

Features

- Fast switching
- Extremely low on-resistance $R_{DS(on)}$
- 100% single pulse avalanche energy test

Product Summary			
V_{DS}	$R_{DS(on)}$ (m Ω) Typ	I_D (A)	Q_g (Typ)
30V	1.7 @ 10V 60A	120	86nc

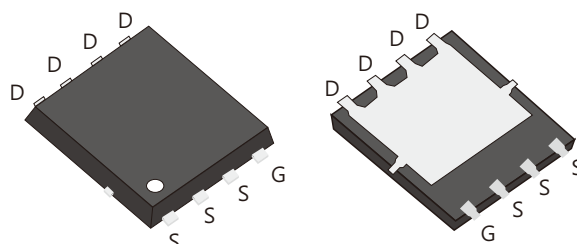
Mechanical Data

- Case: DFN5 $\times$ 6 Package

DFN5 $\times$ 6
D017N03G

Application

- Power switching applications
- Inverter management system
- Electric tools
- Automotive electronics



Ordering Information

Part No.	Package Type	Package	Quantity(box)
D017N03G	DFN5 $\times$ 6	Tape & Reel	5000

Block Diagram

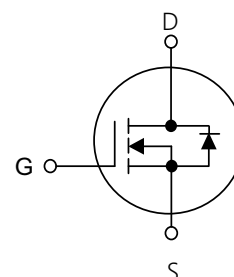


Table1 Absolute Maximum Ratings ($T_c=25^\circ\text{C}$, unless otherwise specified)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current (Note 5)	I_D	$T_c=25^\circ\text{C}$ (Silicon limit)	120
		$T_c=25^\circ\text{C}$ (Package limit)	100
		$T_c=100^\circ\text{C}$	76
Pulsed Drain Current (Note 1)	I_{DM}	400	A
Single Pulse Avalanche Energy (Note 2)	E_{AS}	440	mJ
Power Dissipation $T_c=25^\circ\text{C}$	P_D	50	W
Operating Junction and Storage Temperature	T_J/T_{STG}	$-55\sim+150$	$^\circ\text{C}$

Table 2. Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal resistance Junction to Ambient,Max	$R_{\theta JA}$	50	$^{\circ}\text{C/W}$
Thermal resistance Junction to Case,Max	$R_{\theta JC}$	2.5	$^{\circ}\text{C/W}$

Table 3. Electrical Characteristics ($T_J=25^{\circ}\text{C}$, unless otherwise specified)

Parameter		Symbol	Test Conditions	Min	Typ	Max	Unit
Off Characteristics							
Drain-Source Breakdown Voltage		BV _{DSS}	V _{GS} =0V,I _D =250μA	30	-	-	V
Drain-Source Leakage Current		I _{DSS}	V _{DS} =30V,V _{GS} =0V	-	-	1	μA
Gate- Source Leakage Current	Forward	I _{GSS}	V _{GS} =20V,V _{DS} =0V	-	-	100	nA
	Reverse		V _{GS} =-20V,V _{DS} =0V	-	-	-100	nA
On Characteristics(Note 3)							
Gate Threshold Voltage		V _{GS(TH)}	V _{DS} =V _{GS} ,I _D =250μA	1.2	1.6	2.2	V
Static Drain-Source On-State Resistance		R _{DS(ON)}	V _{GS} =10V,I _D =60A	-	1.7	2.05	mΩ
			V _{GS} =4.5V,I _D =60A	-	2.5	3.2	
Dynamic Characteristics(Note 4)							
Input Capacitance	C _{ISS}	V _{DS} =15V,V _{GS} =0V,f=1MHz	-	4394	-	pF	
Output Capacitance	C _{OSS}		-	578	-	pF	
Reverse Transfer Capacitance	C _{RSS}		-	491	-	pF	
Gate Resitance	R _G	f=1MHz	-	-	-	Ω	
Switching Characteristics (Note 4)							
Turn-On Delay Time	t _{d(on)}	V _{DS} =10V,R _{GEN} =3Ω V _{GS} =10V,I _D =60A,	-	11	-	ns	
Turn-On Rise Time	t _r		-	22	-	ns	
Turn-Off Delay Time	t _{d(off)}		-	62	-	ns	
Turn-Off Fall Time	t _f		-	26	-	ns	
Total Gate Charge	Q _G	V _{DS} =15V,I _D =60A, V _{GS} =10V	-	86	-	nC	
Gate-Source Charge	Q _{GS}		-	12	-	nC	
Gate-Drain Charge	Q _{GD}		-	18	-	nC	
Drain-Source Diode Characteristics and Maximum Ratings							
Drain-Source Diode Forward Voltage	V _{SD}	V _{GS} =0V, I _S =60A	-	-	1.2	V	
Maximum Continuous Drain-Source Diode Forward Current	I _S		-	-	100	A	
Reverse Recovery Time	t _{rr}	V _{GS} =0V, I _F =30A dI _F /dt=100A/μs	-	27	-	ns	
Reverse Recovery Charge	Q _{RR}		-	20	-	nC	

Notes : 1 Repetitive Rating:Pulse width limited by maximum junction temperature

2 $L=0.5\text{mH}$, $I_D=29A$, $R_g=25\Omega$, Starting $T_J=25^{\circ}\text{C}$

3 Pulse Test: Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$

4 Guaranteed by design,not subject to production

5 The maximum current is limited by the package.

Typical Characteristics Diagrams

Fig1. Output Characteristics

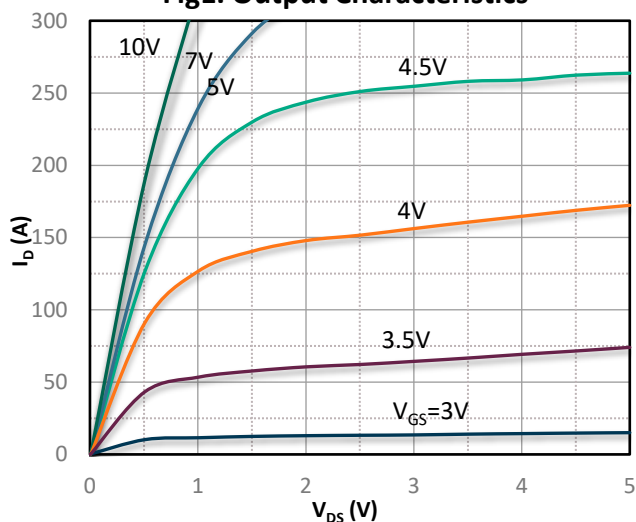


Fig2. Transfer Characteristics

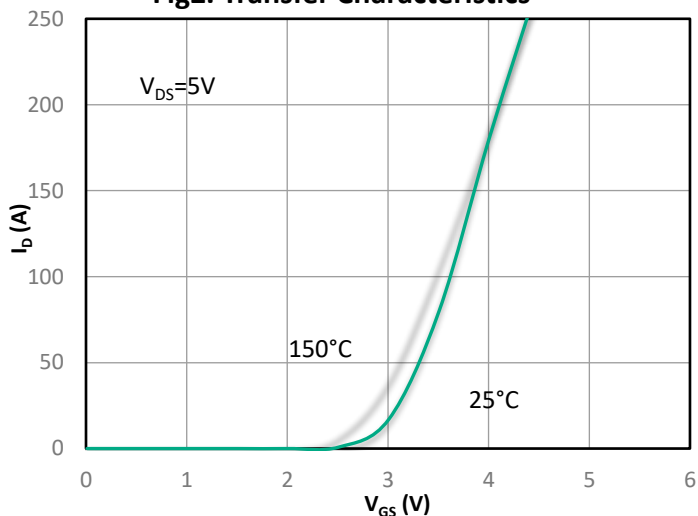


Fig3. Body-diode Forward Characteristics

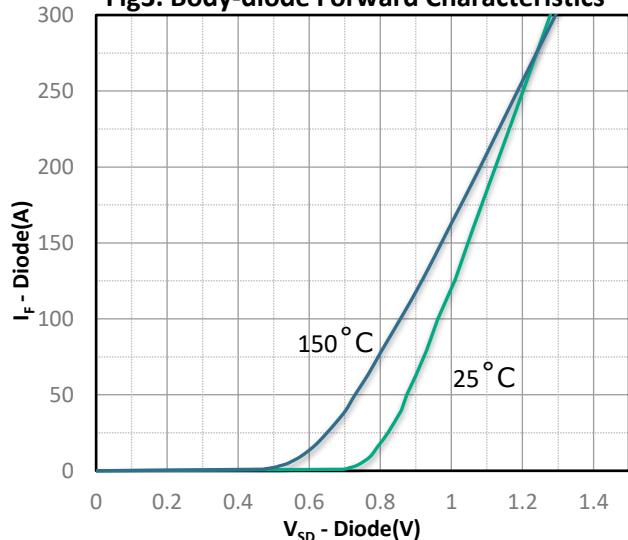


Fig4. $R_{DS(on)}$ vs. Temperature

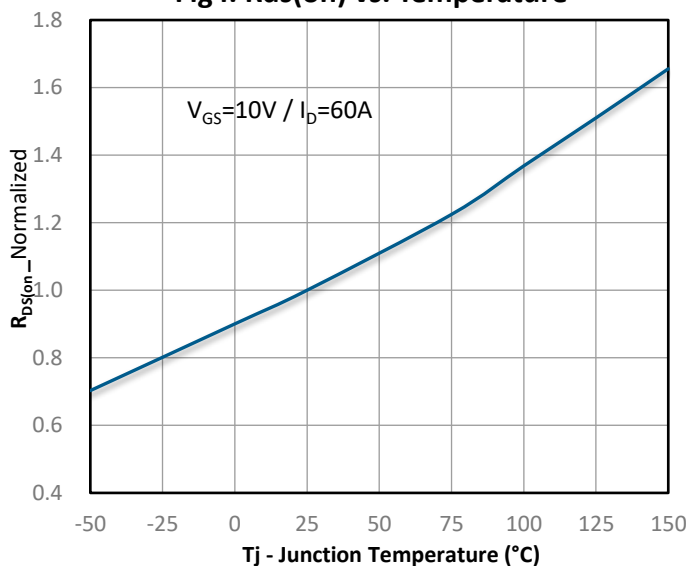


Fig5. Capacitance Characteristics

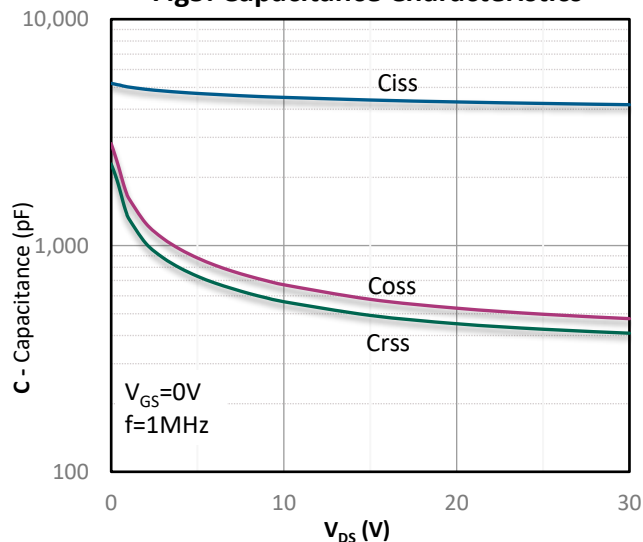


Fig6. Gate Charge Characteristics

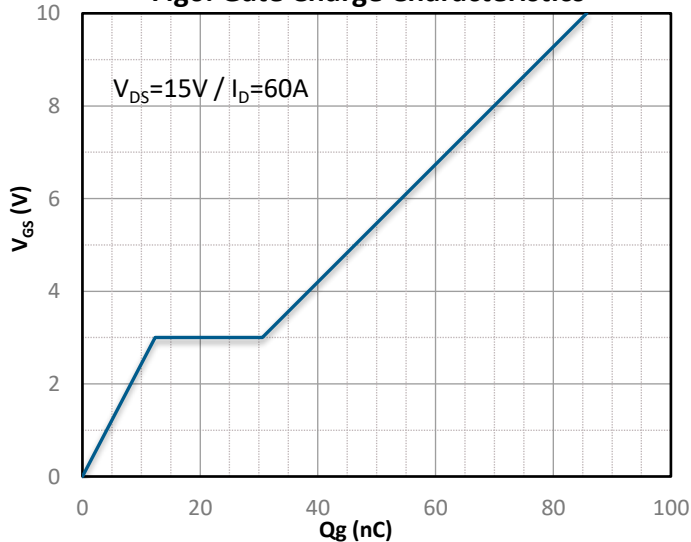


Fig7. Rds(on) vs Drain Current

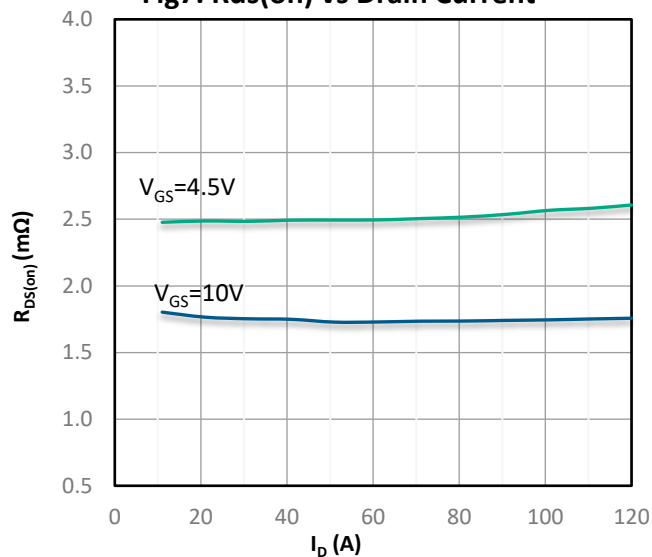


Fig8. Rds(on) vs Gate Voltage

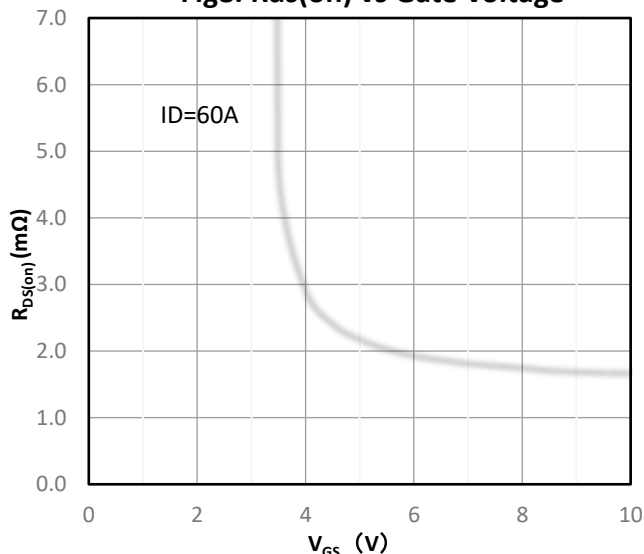


Fig9. Power De-rating

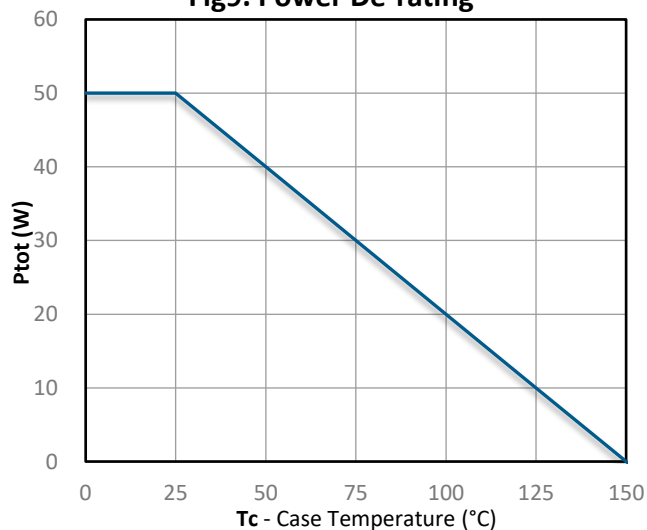


Fig10. Current De-rating

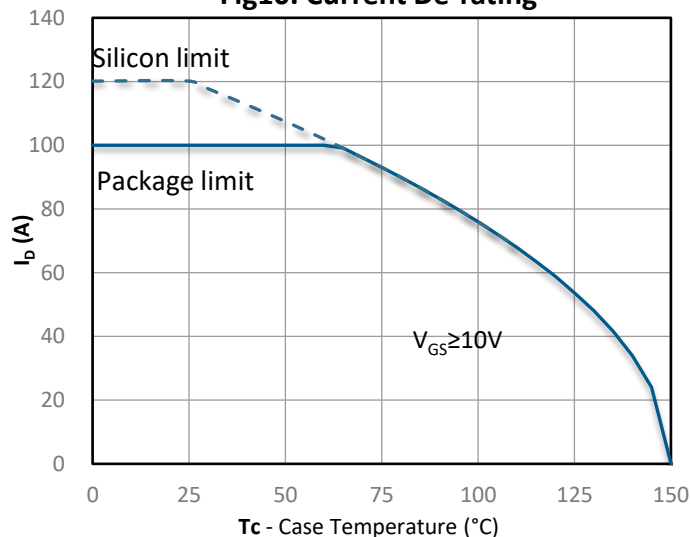


Fig11. Safe Operating Area

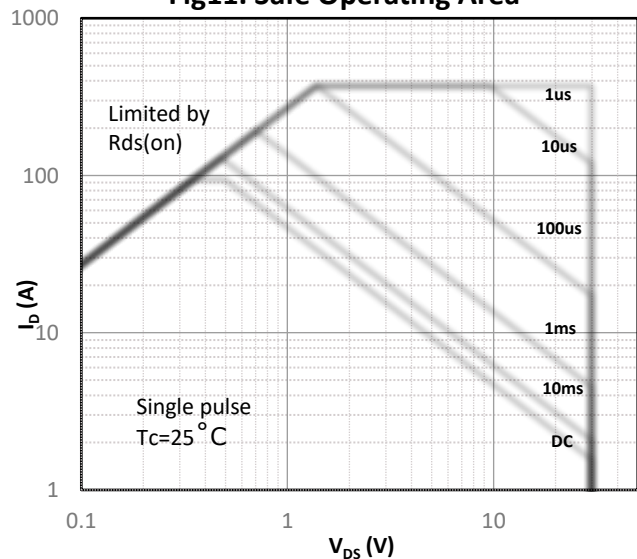
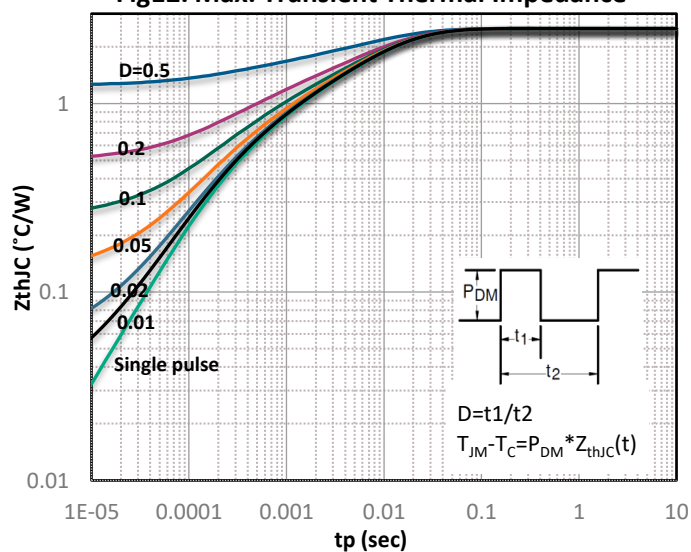
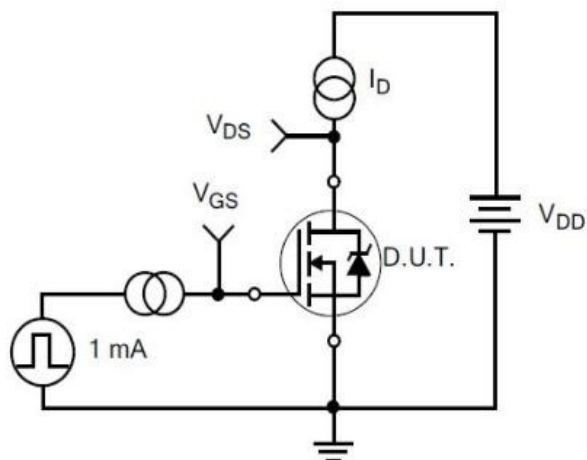


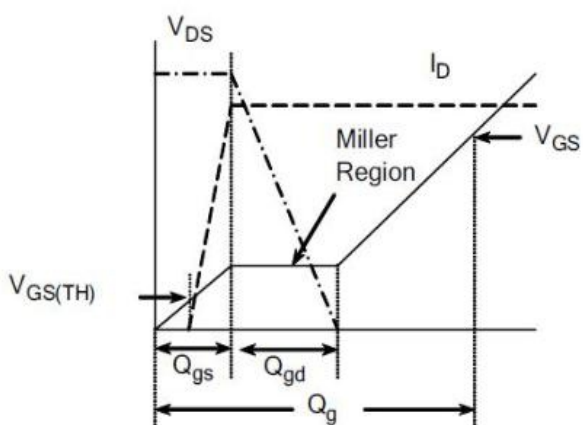
Fig12. Max. Transient Thermal Impedance



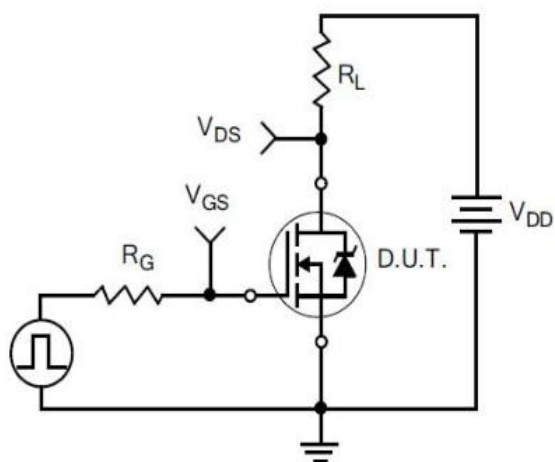
Typical Test Circuit



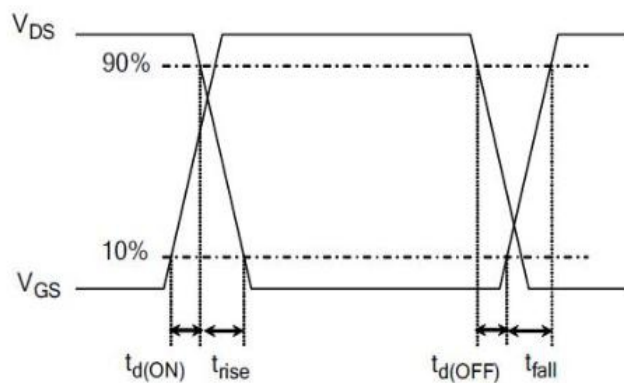
1) Gate Charge Test Circuit



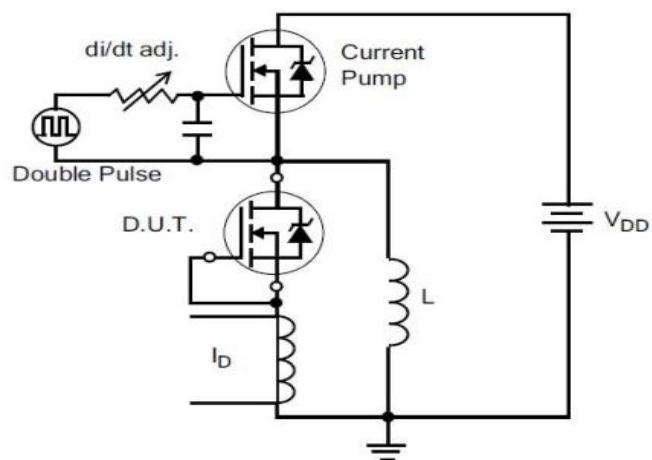
2) . Gate Charge Waveform



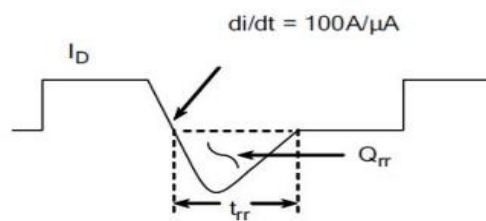
3) Resistive Switching Test Circuit



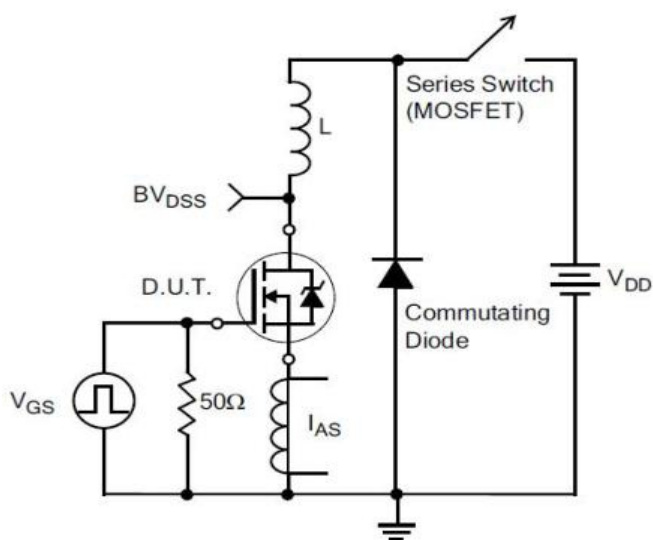
4) Resistive Switching Waveforms



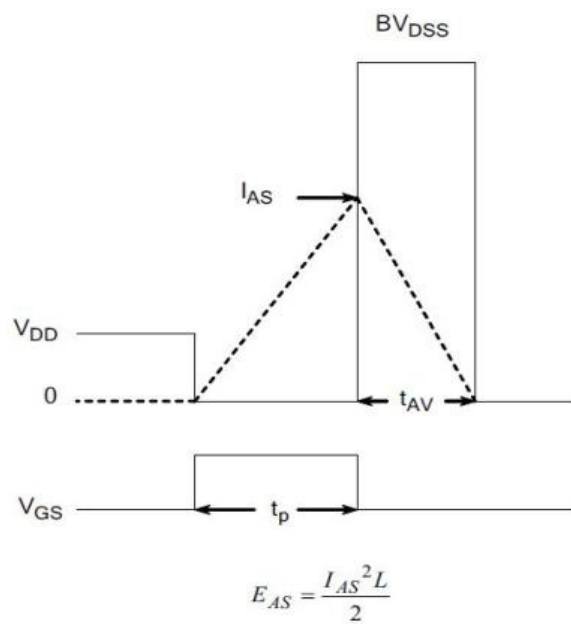
5) Diode Reverse Recovery Test Circuit



6) Diode Reverse Recovery Waveform



7) . Unclamped Inductive Switching Test Circuit



8) Unclamped Inductive Switching Waveforms

Product Names Rules

X X X X N E X X X

Process Type:
VDMOS:default
Super junction:SJ
Low Voltage trench:D

R_{DS(ON)} Typ
With 3-4 Digital,
For Example:
0.8mΩ:0080,
6.7mΩ:067,
10mΩ:10,

Channel Code
N channel:N
P channel:P

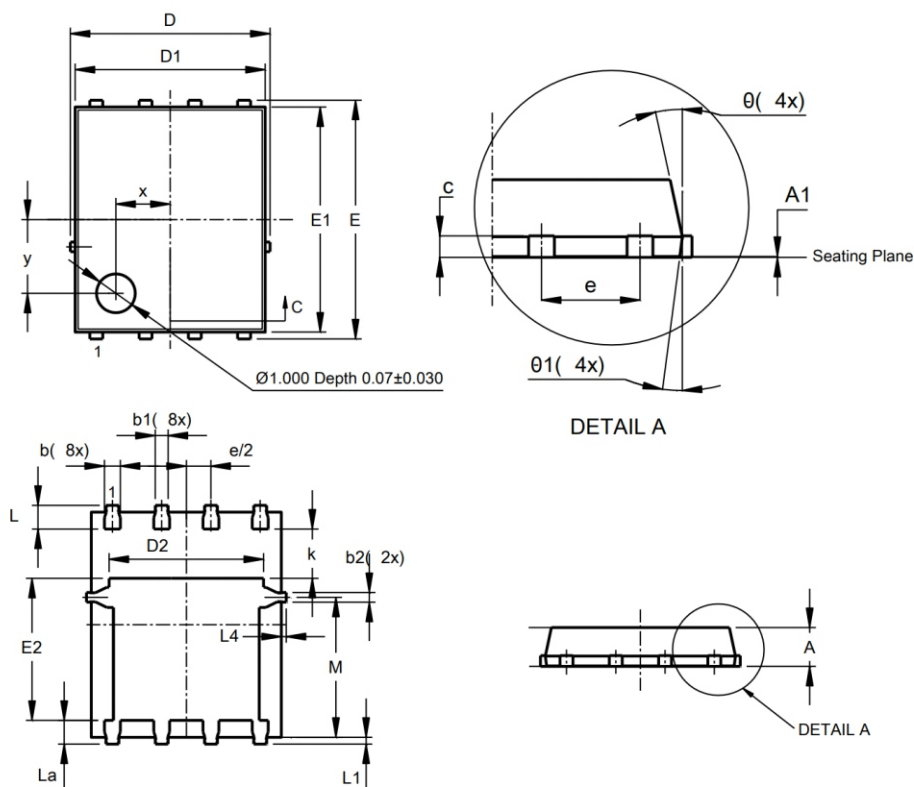
Package Code
TO-220:Default
ITO-220:F
TO-262:E
TO-263:D
TO-252:M
TO-251:N
TO-263-7L:D7
TOLL:T
DFN5×6:G

Rated Voltage Code
With 2 Digital,For Example:
600V:60
60V:06

Special Function Code
G-S ESD Protection:E
No Protection:Default

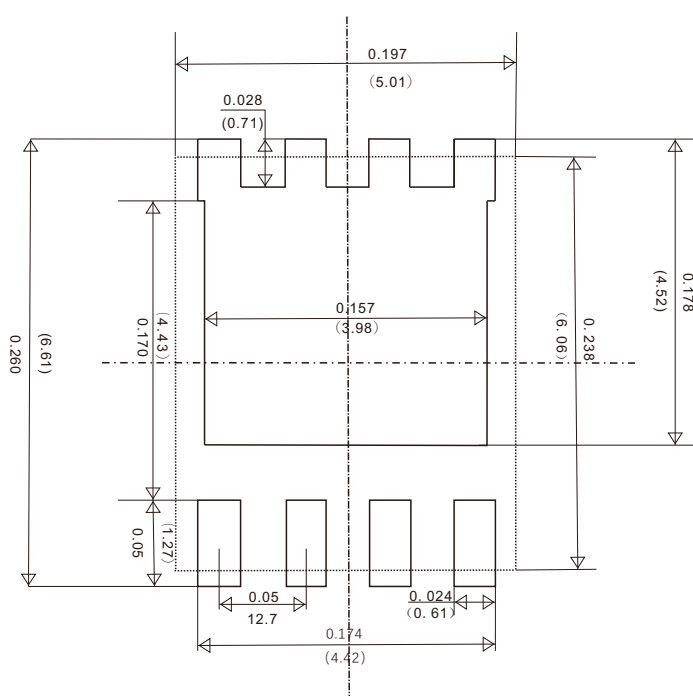
Dimensions

DFN5×6 PACKAGE OUTLINE DIMENSIONS



Dim	Min	Max	Type
A	0.90	1.10	1.00
b	0.23	0.41	0.32
b1	0.24	0.30	0.27
b2	0.16	0.32	0.23
c	0.17	0.27	0.22
D	-	-	5.01
D1	4.80	4.95	4.88
D2	-	-	3.98
E	-	-	6.06
E1	5.72	5.82	5.77
E2	3.42	3.52	3.47
k	-	-	1.33
L	0.56	0.66	0.61
La	0.57	0.67	0.63
L1	0.06	0.15	0.11
L4	-	-	0.06
M	3.00	3.20	3.08
ϕ	10	11	10.39

Suggested Pad Layout



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