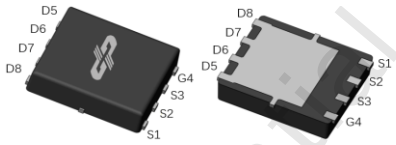
DP012N04FGNI

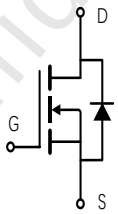
DPMOS N-MOSFET 40V, 1.2mΩ, 200A

Product Summary

Part #	V_{DS}	$R_{DS(on).typ}$	I_D
DP012N04FGNI	40V	1.2mΩ	200A

DFN 5x6





MSL-1

100% Avalanche Tested

100% Rg Tested

Features

- Uses advanced DPMOS2 technology
- Better $R_{DS(on)}$ enabled by a low $R_{DSon.sp}$, low conduction losses
- Excellent Q_gx$R_{DS(on)}$ product(FOM)
- Qualified according to JEDEC criteria

Applications

- Battery management
- Power Management Switches

Package Marking and Ordering Information

Part #	Marking	Package	Packing
DP012N04FGNI	012N04FGNI	DFN 5x6	Tape&Reel

Halogen-Free

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-source voltage	V_{DS}	40	V
Continuous drain current T_C = 25°C T_C = 100°C	I_D	 200 127	A
Pulsed drain current (T_C = 25°C, t_p limited by T_{jmax})	$I_{D\ pulse}$	800	A
Avalanche energy, single pulse (I=0.3mH, Rg=25)[1]	E_{AS}	360	mJ
Gate-Source voltage	V_{GS}	±20	V
Power dissipation (T_C = 25°C)	P_{tot}	96	W
Operating junction and storage temperature	T_j , T_{stg}	-55...+150	°C

[1].EAS is tested at starting T_j = 25℃, V_{GS} = 10V.

Thermal Resistance

Parameter	Symbol	Max	Unit
Thermal resistance, junction – case.	R_{thJC}	1.3	°C/W
Thermal resistance, junction – ambient(min. footprint)	R_{thJA}	52	

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	$V_{GS(th)}$	2	3	4	V	V_{DS}=V_{GS},I_D=250uA
Zero gate voltage drain current	I_{DSS}	- -	- -	1 100	μA	V_{DS}=40V,V_{GS}=0V T_j=25°C T_j=150°C
Gate-source leakage current	I_{GSS}	-	-	±100	nA	V_{GS}=±20V,V_{DS}=0V
Drain-source on-state resistance	$R_{DS(on)}$	-	1.2	1.45	mΩ	T_j=25°C V_{GS}=10V, I_D=40A
Gate resistance	R_g	-	3	-	Ω	V_{GS}=0V, V_{DS}=0V, f=1MHz
Transconductance[2]	g_{fs}	-	252	-	S	V_{DS}=5V,I_D=50A
Dynamic Characteristic[2]						
Input Capacitance	C_{iss}	-	4251	-	pF	V_{GS}=0V, V_{DS}=20V, f=1MHz
Output Capacitance	C_{oss}	-	1354	-		
Reverse Transfer Capacitance	C_{rss}	-	69	-		
Gate Total Charge(V_{GS}=10V)	Q_g	-	75	-	nC	V_{GS}=10V, V_{DS}=20V, I_D=30A, f=1MHz
Gate-Source charge	Q_{gs}	-	22	-		
Gate-Drain charge	Q_{gd}	-	11	-		
Turn-on delay time	$t_{d(on)}$	-	15	-	ns	V_{GS}=10V, V_{DD}=20V, R_{G_ext}=2.7Ω
Rise time	t_r	-	12	-		
Turn-off delay time	$t_{d(off)}$	-	75	-		
Fall time	t_f	-	61	-		

Body Diode Characteristic

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Body Diode Forward Voltage	V_{SD}	-	0.8	1.2	V	V_{GS}=0V,I_{SD}=40A
Diode continuous forward current	I_s	-	-	200	A	TC = 25°C
Diode pluse current	$I_{s\ pluse}$	-	-	800	A	TC = 25°C
Body Diode Reverse Recovery Time[2]	t_{rr}	-	47	-	ns	I_F=50A, dI/dt=100A/μs
Body Diode Reverse Recovery Charge[2]	Q_{rr}	-	29	-	nC	

[2]. Defined by design. Not subject to production test

Typical Performance Characteristics

Fig 1: Output Characteristics

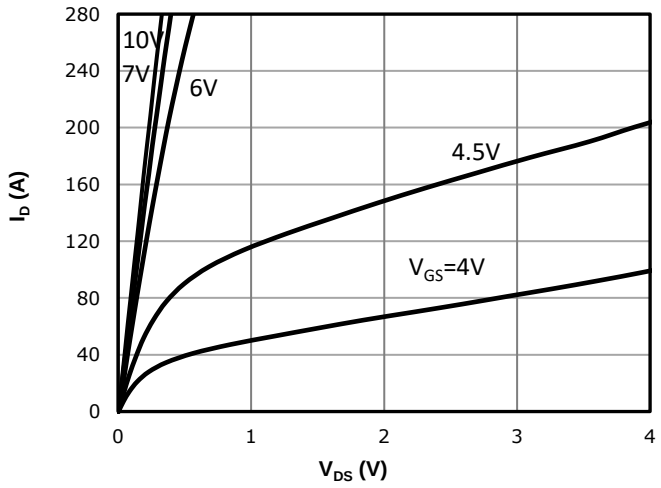


Fig 2: Transfer Characteristics

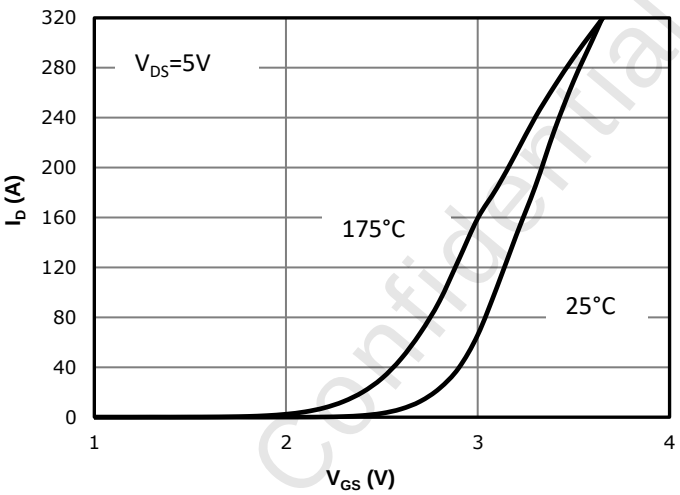


Fig 3: Rds(on) vs Drain Current and Gate Voltage

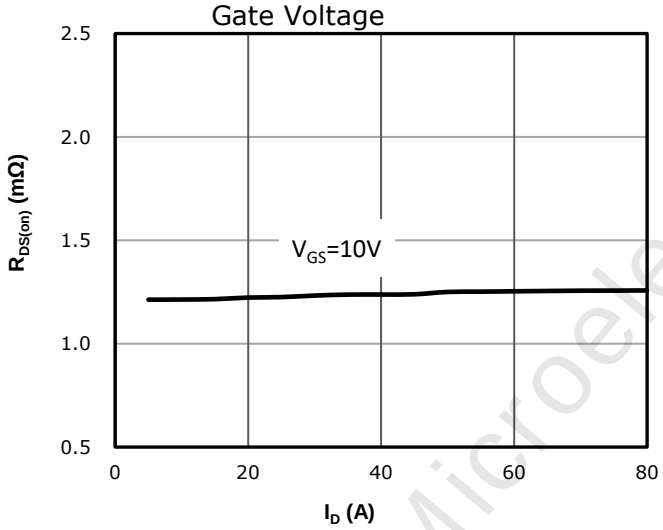


Fig 4: Rds(on) vs Gate Voltage

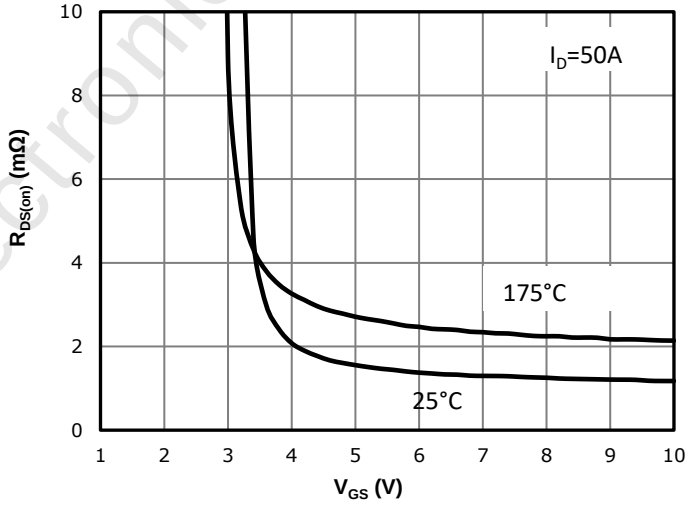


Fig 5: Rds(on) vs. Temperature

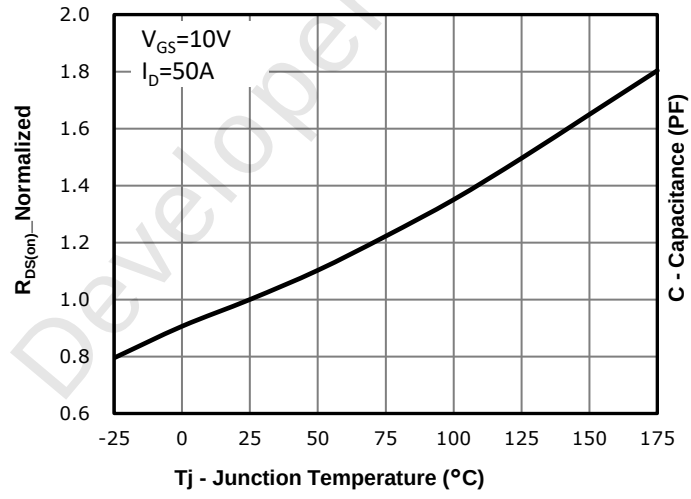


Fig 6: Capacitance Characteristics

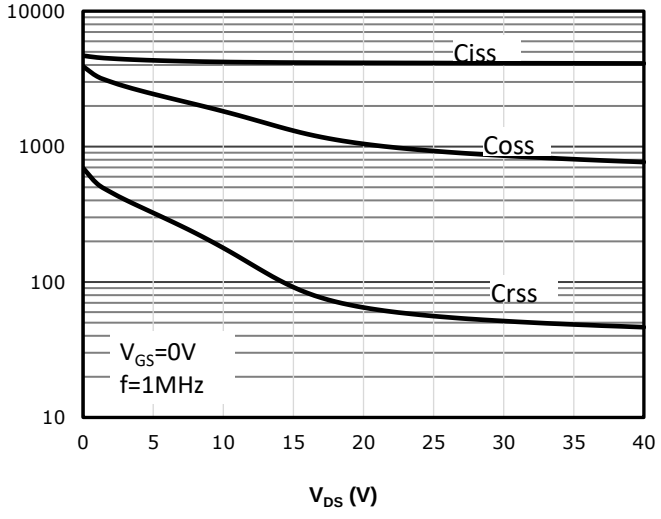


Fig 7: Gate Charge Characteristics

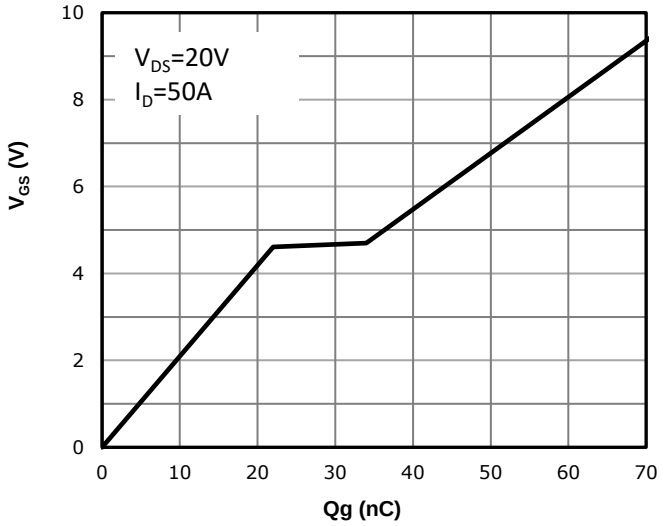


Fig 8: Body-diode Forward Characteristics

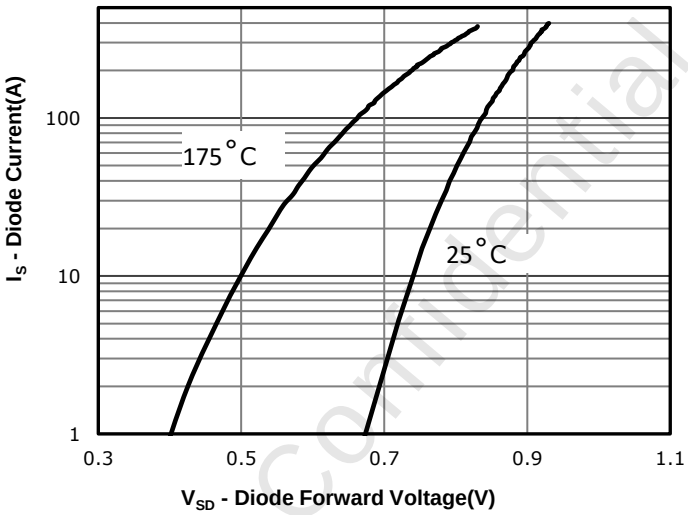


Fig 9: Power Dissipation

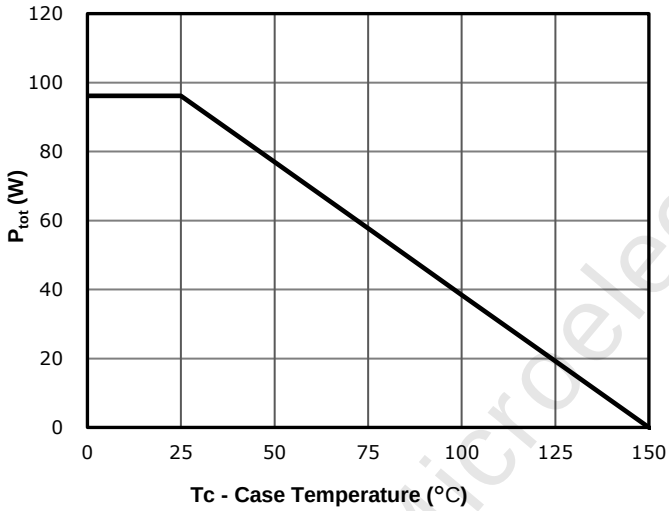


Fig 10: Drain Current Derating

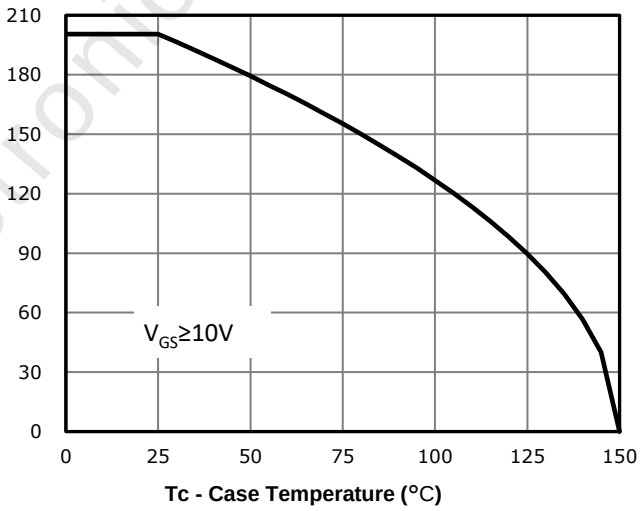


Fig 11: Safe Operating Area

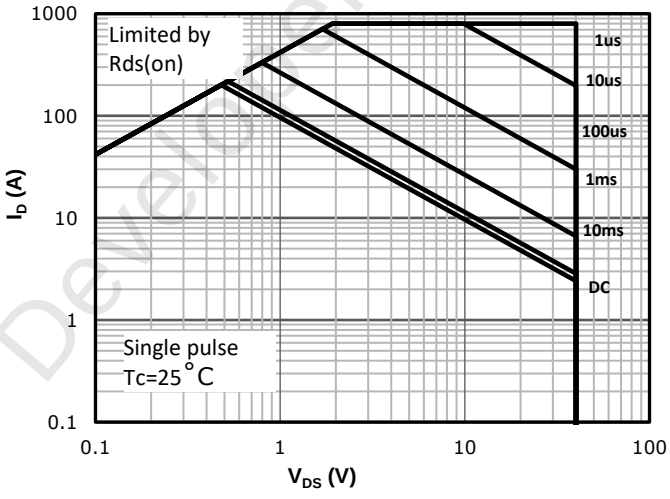
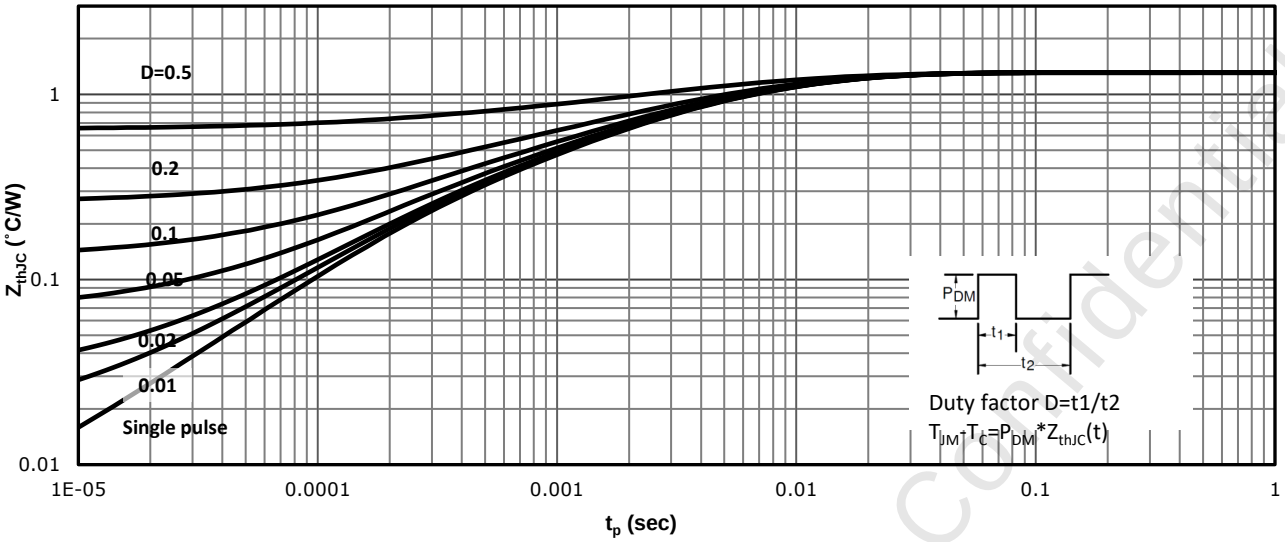
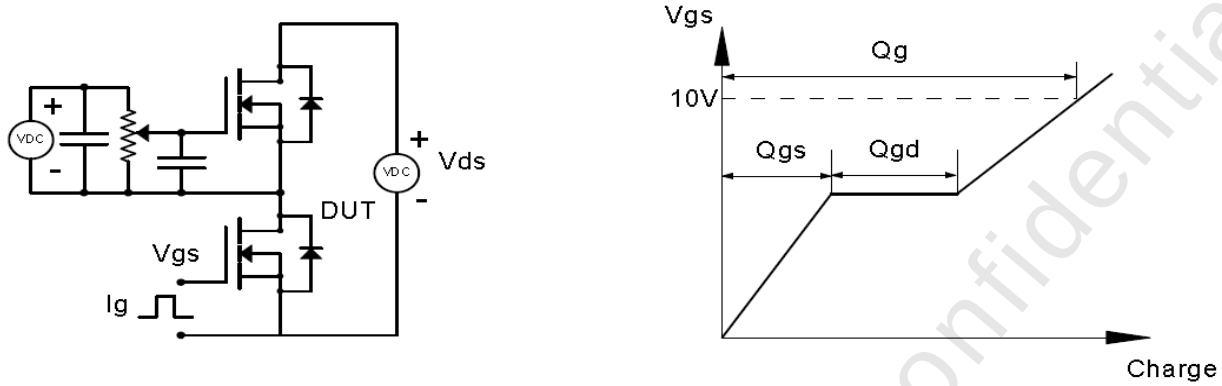


Fig 12: Max. Transient Thermal Impedance

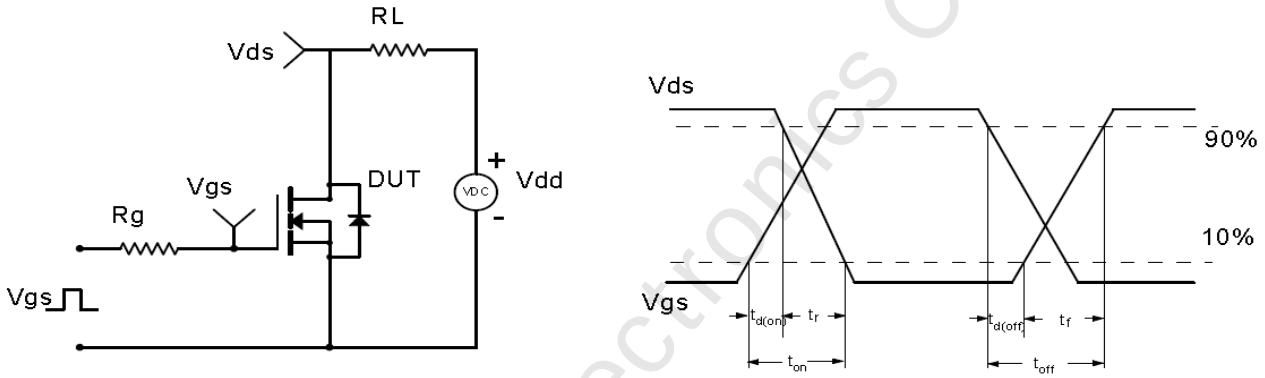


Test Circuit & Waveform

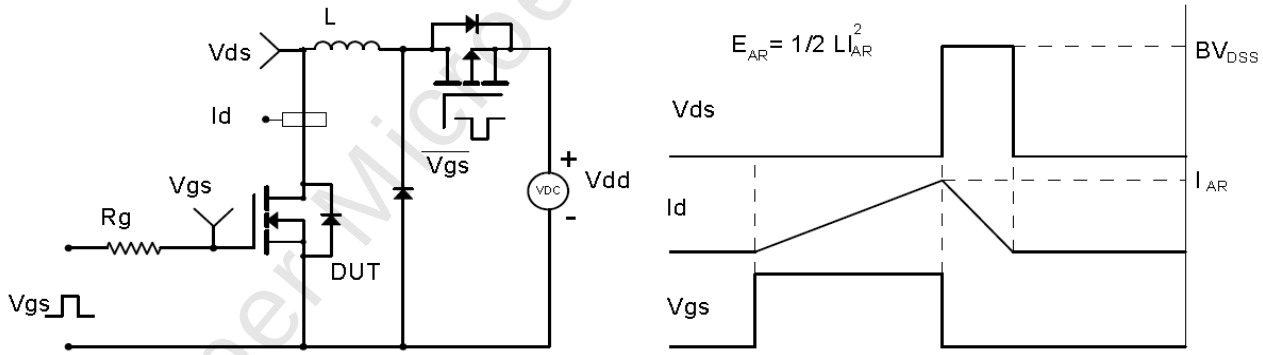
Gate Charge Test Circuit & Waveform



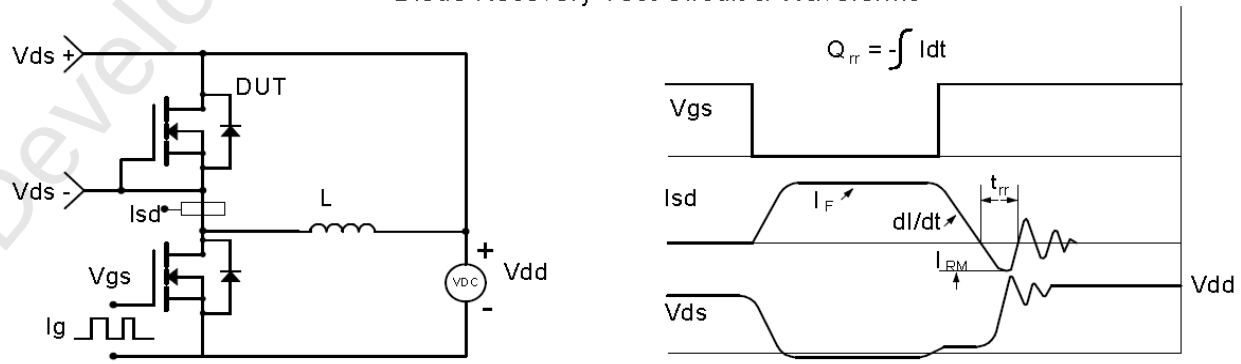
Resistive Switching Test Circuit & Waveforms



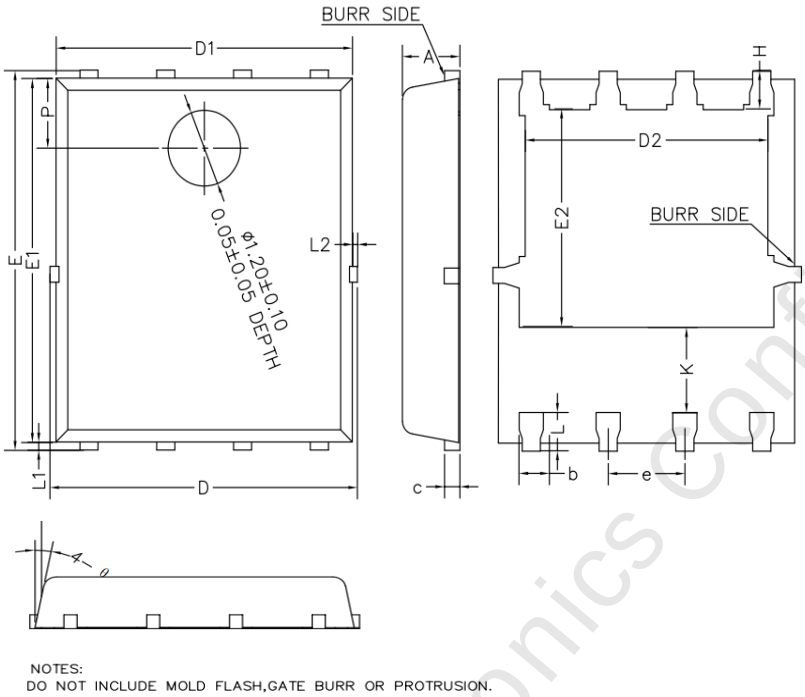
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



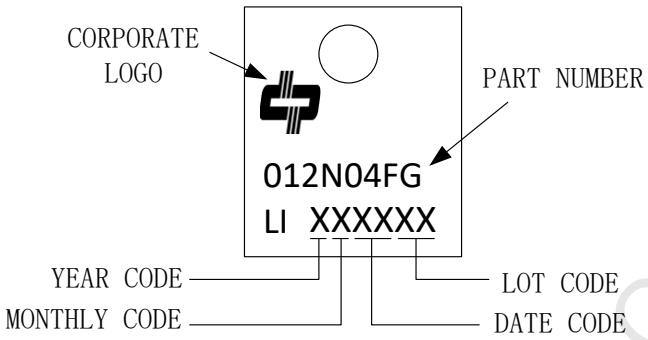
Package Outline: DFN5x6



NOTES:
DO NOT INCLUDE MOLD FLASH,GATE BURR OR PROTRUSION.

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.00	1.20	0.039	0.047
b	0.35	0.45	0.014	0.018
c	0.21	0.34	0.008	0.013
D	-	5.10	-	0.201
D1	4.90	5.00	0.193	0.197
D2	3.91	4.11	0.154	0.162
e	1.17	1.37	0.046	0.054
E	5.90	6.10	0.232	0.240
E1	5.70	5.80	0.224	0.228
E2	3.34	3.54	0.131	0.139
H	0.51	0.71	0.020	0.028
K	1.10	-	0.043	-
L	0.51	0.71	0.020	0.028
L1	0.06	0.20	0.002	0.008
L2	-	0.10	-	0.004
P	1.00	1.10	0.039	0.043
θ	8°	12°	-	-

Part Marking Information



Revision History

Revison	Major changes
1.0	Release for formal version

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