

Description

The ENP45N03 uses advanced trench technology to provide excellent RDS(ON) and low gate charge. Standard Product ENP45N03 is Pb-free (meets ROHS & Sony 259 specifications).

General Features

- VDS =30V ID R =45A
DS(ON)(Typ.)=6.3mΩ @VGS=10V
High power and current handling capability
- Lead free product is acquired
- Surface mount package

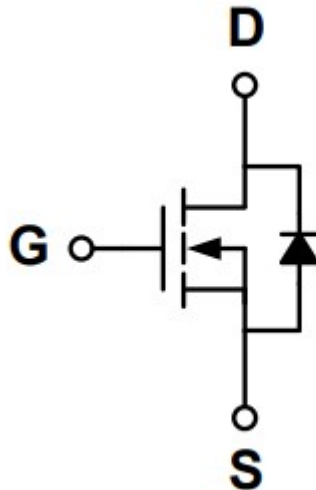
Application

- High Frequency Point-of-Load Synchronous Buck Converter for MB/NB/UMPC/VGA
- Networking DC-DC Power System
- Load switch

Package

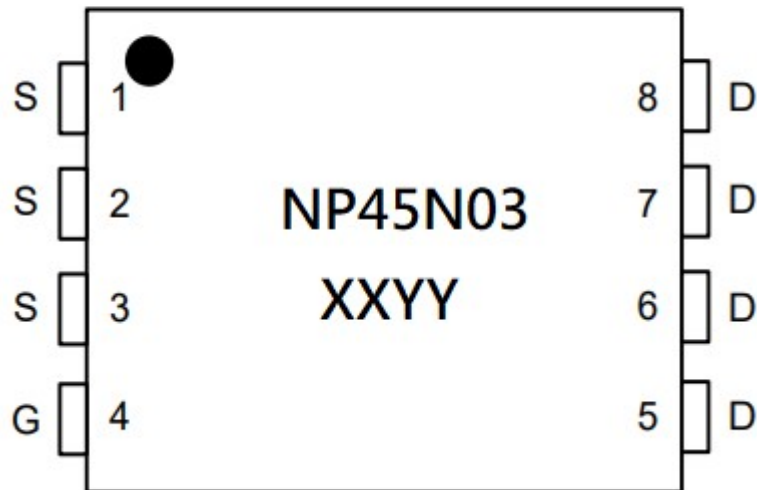
- DFN3×3-8L

Schematic diagram



Marking and pin assignment

DFN3×3-8L
(Top View)



Ordering Information

ENP45N03 F GR



Absolute Maximum Ratings (TA=25°C unless otherwise noted)

parameter		symbol	limit	unit
Drain-source voltage		V _{DS}	30	V
Gate-source voltage		V _{GS}	±20	V
Continuous Drain Current	TC=25°C	I _D	45	A
	TC=100°C		28	
Pulsed Drain Current		I _{DP}	180	A
Avalanche Current		I _{AS}	32	A
Avalanche energy(L=0.5mH)		EAS	120	mJ
Maximum power dissipation	TC=25°C	P _D	28	W
Power Dissipation – Derate above 25°C	TC=25°C		1.67	
Operating junction Temperature range		T _j	-55—150	°C

Electrical Characteristics (TA=25°C unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Static Characteristics						
Drain-source breakdown voltage	BV _{DSS}	V _{GS} =0V, I _D =250μA	30	-	-	V
BVDSS Temperature Coefficient	ΔBV _{DSS} /ΔT _J	Reference to 25°C, I _D =1mA		27		mV/°C
Zero gate voltage drain current	I _{DSS}	V _{DS} =30V, V _{GS} =0V	-	-	1	μA
		T _J =85°C	-	-	30	
Gate Leakage Current	I _{GSS}	V _{DS} =0V, V _{GS} =±20V	-	-	±100	nA
Gate threshold voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	1.0	1.6	2.5	V
Drain-source on-state resistance ¹	R _{DS(on)}	V _{GS} =10V, I _D =45A	-	6.3	7	mΩ
		V _{GS} =4.5V, I _D =40A		9.9	12.9	
On Status Drain Current	I _{D(on)}	V _{DS} =10V, V _{GS} =10V	50	-	-	A
Diode Characteristics						
Diode Forward Voltage ¹	V _{SD}	I _{SD} =1A, V _{GS} =0V	-	0.8	1.1	V
Diode Continuous Forward Current	I _S		-	-	46	A
Reverse Recovery Time	t _{rr}	I _F =30A, dI/dt=100A/us	-	9.2	-	ns
Reverse Recovery Charge	Q _{rr}		-	2	-	nC
Dynamic Characteristics²						
Gate Resistance	R _G	V _{GS} =0V, V _{DS} =0V, f=1MHz	-	1.7	-	
Input capacitance	C _{ISS}	V _{GS} =0V, V _{DS} =20V f=1.0MHz	-	1317	-	pF
Output capacitance	C _{OSS}		-	163	-	
Reverse transfer capacitance	C _{RSS}		-	131	-	
Turn-on delay time	t _{D(on)}	V _{GS} =10V, V _{DD} =15V, R _L =20Ω, I _D =15A, R _G =3.3Ω	-	4.6	-	ns
Turn-on Rise time	t _r		-	12.2	-	
Turn-off delay time	t _{D(off)}		-	26.6	-	
Turn-off Fall time	t _f		-	8	-	
Total gate charge	Q _g	V _{GS} =4.5V, I _D =15A V _{DS} =15V	-	12.6		nC
Gate-source charge	Q _{gs}			4.2		
Gate-drain charge	Q _{gd}		-	5.1	-	
Drain-Source Diode Characteristics						
Diode forward voltage	V _{SD}	I _{SD} =50A, V _{GS} =0V	-	0.8	1.1	V

Note: 1 : Pulse test; pulse width ≤ 300ns, duty cycle ≤ 2%.

2 : Guaranteed by design, not subject to production testing.

Thermal Characteristics

Parameter	Symbol	Typical	Unit
Thermal Resistance-Junction to Case	Rθjc	1.7	°C/W
Thermal Resistance junction-to ambient	Rθja	62.5	

Typical Performance Characteristics

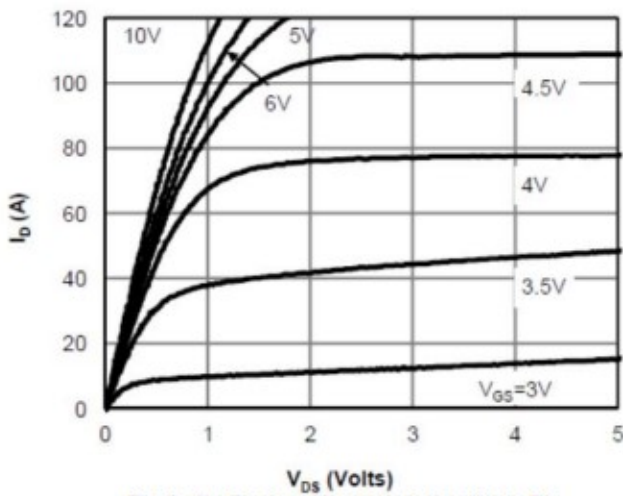


Fig 1: On-Region Characteristics (Note E)

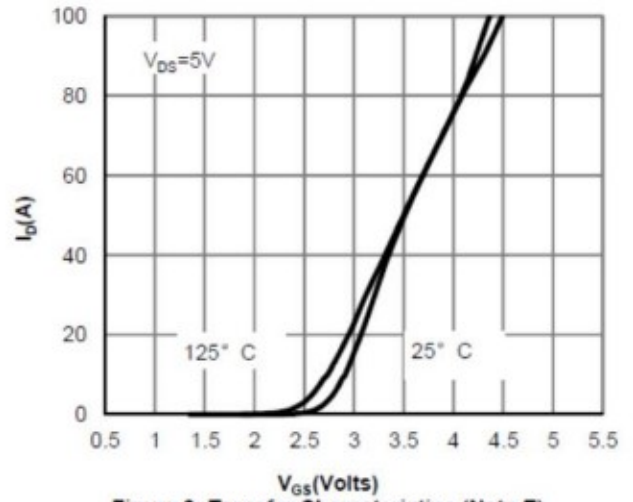


Figure 2: Transfer Characteristics (Note E)

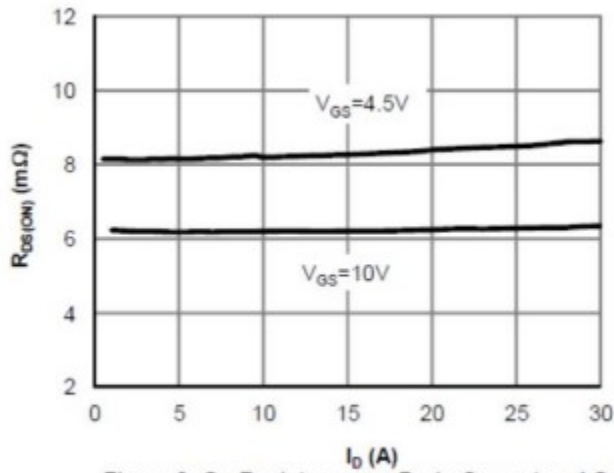


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

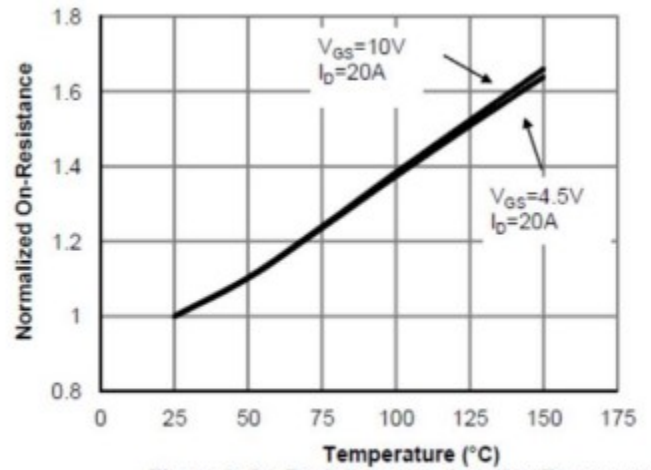


Figure 4: On-Resistance vs. Junction Temperature (Note E)

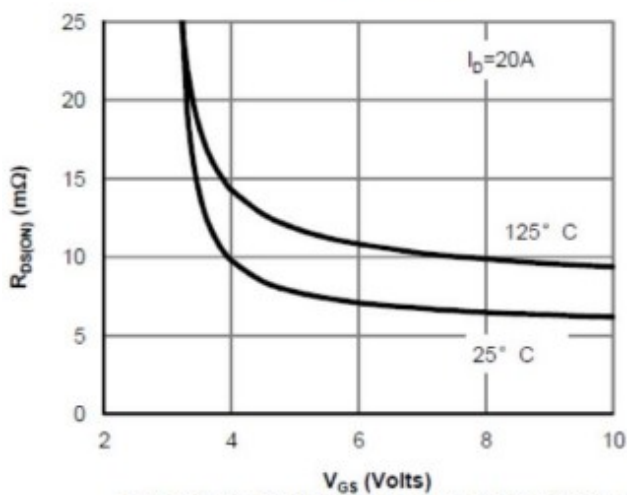


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

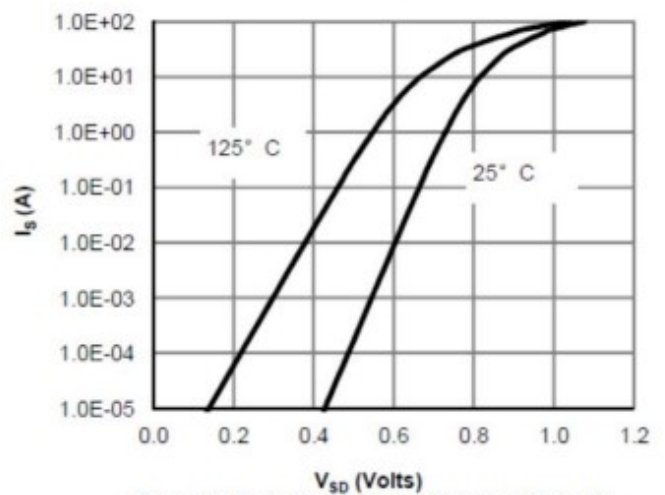


Figure 6: Body-Diode Characteristics (Note E)

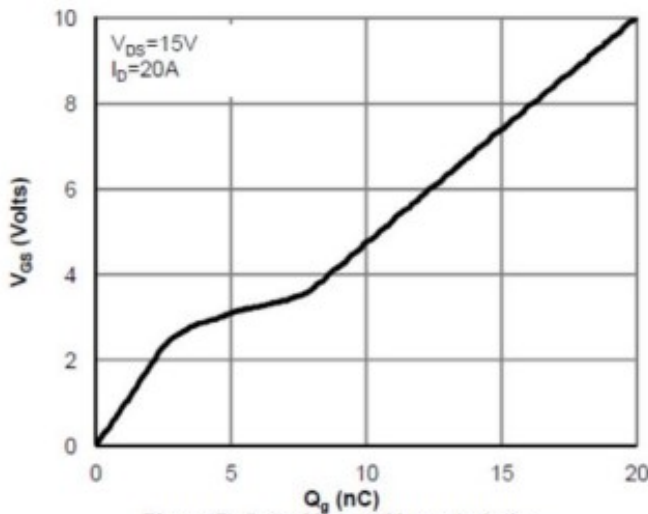


Figure 7: Gate-Charge Characteristics

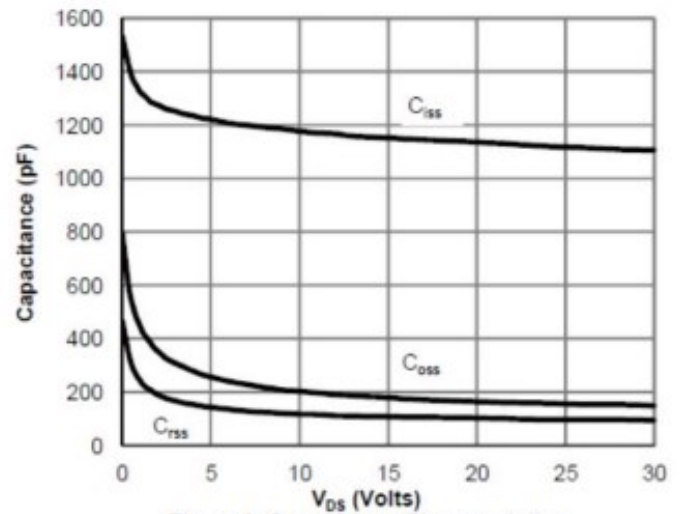


Figure 8: Capacitance Characteristics

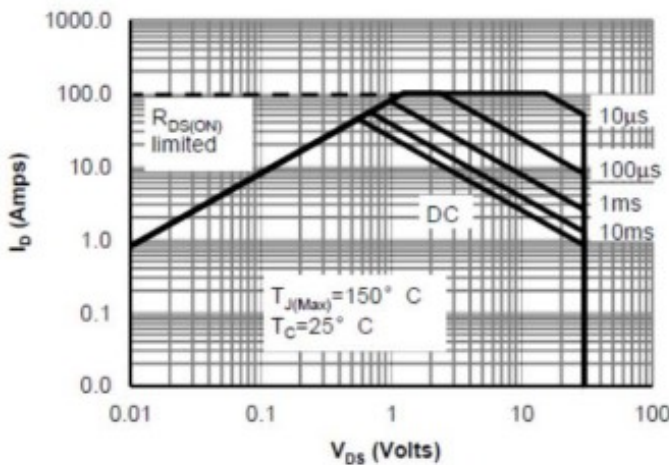


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

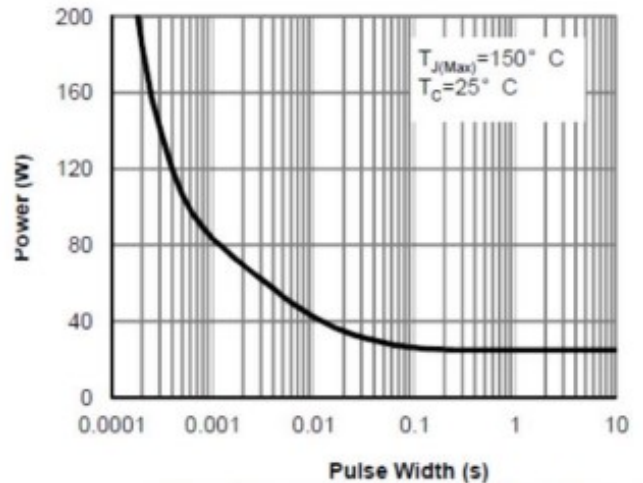


Figure 10: Single Pulse Power Rating Junction-to-Case (Note F)

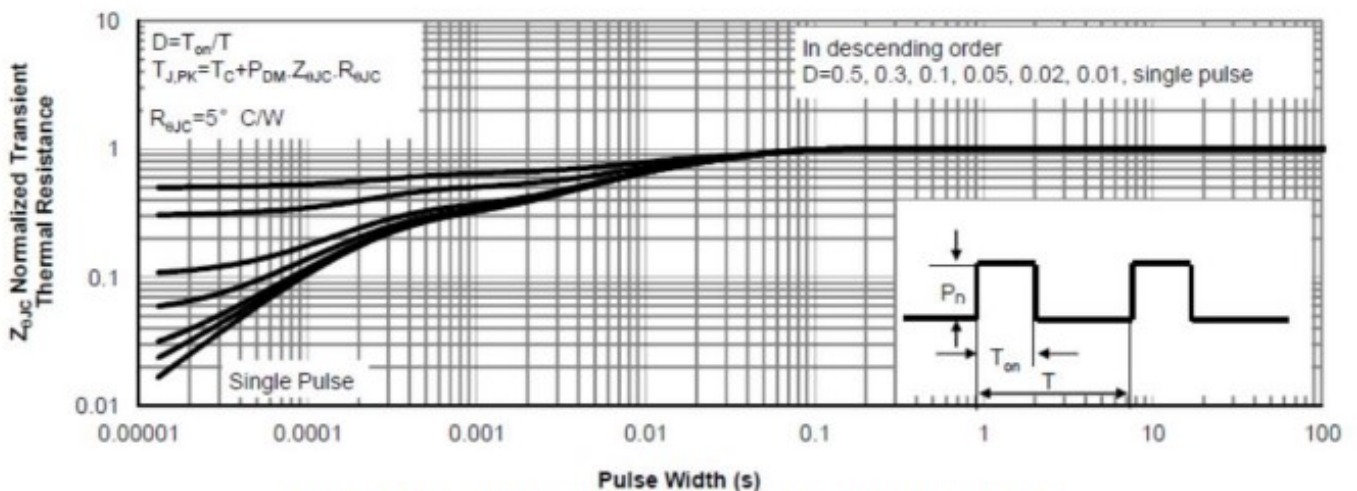


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

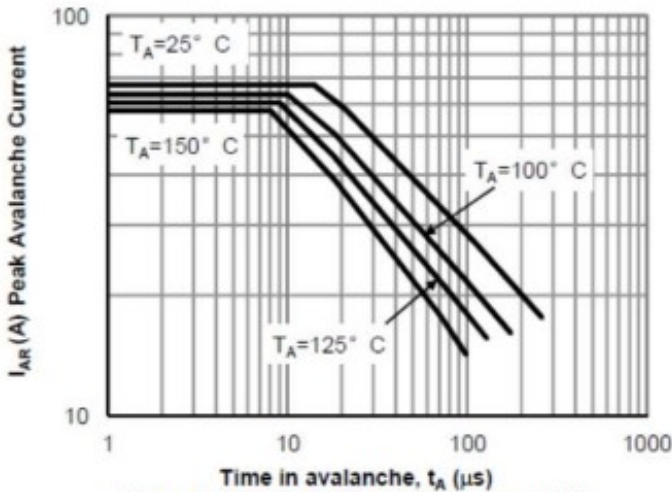


Figure 12: Single Pulse Avalanche capability (Note C)

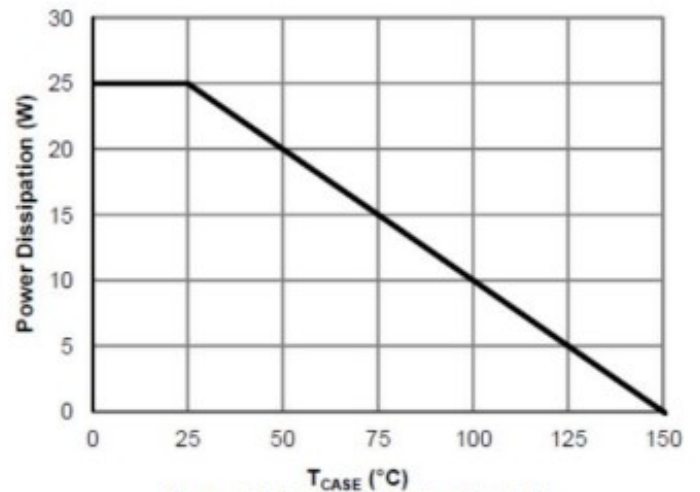


Figure 13: Power De-rating (Note F)

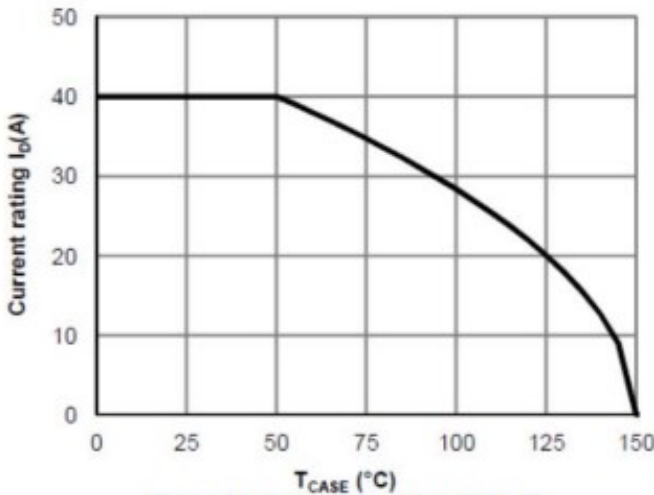


Figure 14: Current De-rating (Note F)

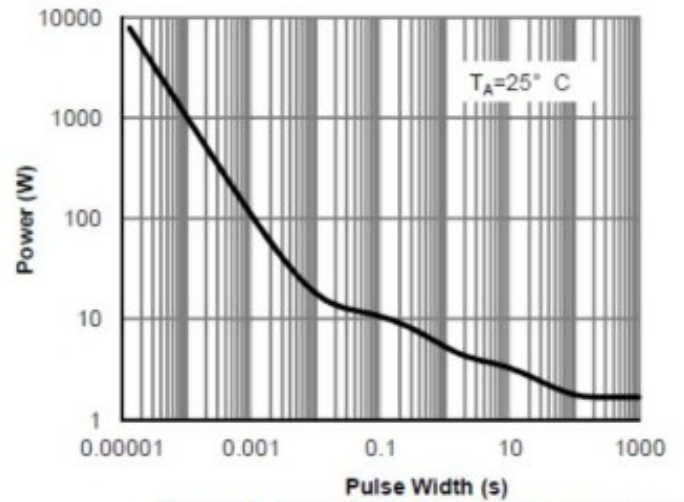


Figure 15: Single Pulse Power Rating Junction-to-Ambient (Note H)

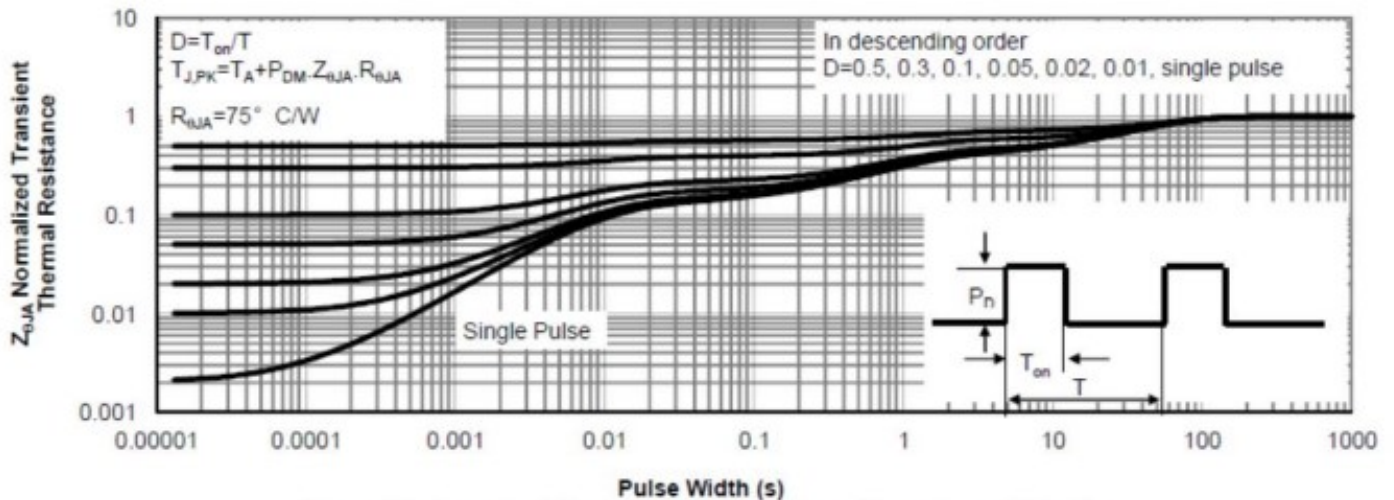
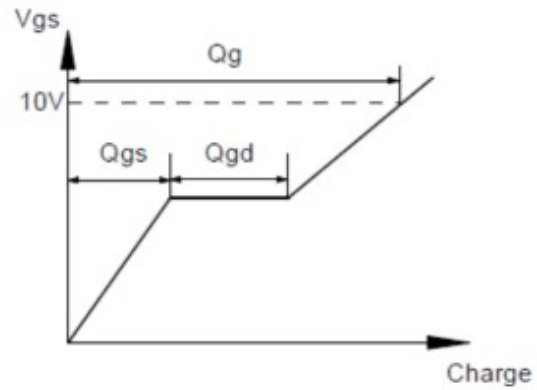
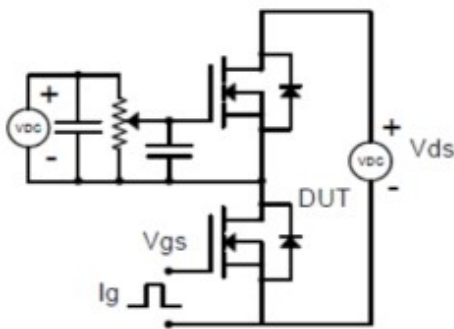
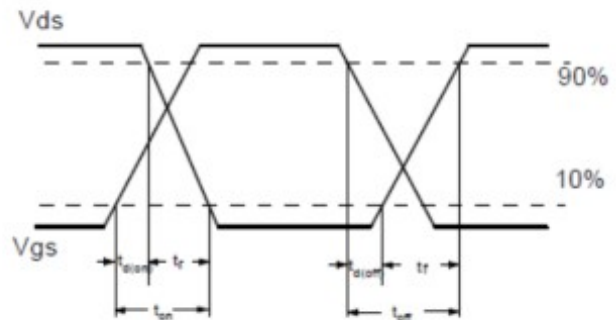
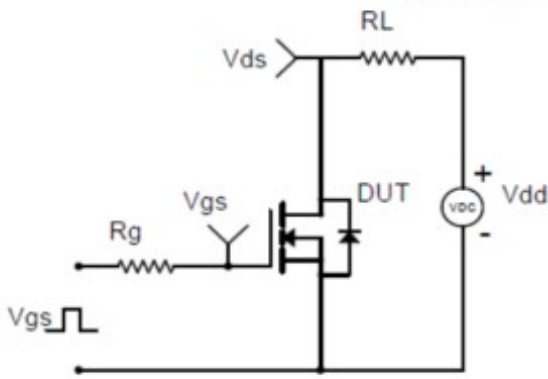


Figure 16: Normalized Maximum Transient Thermal Impedance (Note H)

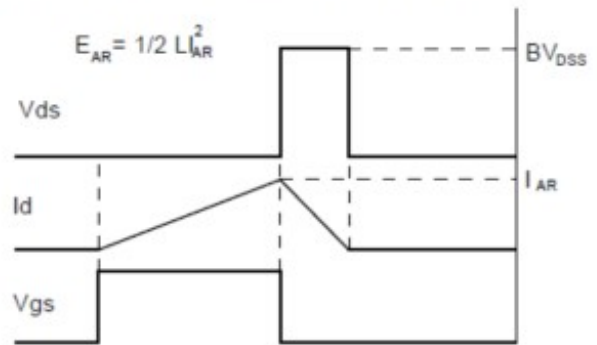
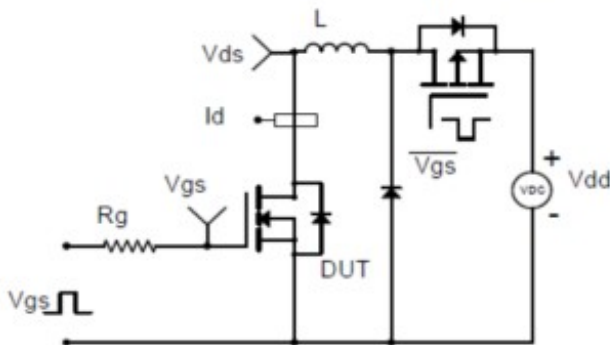
Gate Charge Test Circuit & Waveform



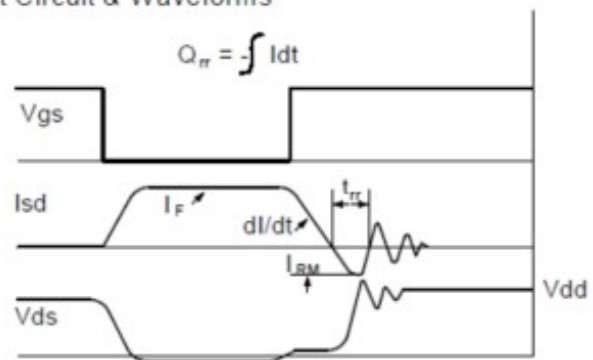
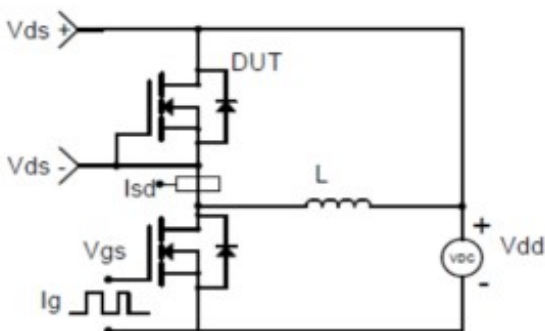
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

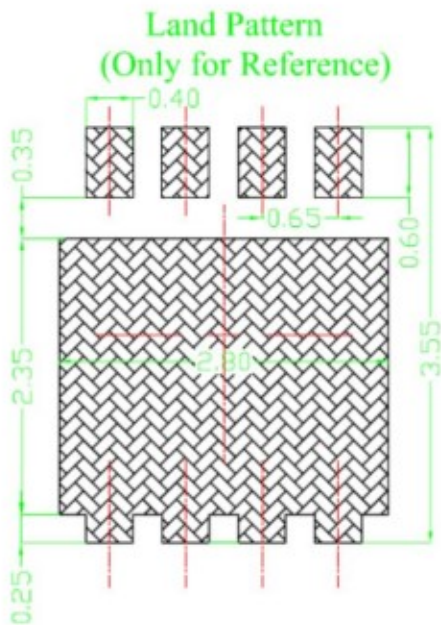
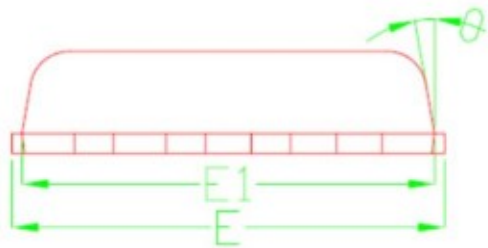
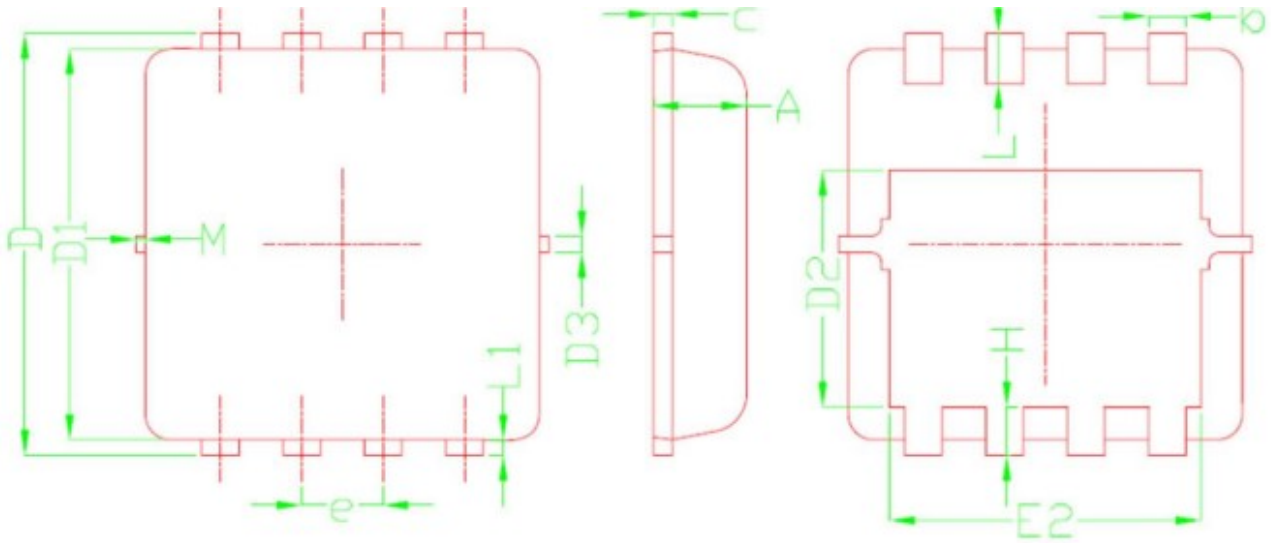


Diode Recovery Test Circuit & Waveforms



Package Information

- DFN3×3-8L



SYMBOL	DIMENSIONAL REQMTS		
	MIN	NOM	MAX
A	0.70	0.75	0.80
b	0.25	0.30	0.35
c	0.10	0.15	0.25
D	3.25	3.35	3.45
D1	3.00	3.10	3.20
D2	1.78	1.88	1.98
D3	---	0.13	---
E	3.20	3.30	3.40
E1	3.00	3.15	3.20
E2	2.39	2.49	2.59
e	0.65BSC		
H	0.30	0.39	0.50
L	0.30	0.40	0.50
L1	---	0.13	---
θ	---	10°	12°
M	*	*	0.15
* Not specified			