BST030N04ML

Trench N-MOSFET 40V, 2.3mΩ, 116A

Features

- Uses BeST advanced Trench technology
- Extremely low on-resistance $R_{DS(on)}$
- Excellent Q_g*$R_{DS(on)}$ product(FOM)
- Qualified according to JEDEC criteria

Applications

- Motor control and drive
- Battery management
- UPS

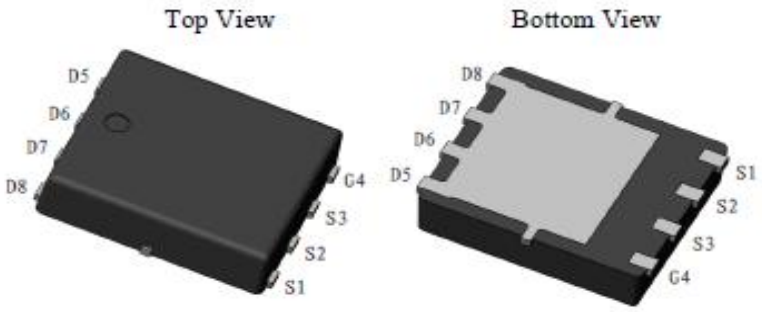
Product Summary

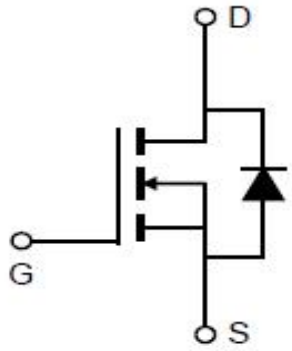
V_{DS}	40V
$R_{DS(on)\ typ.}$	2.3mΩ
I_D	116A

100% DVDS Tested

100% Avalanche Tested

DFN5×6





Package Marking and Ordering Information

Part #	Marking	Package	Packing	Reel Size	Qty
BST030N04ML	BST030N04ML	DFN5*6	Reel	13 Inch	5000pcs

Absolute Maximum Ratings (at Tc = 25 °C, unless otherwise specified)

Parameter	Symbol	Value	Unit
Drain-source voltage	V_{DS}	40	V
Continuous drain current T_C = 25°C (Silicon limit) T_C = 100°C (Silicon limit)	I_D	 116 74	A
Pulsed drain current (T_C = 25°C, t_p limited by T_{jmax})	$I_{D\ pulse}$	464	A
Avalanche energy, single pulse (L=0.5mH, Rg=25Ω)	E_{AS}	210	mJ
Gate-Source voltage	V_{GS}	±20	V
Power dissipation (T_C = 25°C)	P_{tot}	61	W
Operating junction and storage temperature	T_j , T_{stg}	-55~150	°C

Thermal Resistance

Parameter	Symbol	Max	Unit
Thermal resistance, junction – case.	R_{thJC}	2.05	°C/W
Thermal resistance, junction – ambient(min. footprint)	R_{thJA}	47	

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}	40	-	-	V	V_{GS}=0V, I_D=250uA
Gate threshold voltage	$V_{GS(th)}$	1	2	3	V	V_{DS}=V_{GS}, I_D=250uA
Zero gate voltage drain current	I_{DSS}	- -	0.01 -	1 10	μA	V_{DS}=36V, V_{GS}=0V T_j=25°C T_j=125°C
Gate-source leakage current	I_{GSS}	-	5	100	nA	V_{GS}=20V, V_{DS}=0V
Drain-source on-state resistance	$R_{DS(on)}$	- - 	2.3 3.7 3.1	2.7 4.5 3.5	mΩ	V_{GS}=10V, I_D=50A, T_j=25°C T_j=150°C V_{GS}=4.5V, I_D=30A,
Transconductance	g_{fs}	-	130	-	S	V_{DS}=5V, ID=40A
Dynamic Characteristic						
Input Capacitance	C_{iss}	-	5669	-	pF	V_{GS}=0V, V_{DS}=20V, f=1MHz
Output Capacitance	C_{oss}	-	686	-		
Reverse Transfer Capacitance	C_{rss}	-	318	-		
Gate Total Charge	Q_G	-	127	-	nC	V_{GS}=10V, V_{DS}=20V, I_D=40A, f=1MHz
Gate-Source charge	Q_{gs}	-	24	-		
Gate-Drain charge	Q_{gd}	-	31	-		
Turn-on delay time	$t_{d(on)}$	-	18	-	ns	V_{GS}=10V, V_{DD}=20V, R_{G_ext}=2.7Ω, I_D=40A,
Rise time	t_r	-	118	-		
Turn-off delay time	$t_{d(off)}$	-	69	-		
Fall time	t_f	-	66	-		
Gate resistance	R_G	-	1.2	-	Ω	V_{GS}=0V, V_{DS}=0V, f=1MHz

Body Diode Characteristic

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Body Diode Forward Voltage	V_{SD}	-	0.8	1.3	V	V_{GS}=0V, I_{SD}=40A
Body Diode Reverse Recovery Time	T_{rr}	-	31	-	ns	I_F=40A, dI/dt=100A/μs
Body Diode Reverse Recovery Charge	Q_{rr}	-	26	-	nC	

Typical Performance Characteristics

Fig 1: Output Characteristics

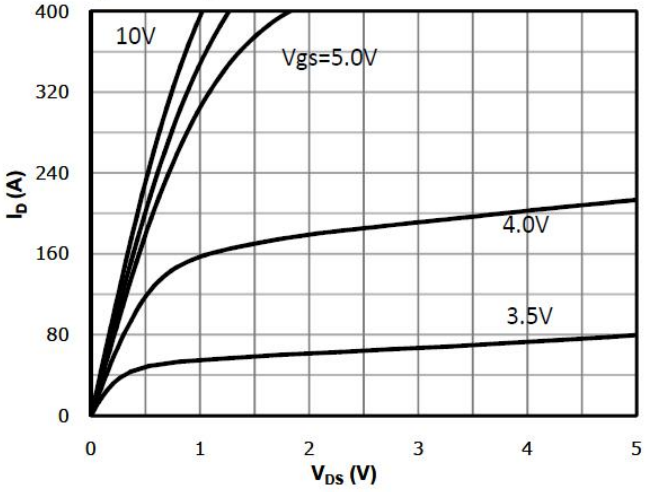


Fig 2: Transfer Characteristics

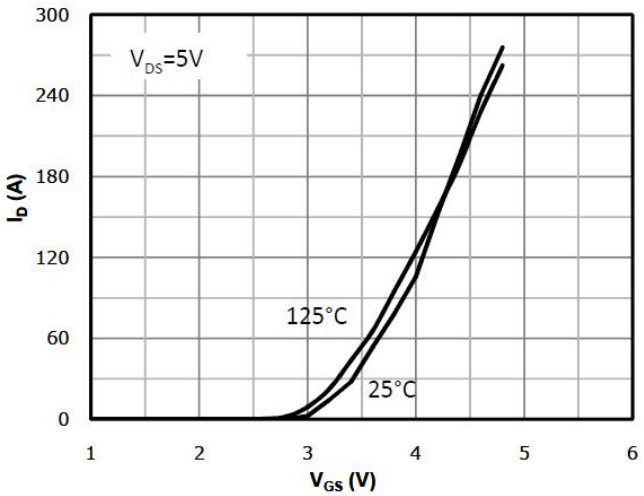


Fig 3: Rds(on) vs Drain Current and Gate Voltage

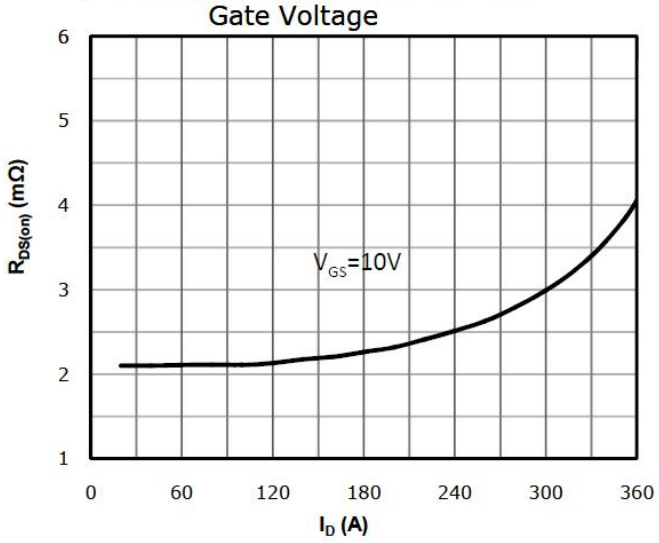


Fig 4: Rds(on) vs Gate Voltage

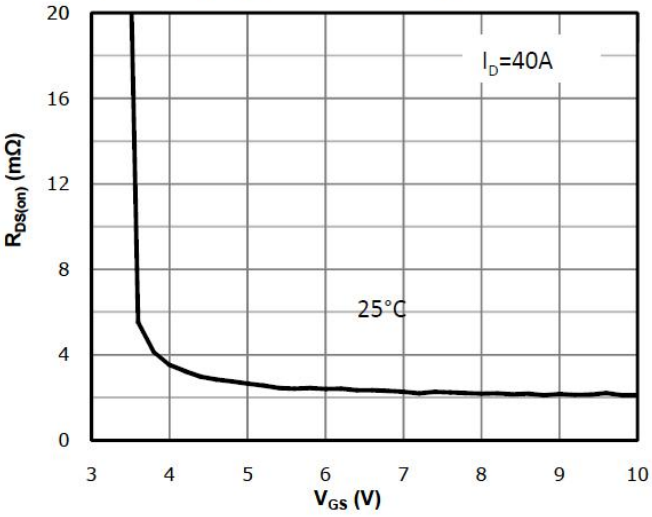


Fig 5: Rds(on) vs. Temperature

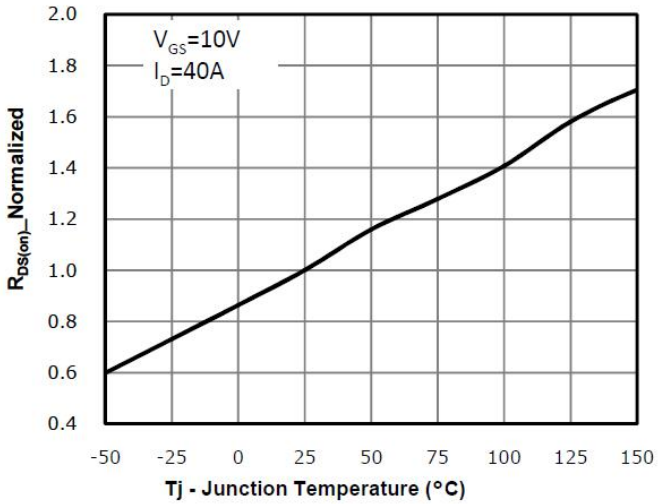


Fig 6: Capacitance Characteristics

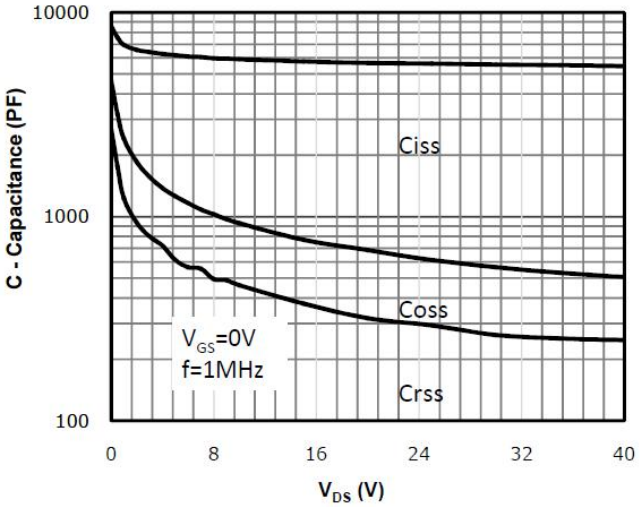


Fig 7: Gate Charge Characteristics

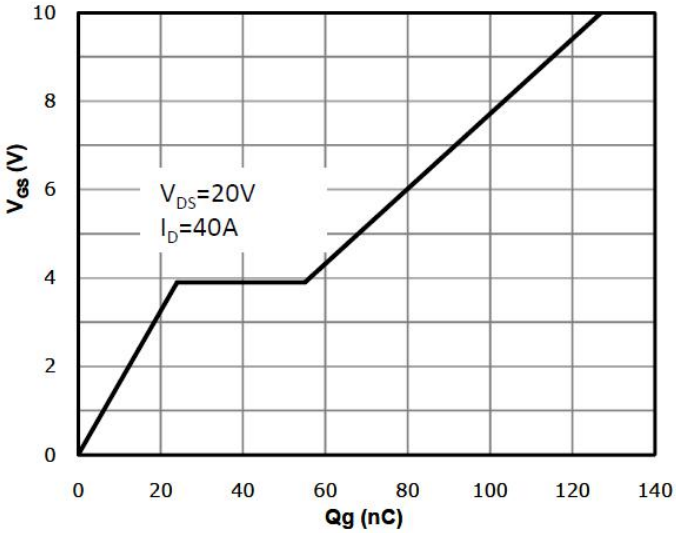


Fig 8: Body-diode Forward Characteristics

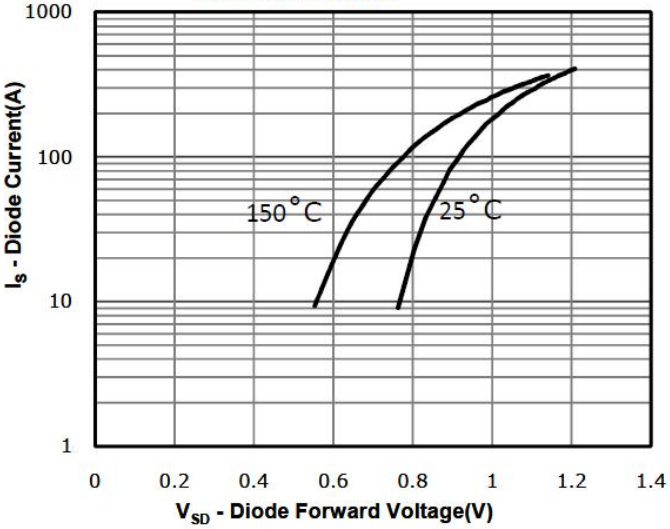


Fig 9: Power Dissipation

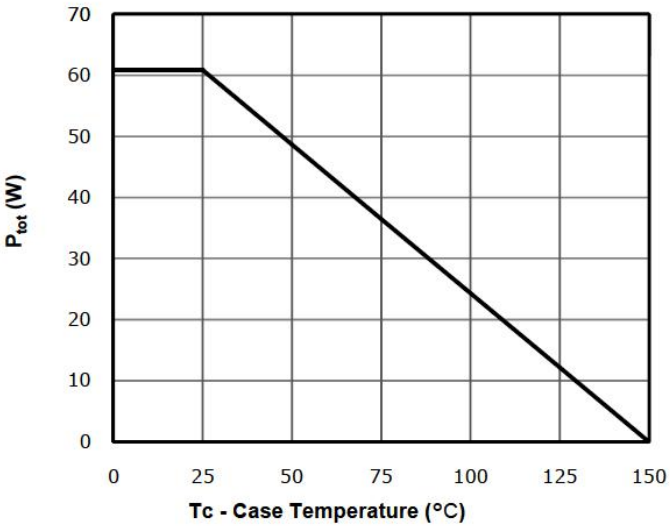


Fig 10: Drain Current Derating

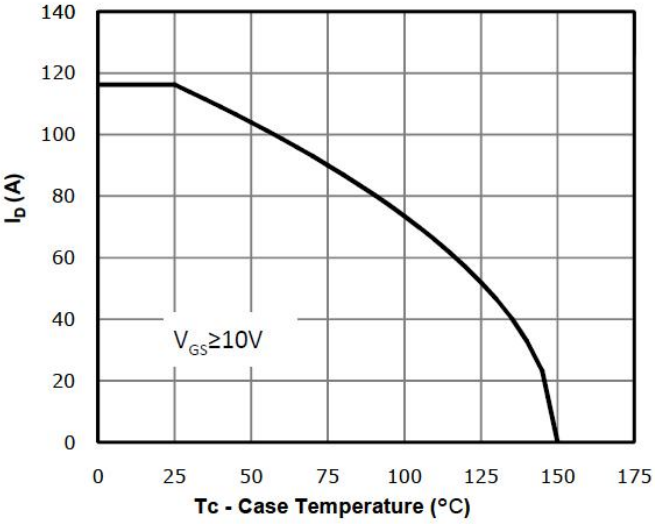


Fig 11: Safe Operating Area

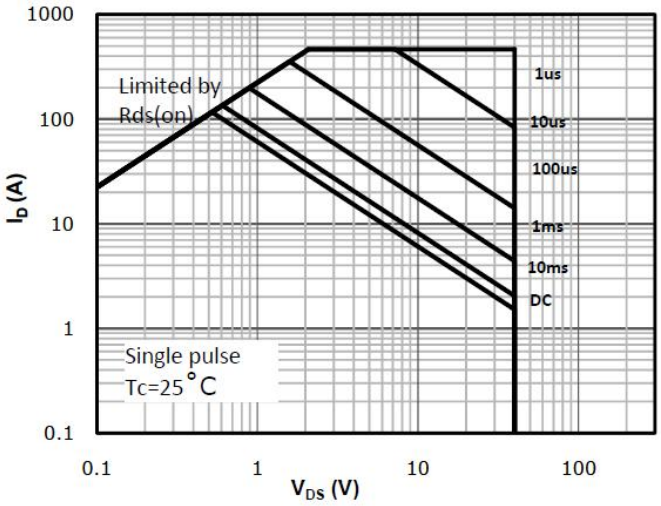
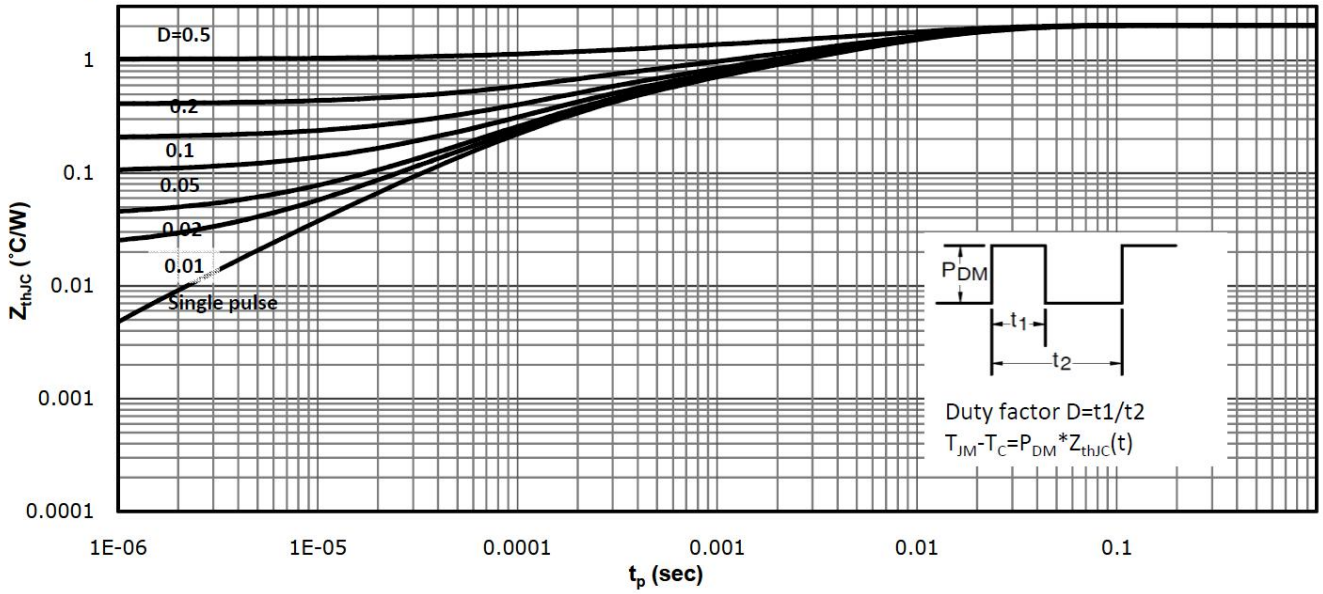
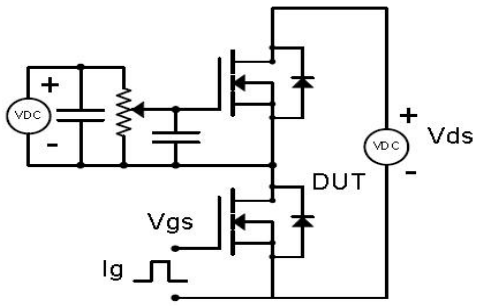


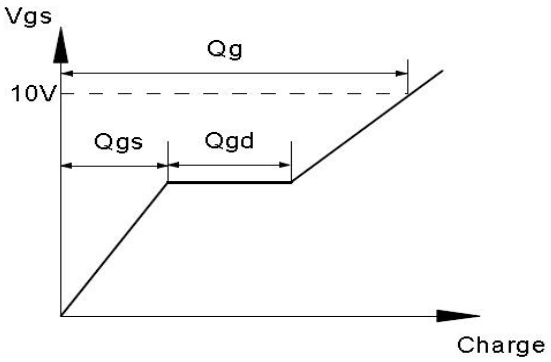
Fig 12: Max. Transient Thermal Impedance



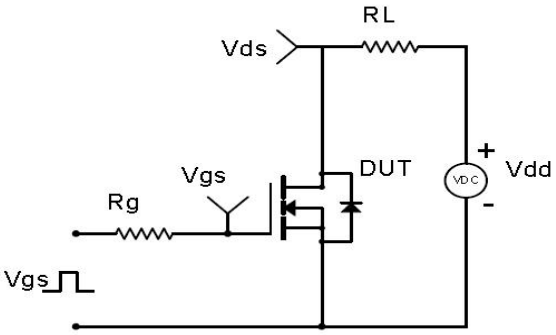
Test Circuit & Waveform

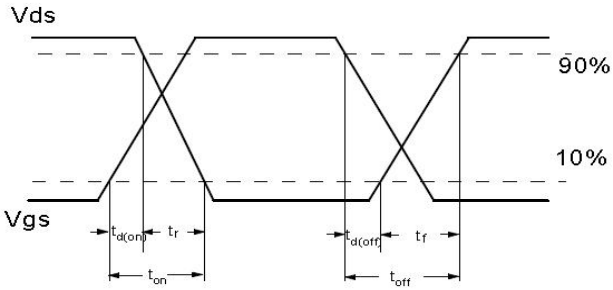
Gate Charge Test Circuit & Waveform



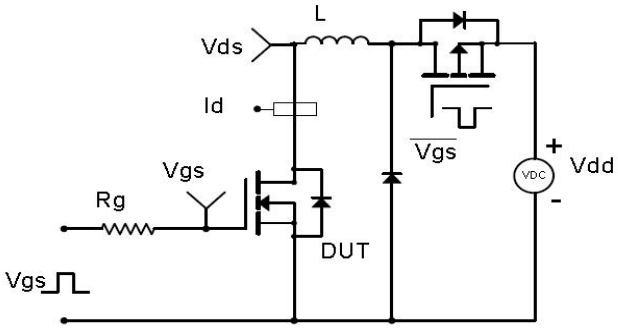


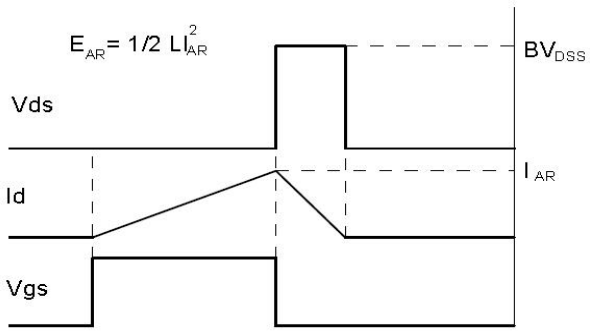
Resistive Switching Test Circuit & Waveforms



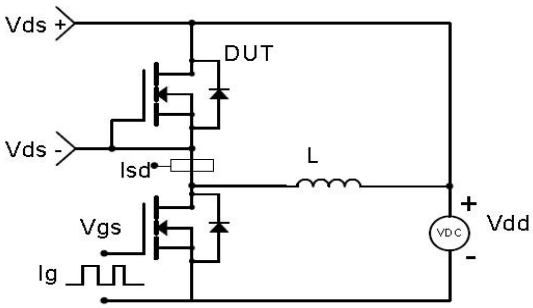


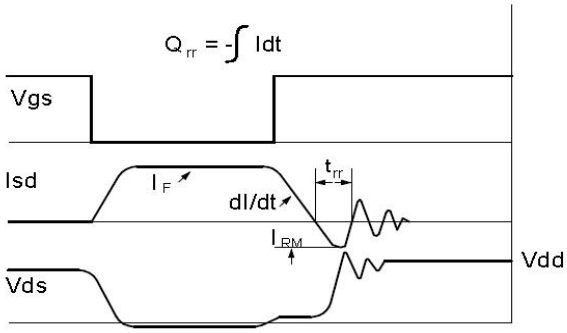
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



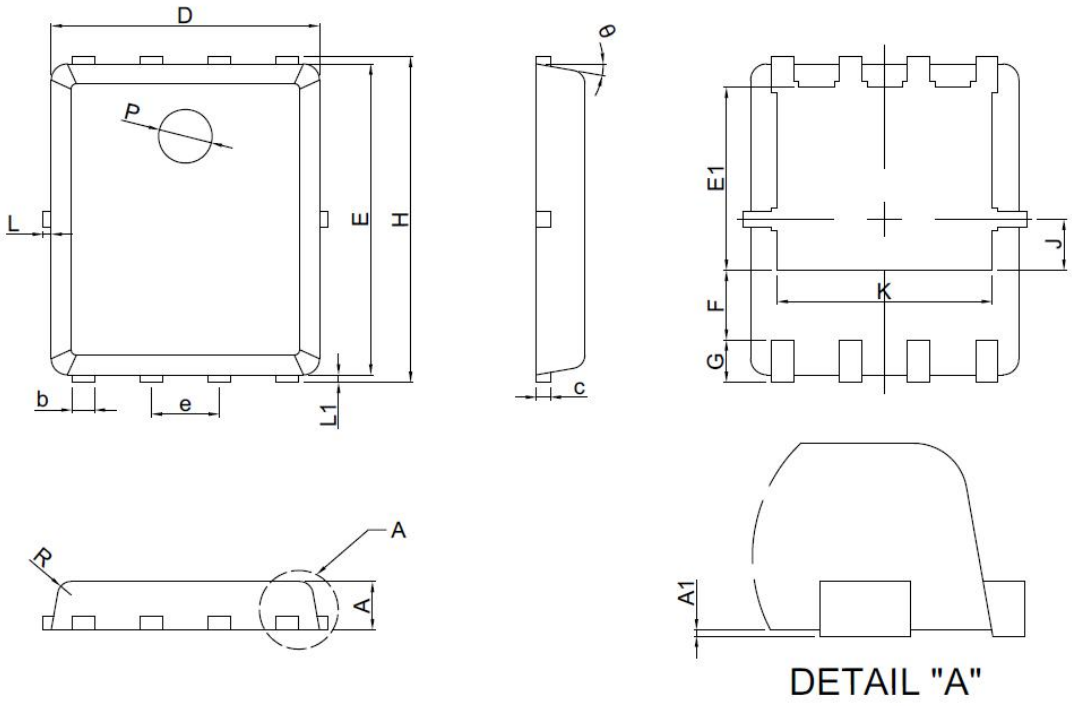


Diode Recovery Test Circuit & Waveforms





Package Outline: PDFN5x6 8L



SYMBOL	MIN	NOM	MAX
A	0.80	0.90	1.00
A1	0.00	0.03	0.05
b	0.35	0.42	0.49
c		0.254REF	
D	4.90	5.00	5.10
F		1.40REF	
E	5.70	5.80	5.90
e		1.27BSC	
H	5.95	6.08	6.20
L1	0.10	0.14	0.18
G		0.60REF	
K		4.00REF	
L	-	-	0.15
J		0.95BSC	
P		1.00REF	
E1		3.40REF	
θ	6°	10°	14°
R		0.25REF	

Revision History

Revision	Date	Subjects (major changes since last revision)
O	2019/1/24	First release

Disclaimer

Unless otherwise specified in the datasheet, the product is designed and qualified as a standard commercial product and is not intended for use in applications that require extraordinary levels of quality and reliability, such as automotive, aviation/aerospace and life-support devices or systems.

Any and all semiconductor products have certain probability to fail or malfunction, which may result in personal injury, death or property damage. Customer are solely responsible for providing adequate safe measures when design their systems.

BeST reserves the right to improve product design, function and reliability without notice.