_j, T_{stg}	-55...+175	$^\circ\text{C}$

Thermal Resistance

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Thermal resistance, junction – case.	R_{thJC}	-	0.64	1.0	°C/W	-
Thermal resistance, junction - ambient(min. footprint)	R_{thJA}	-	-	40.0	°C/W	

Electrical Characteristic (at $T_j = 25\text{ °C}$, unless otherwise specified)

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

Static Characteristic

Drain-source breakdown voltage	BV_{DSS}	1200	-	-	V	$V_{GS}=0V, I_D=100\mu A$
Gate threshold voltage	$V_{GS(th)}$	2.0	3.0	4.2	V	$V_{DS}=V_{GS}, I_D=5mA$
Zero gate voltage drain current	I_{DSS}	-	1	100	μA	$V_{DS}=1200V, V_{GS}=0V$ $T_j=25\text{ °C}$
Gate-source leakage current	I_{GSS}	-	-	200	nA	$V_{GS}=20V, V_{DS}=0V$
		-	-	-200	nA	$V_{GS}=-5V, V_{DS}=0V$
Drain-source on-state resistance	$R_{DS(on)}$	-	60	70	mΩ	$V_{GS}=18V, I_D=20A, T_j=25\text{ °C}$
Drain-source on-state resistance	$R_{DS(on)}$	-	109	-	mΩ	$V_{GS}=18V, I_D=20A, T_j=175\text{ °C}$
Transconductance	g_{fs}	-	18.0	-	S	$V_{DS}=20V, I_D=20A$

Dynamic Characteristic

Input Capacitance	C_{iss}	-	1702	-	pF	$V_{GS}=0V, V_{DS}=800V,$ $f=1MHz$
Output Capacitance	C_{oss}	-	77	-		
Reverse Transfer Capacitance	C_{rss}	-	8	-		
Gate Total Charge	Q_G	-	76	-	nC	$V_{DS}=800V, I_D=20A$ $V_{GS}=-5/18V$
Gate-Source charge	Q_{gs}	-	29	-		
Gate-Drain charge	Q_{gd}	-	21	-		
Turn-on delay time	$t_{d(on)}$	-	11	-	ns	$V_{GS}=-5/18V, V_{DD}=800V,$ $R_G=5\Omega, I_D=20A$
Rise time	t_r	-	8	-		
Turn-off delay time	$t_{d(off)}$	-	18	-		
Fall time	t_f	-	4	-		
Turn-on energy	E_{on}	-	98	-	uJ	
Turn-off energy	E_{off}	-	89	-		
Gate resistance	R_G	-	5.0	-	Ω	$V_{GS}=0V, f=1MHz$

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Body Diode Characteristic

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Body Diode Forward Voltage	V_{SD}	-	3.7	-	V	$V_{GS} = -5V, I_{SD} = 10A$ $T_j = 25^{\circ}C$
		-	3.35	-		$T_j = 175^{\circ}C$
Body Diode Continuous Forward Current	I_S	-	48		A	$T_C = 25^{\circ}C$
		-	34		A	$T_C = 100^{\circ}C$
Body Diode Reverse Recovery Time	t_{rr}	-	23	-	ns	$V_{GS} = -5V, I_{SD} = 20A,$ $V_R = 800V$ $di/dt = 1200A/us$
Body Diode Reverse Recovery Charge	Q_{rr}	-	108	-	nC	
Peak Reverse Recovery Current	I_{RRM}	-	7.2	-	A	

Typical Performance Characteristics

Fig 1: Output Characteristics $T_j=25^{\circ}\text{C}$

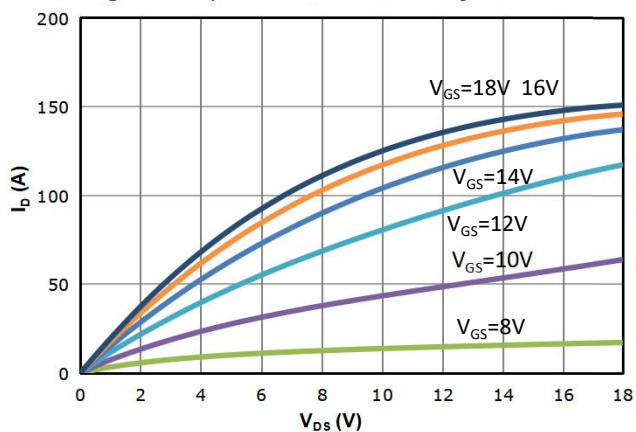


Fig 2: Output Characteristics $T_j=175^{\circ}\text{C}$

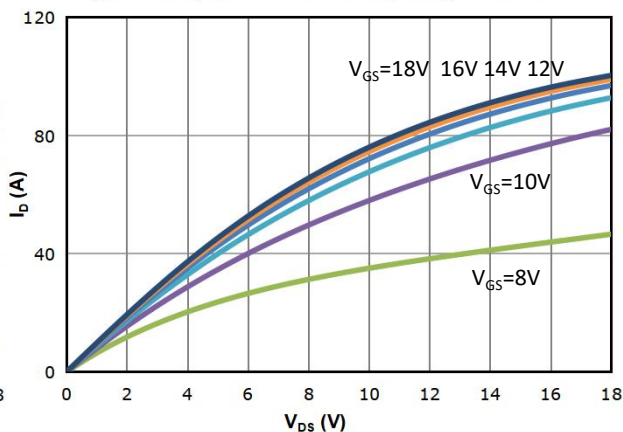


Fig 3: Transfer Characteristics

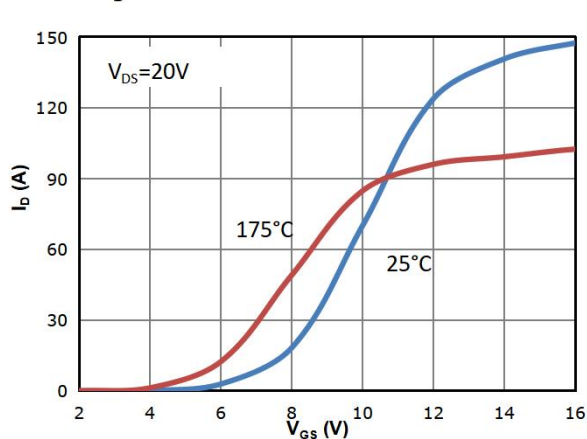


Fig 4: $R_{ds(on)}$ vs Drain Current and Gate Voltage

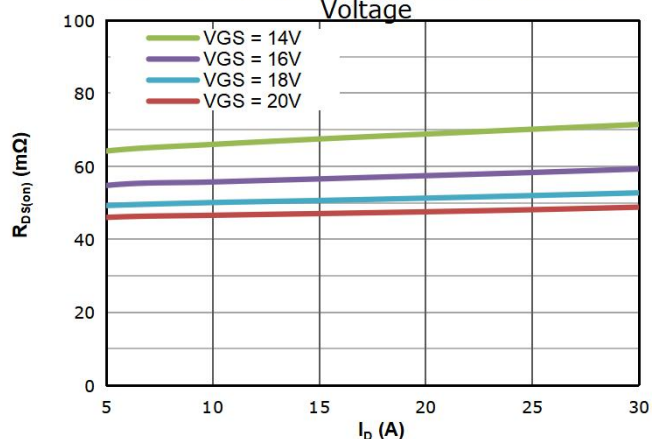


Fig 5: $R_{ds(on)}$ vs. Temperature

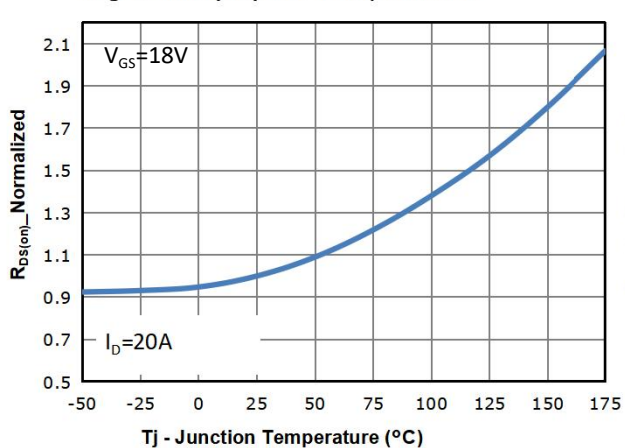


Fig 6: $V_{gs(th)}$ vs. Temperature

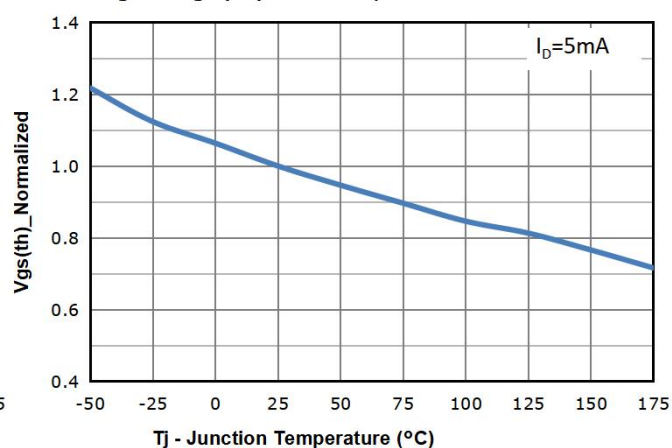


Fig 7: BVdss vs. Temperature

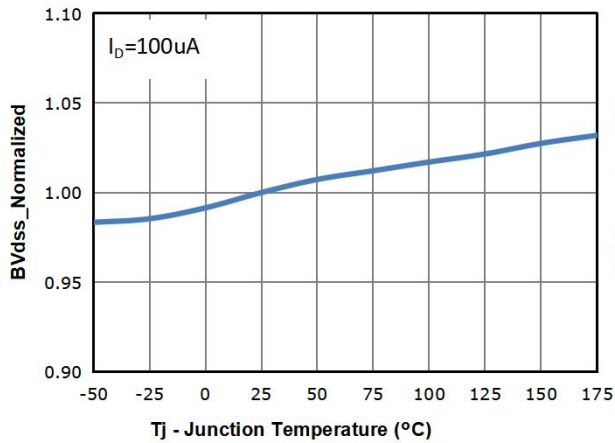


Fig 8: Capacitance Characteristics

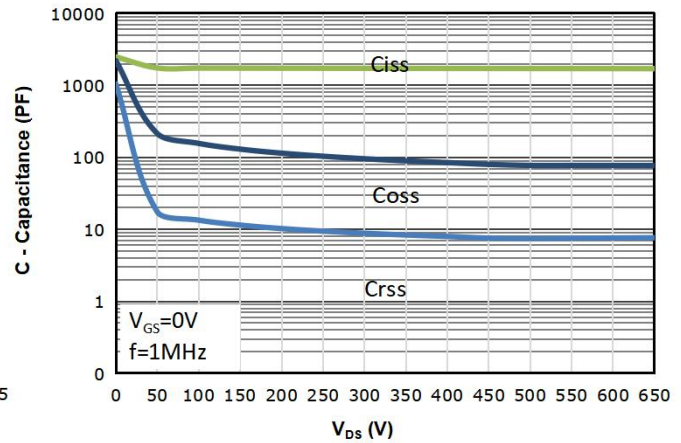


Fig 9: Gate Charge Characteristics

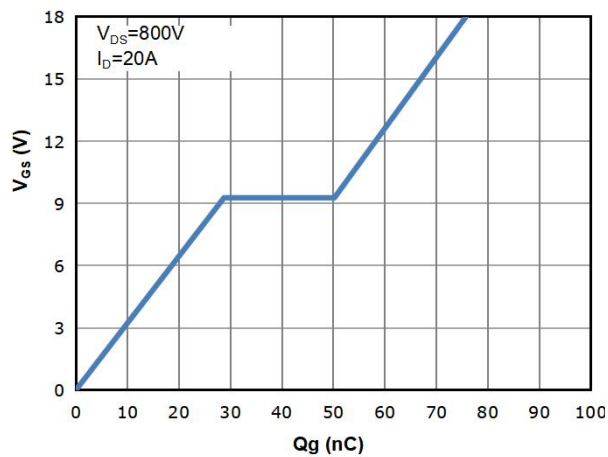


Fig 10: Body-diode Forward Characteristics

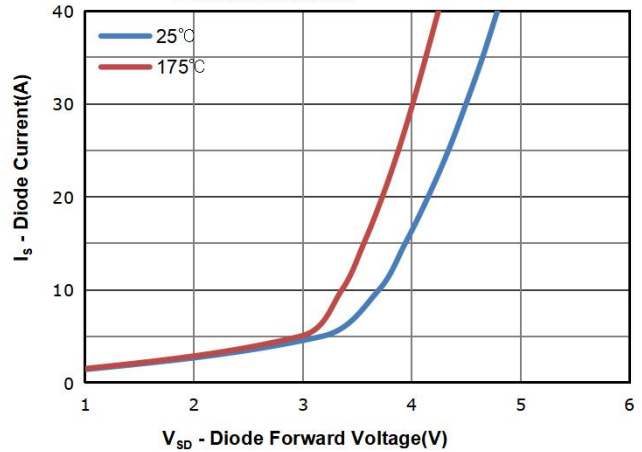


Fig 11: Power Dissipation

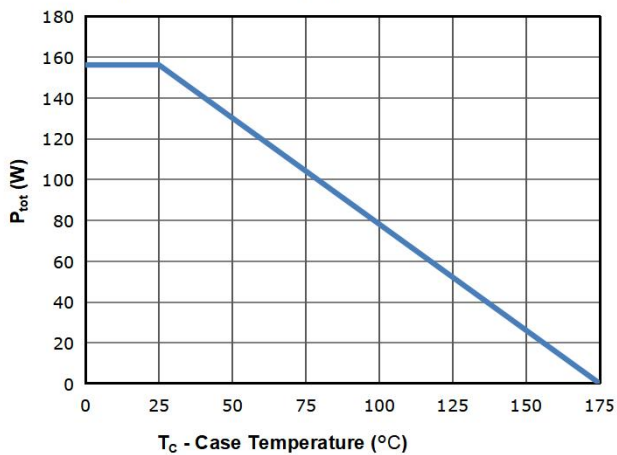


Fig 12: Drain Current Derating

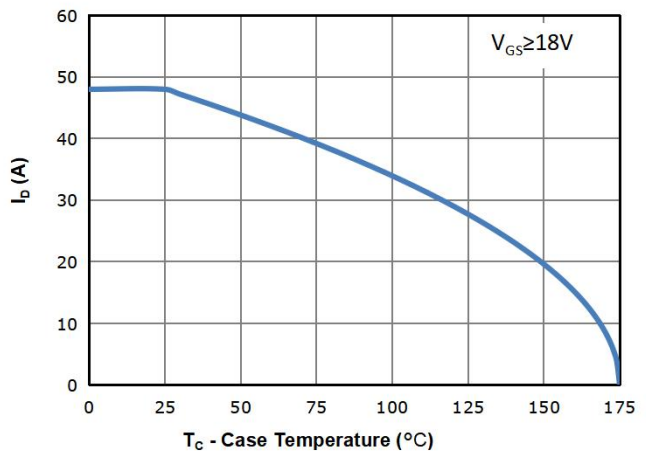


Fig 13: Safe Operating Area

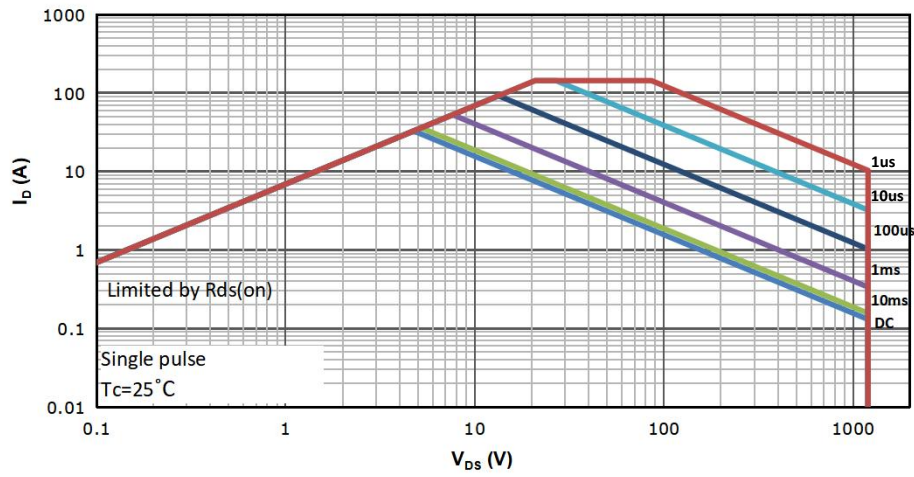
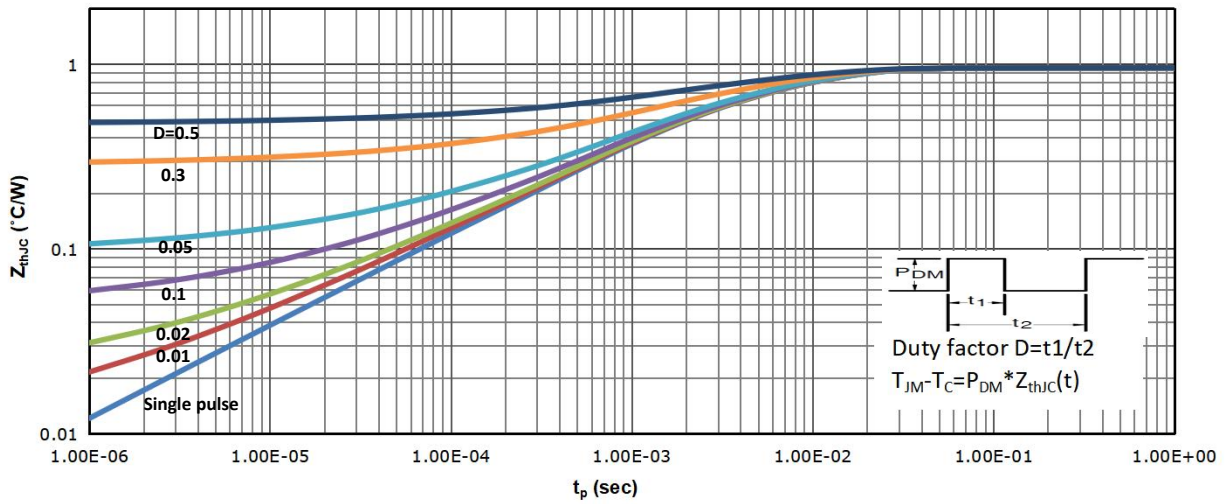
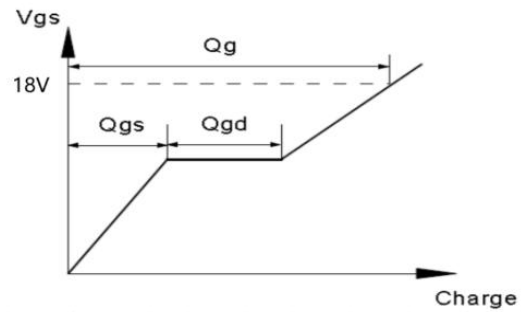
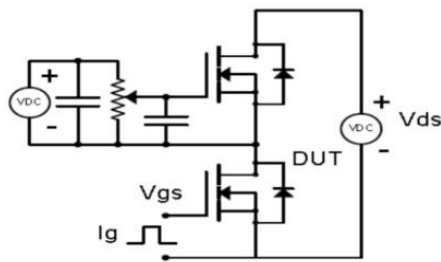


Fig 14: Max. Transient Thermal Impedance

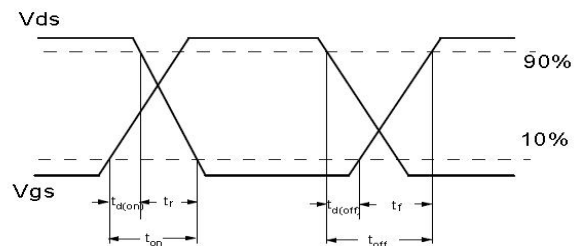
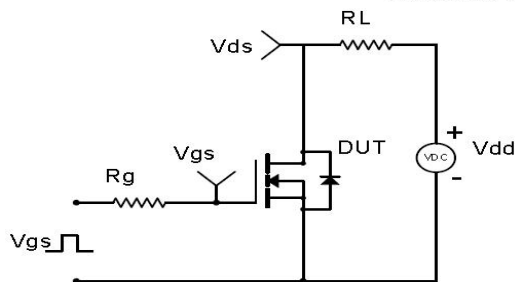


Test Circuit & Waveform

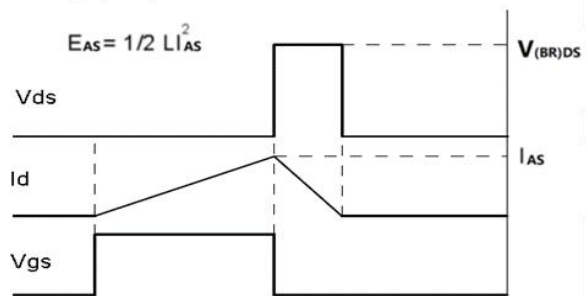
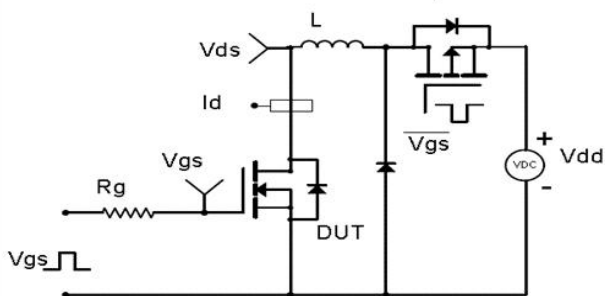
Gate Charge Test Circuit & Waveform



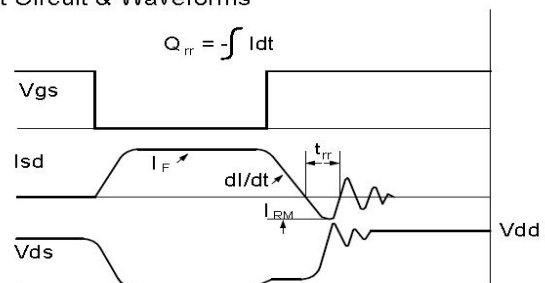
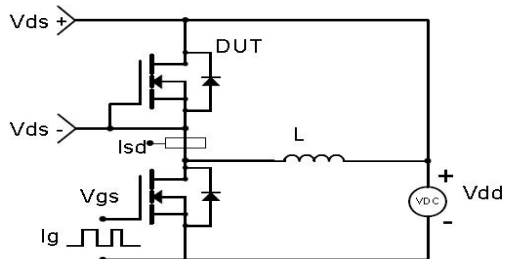
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



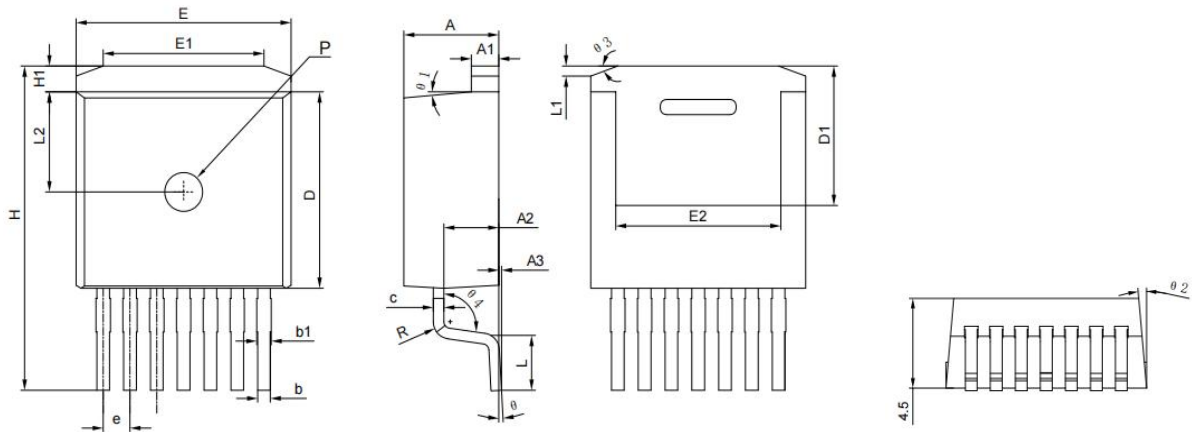
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Package Outline: TO-263-7H



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		0.263	
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

Disclaimer

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