

EVVOSEMI[®]

THINK CHANGE DO



ESD



TVS



MOS



LDO



Diode



Sensor



DC-DC

Product Specification

▶ Domestic	Part Number	BSC039N06NS
▶ Overseas	Part Number	BSC039N06NS
▶ Equivalent	Part Number	BSC039N06NS

EV is the abbreviation of name EVVO

60V N-Channel Enhancement Mode MOSFET

Features

- Split Gate Trench MOSFET technology
- Excellent package for heat dissipation
- High density cell design for low $R_{DS(ON)}$

Product Summary

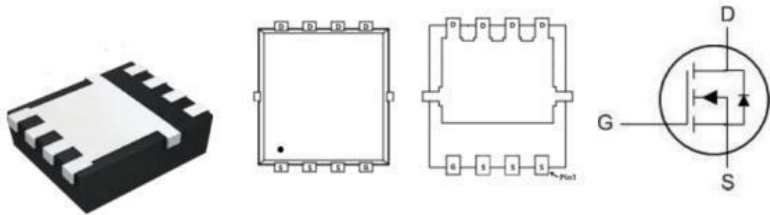
$V_{DS} = 60V$ $I_D = 125A$

$R_{DS(ON)} = 2.4\ m\Omega @ V_{GS}=10V$

PDFN5*6-8L Pin Configuration

Applications

- DC-DC Converters
- Power management functions
- Synchronous-rectification applications



Package Marking and Ordering Information

Product ID	Package	Marking	QTY(PCS)	Packing method
BSC039N06NS	PDFN5*6L	T29FND	5000	Reel

Absolute Maximum Ratings:

Symbol	Parameter		Value	Units
V_{DSS}	Drain-to-Source Voltage		60	V
I_D	Continuous Drain Current	$T_C = 25\ ^\circ C$	125	A
	Continuous Drain Current	$T_C = 100\ ^\circ C$	101	A
I_{DM}^{a1}	Pulsed Drain Current		641	A
E_{AS}^{a2}	Single pulse avalanche energy		189	mJ
V_{GS}	Gate-to-Source Voltage		± 20	V
P_D	Power Dissipation		113	W
T_J, T_{STG}	Operating Junction and Storage Temperature Range		150, -55 to 150	$^\circ C$
T_L	Maximum Temperature for Soldering		260	$^\circ C$

Thermal Characteristics:

Symbol	Parameter	Value	Units
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	1.11	$^\circ C/W$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	39.4	$^\circ C/W$

60V N-Channel Enhancement Mode MOSFET
Electrical Characteristics (T_c= 25°C unless otherwise specified):

Static Characteristics						
Symbol	Parameter	Test Conditions	Value			Units
			Min.	Typ.	Max.	
V _{DSS}	Drain to Source Breakdown Voltage	V _{GS} =0V, I _D =250μA	60	--	--	V
I _{DSS}	Drain to Source Leakage Current	V _{DS} = 60V, V _{GS} = 0V	--	--	1	μA
I _{GSS(F)}	Gate to Source Forward Leakage	V _{GS} =+20V	--	--	100	nA
I _{GSS(R)}	Gate to Source Reverse Leakage	V _{GS} =-20V	--	--	-100	nA
V _{GS(TH)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D = 250μA	1.2	--	2.2	V
R _{DS(ON)}	Drain-to-Source On-Resistance	V _{GS} =10V, I _D =20A	--	2.4	2.9	mΩ

Dynamic Characteristics						
Symbol	Parameter	Test Conditions	Value			Units
			Min.	Typ.	Max.	
C _{iss}	Input Capacitance	V _{GS} = 0V V _{DS} = 30V f = 1.0MHz	--	4610	6915	pF
C _{oss}	Output Capacitance		--	2188	3282	
C _{rss}	Reverse Transfer Capacitance		--	66	132	
R _g	Gate resistance		--	0.93	18.8	Ω

Resistive Switching Characteristics						
Symbol	Parameter	Test Conditions	Value			Units
			Min.	Typ.	Max.	
t _{d(ON)}	Turn-on Delay Time	I _D =40A V _{DS} = 30V V _{GS} = 10V R _G = 2.7Ω	--	14.13	--	ns
t _r	Rise Time		--	63.73	--	
t _{d(OFF)}	Turn-Off Delay Time		--	46.8	--	
t _f	Fall Time		--	105.07	--	
Q _g	Total Gate Charge	V _{GS} =10V V _{DS} = 30V I _D =40A	--	74.37	111.56	nC
Q _{gs}	Gate Source Charge		--	17.26	--	
Q _{gd}	Gate Drain Charge		--	9.44	18.88	

Source-Drain Diode Characteristics						
Symbol	Parameter	Test Conditions	Value			Units
			Min.	Typ.	Max.	
I _S	Diode Forward Current	T _C =25 °C	--	--	125	A
V _{SD}	Diode Forward Voltage	I _S =40A, V _{GS} =0V	--	0.83	1.2	V
t _{rr}	Reverse Recovery time	I _S =40A, dI/dt=300A/μs	--	52.78	105.56	ns
Q _{rr}	Reverse Recovery Charge		--	56.31	112.62	nC

a¹: Repetitive rating; pulse width limited by maximum junction temperature a²:
 VDD=30V, L=0.3mH, R_g=25Ω, Starting T_J=25 °C

Typical Performance Characteristics

60V N-Channel Enhancement Mode MOSFET

Fig 1: Output Characteristics

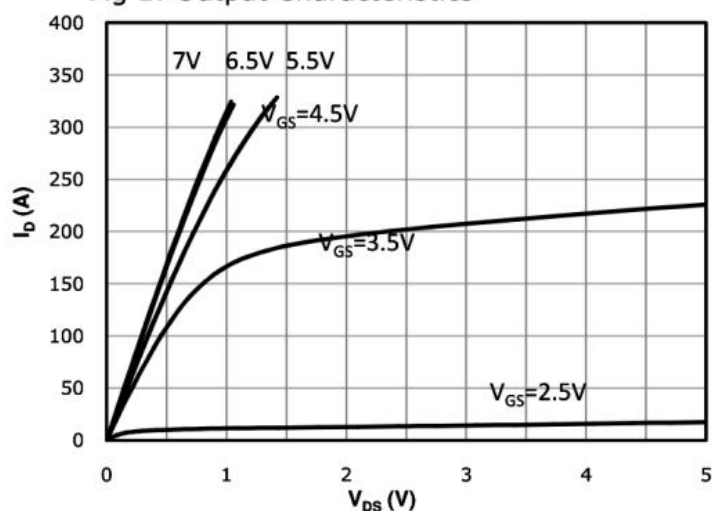


Fig 2: Transfer Characteristics

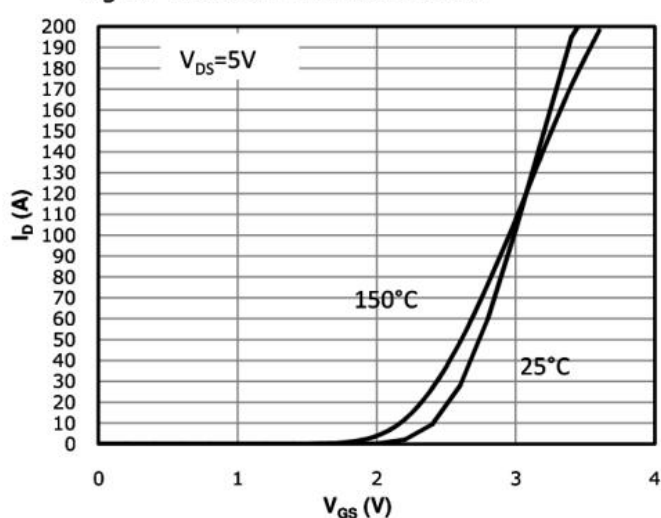
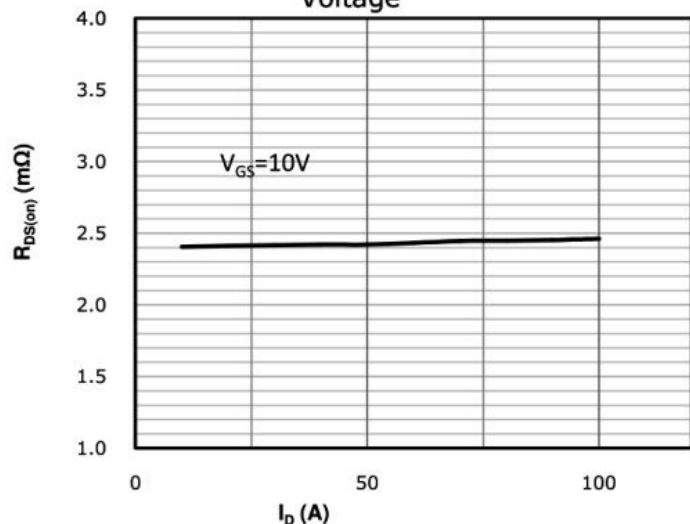
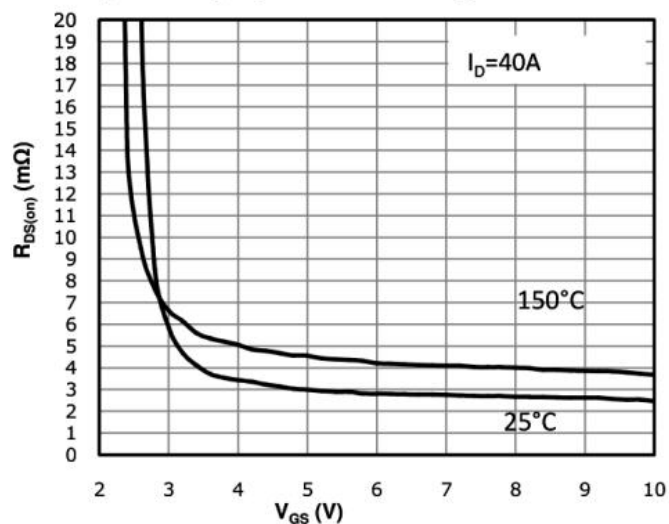
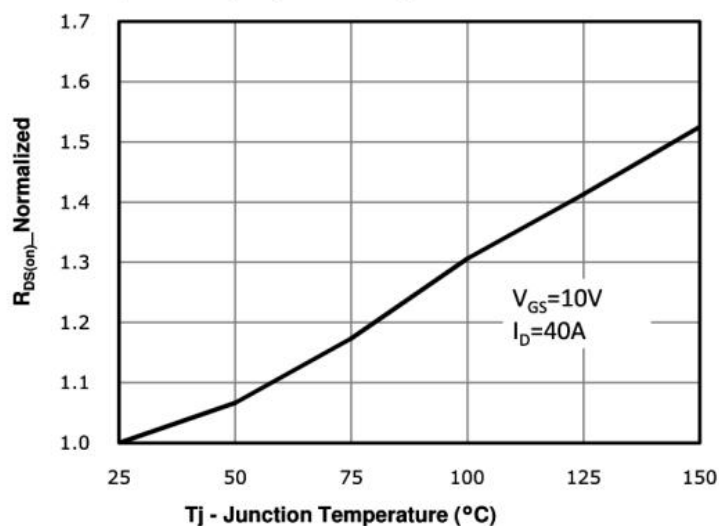
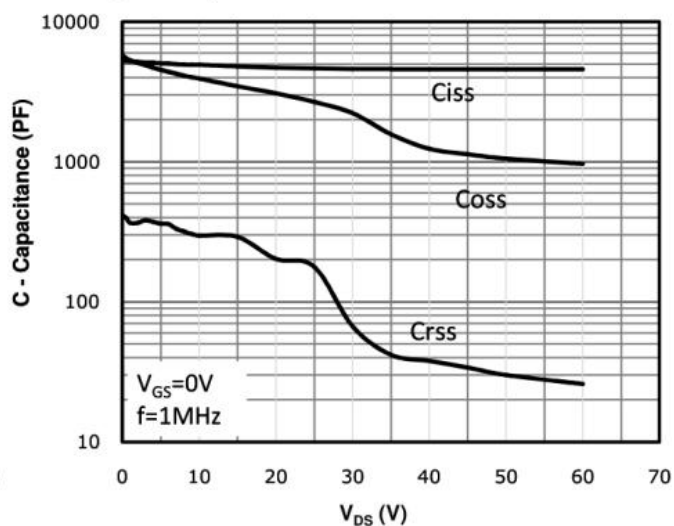
Fig 3: $R_{DS(on)}$ vs Drain Current and Gate VoltageFig 4: $R_{DS(on)}$ vs Gate VoltageFig 5: $R_{DS(on)}$ vs. Temperature

Fig 6: Capacitance Characteristics



60V N-Channel Enhancement Mode MOSFET

Fig 7: Gate Charge Characteristics

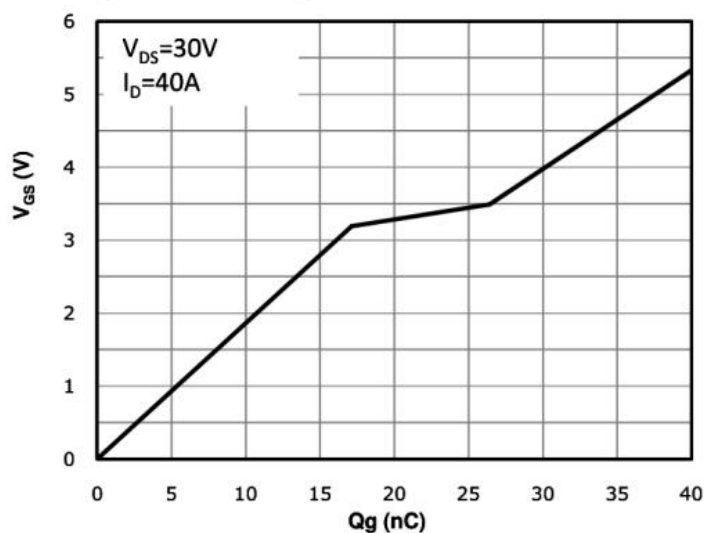


Fig 8: Body-diode Forward Characteristics

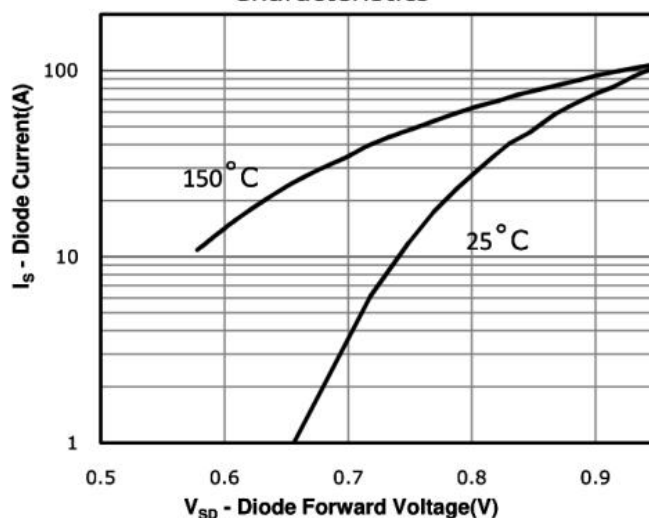


Fig 9: Power Dissipation

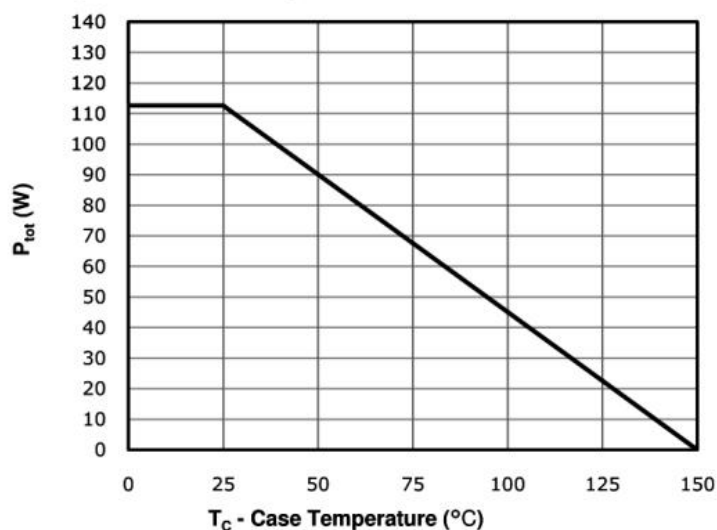


Fig 10: Drain Current Derating

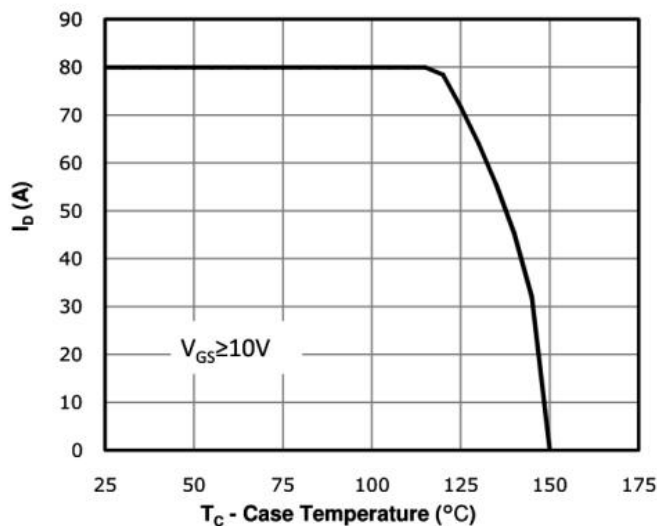
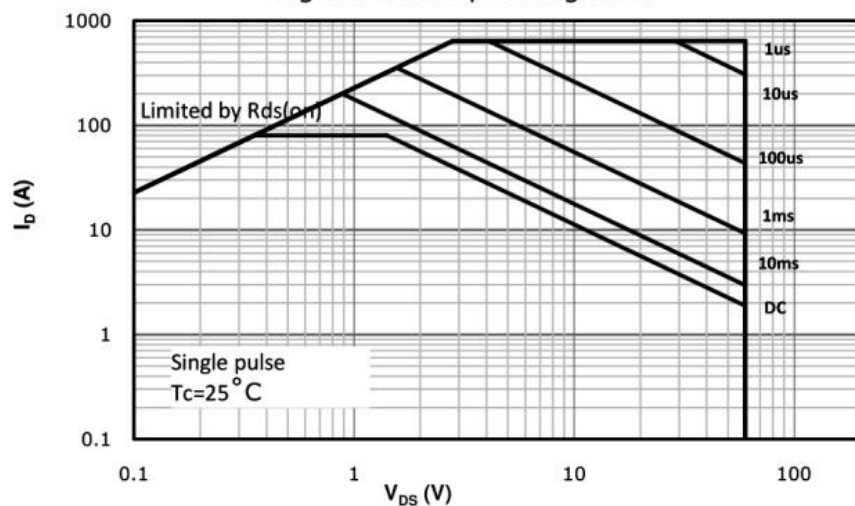
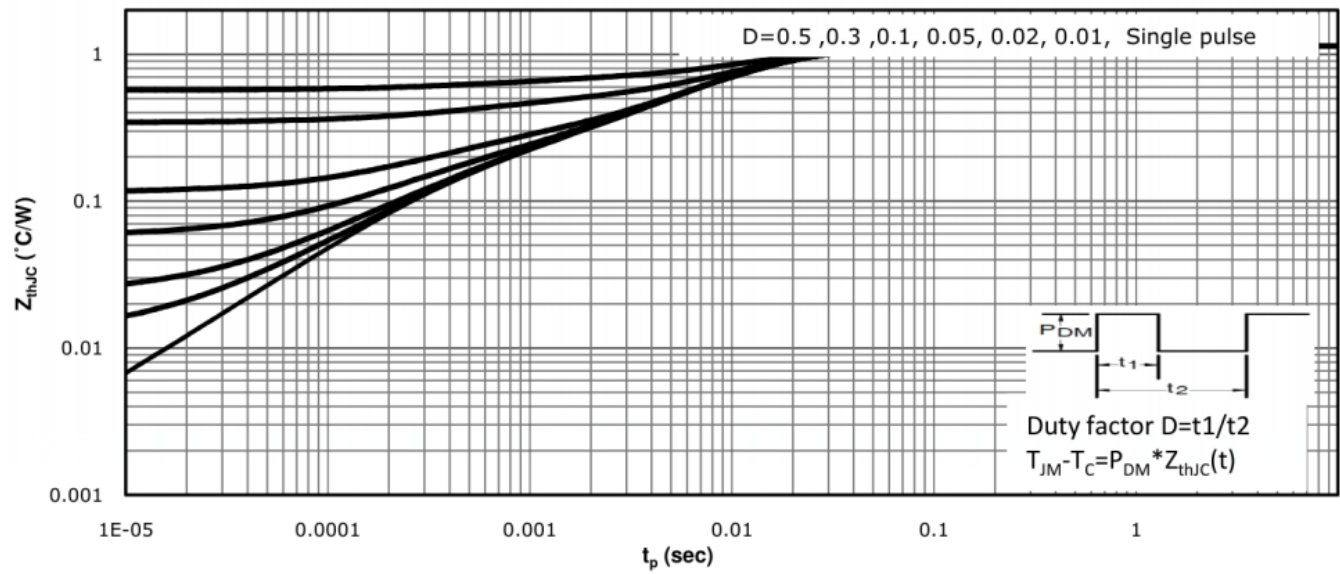


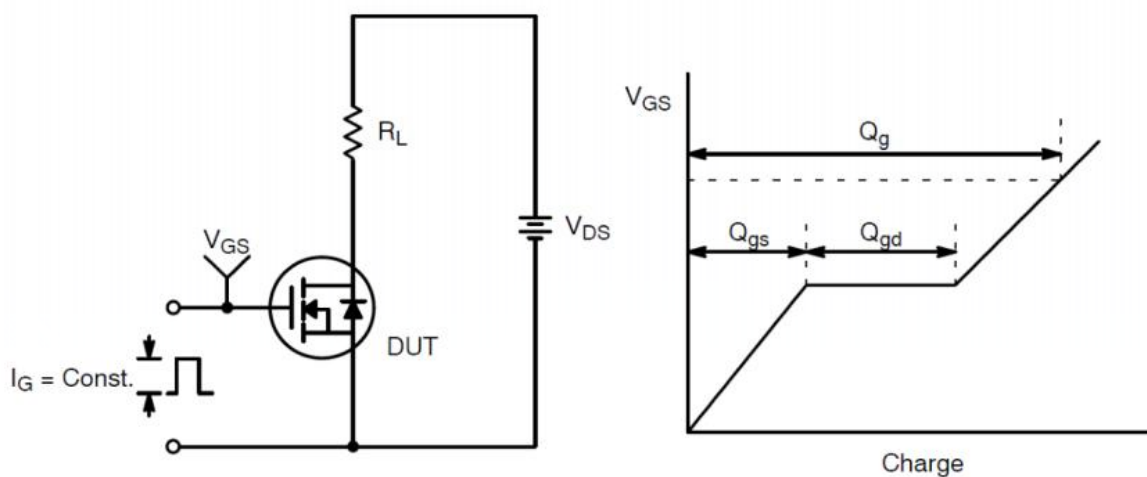
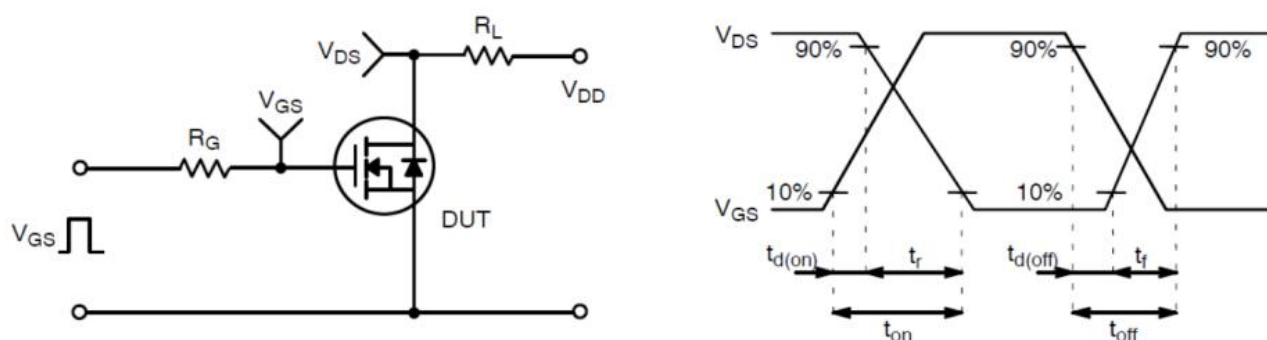
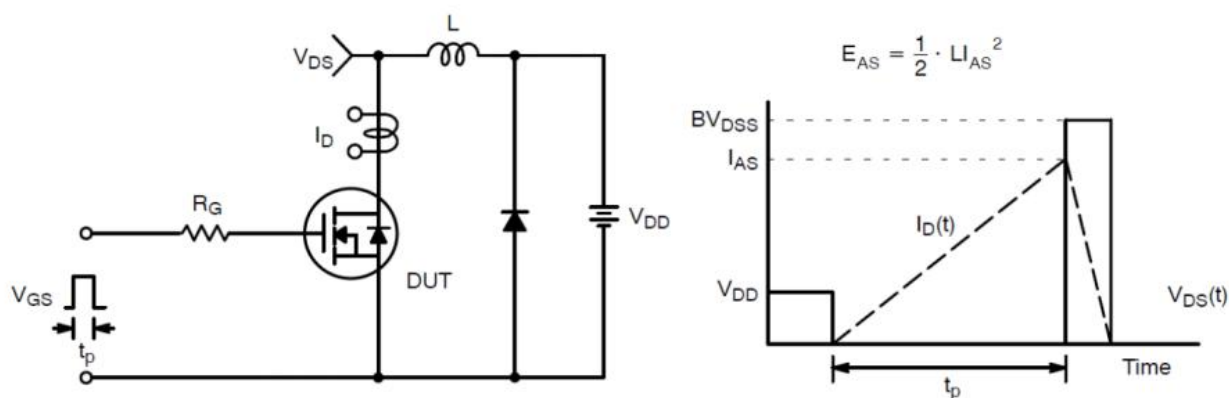
Fig 11: Safe Operating Area



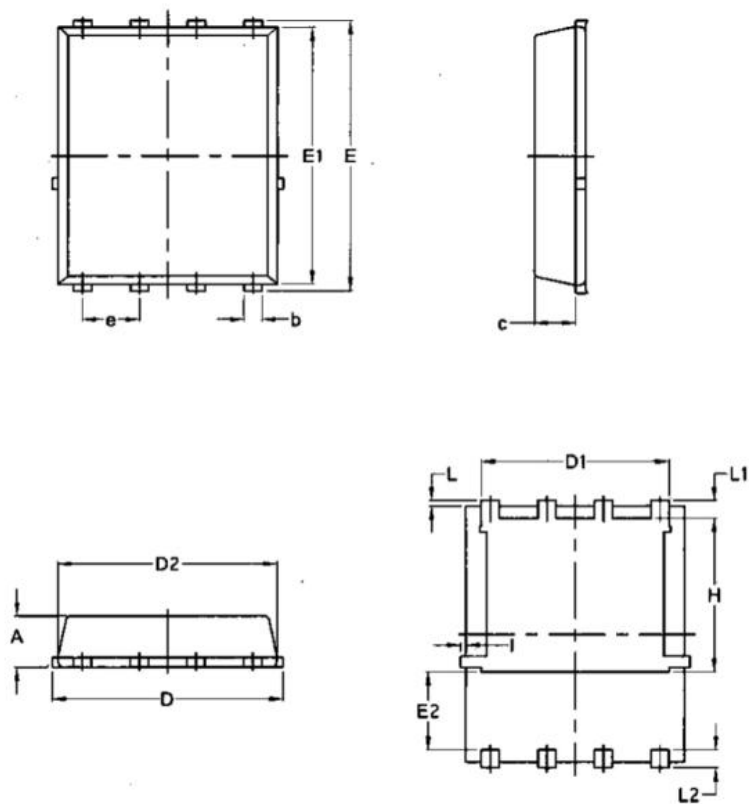
60V N-Channel Enhancement Mode MOSFET

Fig 12: Max. Transient Thermal Impedance



60V N-Channel Enhancement Mode MOSFET
Test Circuit and Waveform:

Gate Charge Test Circuit & Waveform

Resistive Switching Test Circuit & Waveforms

Unclamped Inductive Switching Test Circuit & Waveforms

Package Mechanical Data-PDFN5*6-8L-Single



Symbol	Common			
	mm		Inch	
	Mim	Max	Min	Max
A	1.03	1.17	0.0406	0.0461
b	0.34	0.48	0.0134	0.0189
c	0.824	0.0970	0.0324	0.082
D	4.80	5.40	0.1890	0.2126
D1	4.11	4.31	0.1618	0.1697
D2	4.80	5.00	0.1890	0.1969
E	5.95	6.15	0.2343	0.2421
E1	5.65	5.85	0.2224	0.2303
E2	1.60	/	0.0630	/
e	1.27 BSC		0.05 BSC	
L	0.05	0.25	0.0020	0.0098
L1	0.38	0.50	0.0150	0.0197
L2	0.38	0.50	0.0150	0.0197
H	3.30	3.50	0.1299	0.1378
I	/	0.18	/	0.0070

Disclaimer

EVVOSEMI ("EVVO") reserves the right to make corrections, enhancements, improvements, and other changes to its products and services at any time, and to discontinue any product or service without notice.

EVVO warrants the performance of its hardware products to the specifications applicable at the time of sale in accordance with its standard warranty. Testing and other quality control techniques are used as deemed necessary by EVVO to support this warranty. Except where mandated by government requirements, testing of all parameters of each product is not necessarily performed.

Customers should obtain and confirm the latest product information and specifications before final design, purchase, or use. EVVO makes no warranty, representation, or guarantee regarding the suitability of its products for any particular purpose, nor does EVVO assume any liability for application assistance or customer product design. EVVO does not warrant or accept any liability for products that are purchased or used for any unintended or unauthorized application.

EVVO products are not authorized for use as critical components in life support devices or systems without the express written approval of EVVOSEMI.

The EVVO logo and EVVOSEMI are trademarks of EVVOSEMI or its subsidiaries in relevant jurisdictions. EVVO reserves the right to make changes without further notice to any products herein.