

Features

- High Reliability Capability
- Extremely low on-resistance $R_{DS(on)}$
- Excellent gate charge x $R_{DS(on)}$ product(FOM)

Product Summary			
V_{DS}	$R_{DS(on)}$ (m Ω) Typ	I_D (A)	Q_g (Typ)
40V	2.3 @ 10V 20A	100	90nc

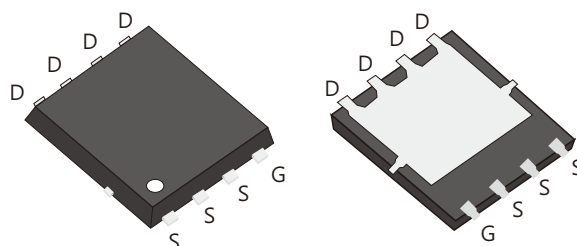
Mechanical Data

- Case:DFN5 \times 6 Package

DFN5 \times 6
D028N04G

Application

- Charger
- DC/DC converter
- Ideal for high-frequency switching and synchronous rectification



Ordering Information

Part No.	Package Type	Package	Quality(box)
D028N04G	DFN5 \times 6	Tape & Reel	5000

Block Diagram

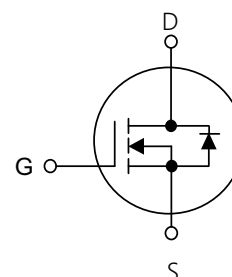


Table1 Absolute Maximum Ratings ($T_c=25^\circ\text{C}$, unless otherwise specified)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	40	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current	I_D	100	A
		70	
Pulsed Drain Current (Note 1)	I_{DM}	400	A
Single Pulse Avalanche Energy(Note 2)	E_{AS}	196	mJ
Power Dissipation $T_c=25^\circ\text{C}$	P_D	48	W
Operating Junction and Storage Temperature	T_J/T_{STG}	-55~+150	$^\circ\text{C}$

Table 2. Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal resistance Junction to Ambient	$R_{\theta JA}$	62	$^{\circ}\text{C}/\text{W}$
Thermal resistance Junction to Case	$R_{\theta JC}$	2.6	$^{\circ}\text{C}/\text{W}$

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	40	-	-	V
Drain-Source Leakage Current		I _{DSS}	V _{DS} =40V,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	1.0	1.6	2.2	V
Static Drain-Source On-State Resistance		R _{DS(ON)}	V _{GS} =10V,I _D =20A	-	2.3	2.8	mΩ
Dynamic Characteristics(Note 4)							
Input Capacitance		C _{ISS}	V _{DS} =20V,V _{GS} =0V,f=1MHz	-	6736	-	pF
Output Capacitance		C _{OSS}		-	484	-	pF
Reverse Transfer Capacitance		C _{RSS}		-	311	-	pF
Switching Characteristics (Note 4)							
Turn-On Delay Time		t _{d(on)}	V _{DS} =20V,I _D =30A V _{GS} =10V,R _L =3Ω,	-	16	-	ns
Turn-On Rise Time		t _r		-	21	-	ns
Turn-Off Delay Time		t _{d(off)}		-	40	-	ns
Turn-Off Fall Time		t _f		-	14	-	ns
Total Gate Charge		Q _G	V _{DS} =20V,I _D =30A, V _{GS} =10V	-	90	-	nC
Gate-Source Charge		Q _{GS}		-	17	-	nC
Gate-Drain Charge		Q _{GD}		-	39	-	nC
Drain-Source Diode Characteristics and Maximum Ratings							
Drain-Source Diode Forward Voltage		V _{SD}	V _{GS} =0V, I _S =30A	-	-	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	-	22	-	ns
Reverse Recovery Charge		Q _{RR}		-	18	-	nC

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

2 $L=0.5\text{mH}$, $R_G=25\Omega$, 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

Typical Characteristics Diagrams

Figure 1. Output Characteristics

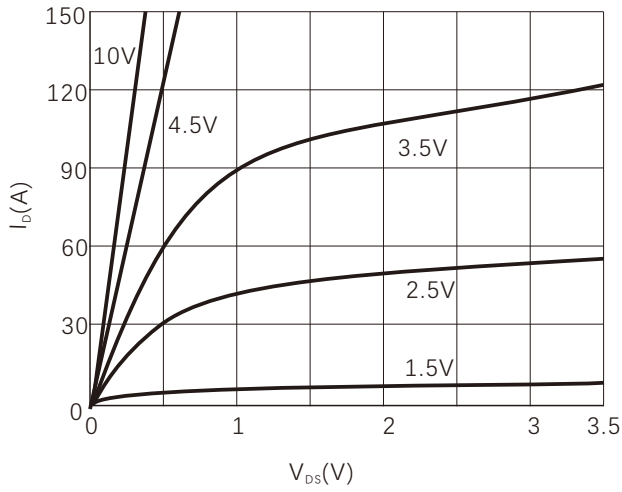


Figure 2. Normalized $R_{DS(on)}$ vs Temperature

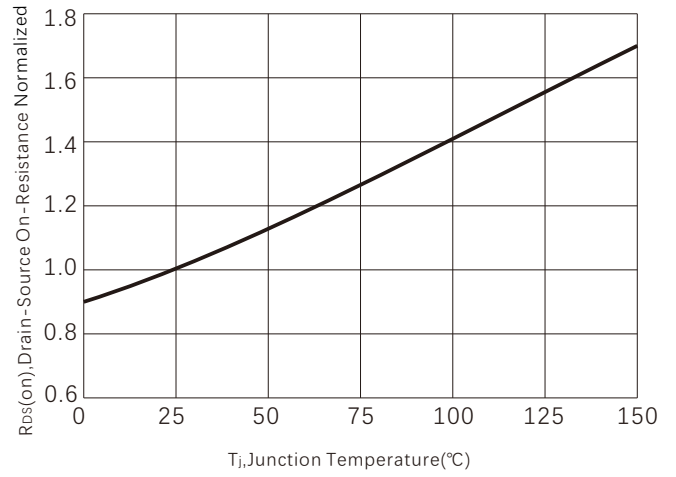


Figure 3. On-Resistance vs. Drain Current

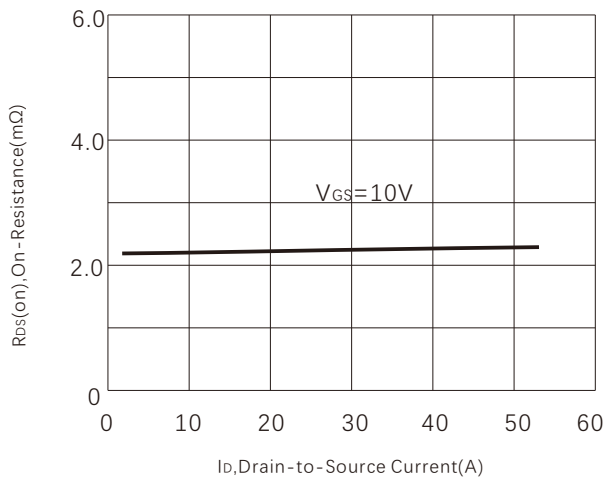


Figure 4. Capacitance

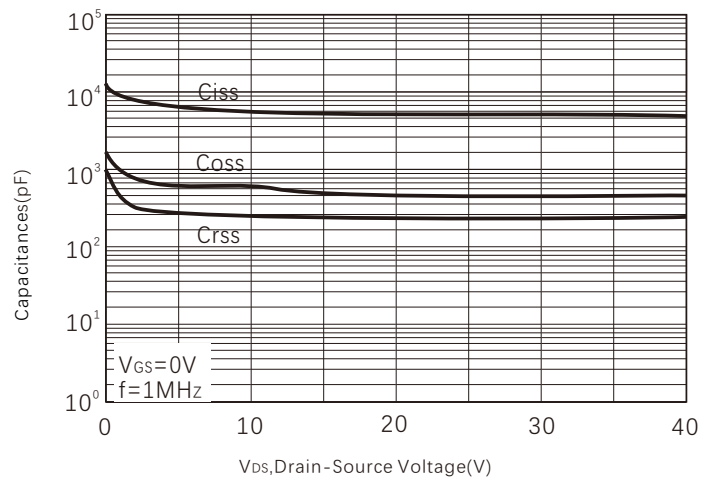


Figure 5. Gate charge

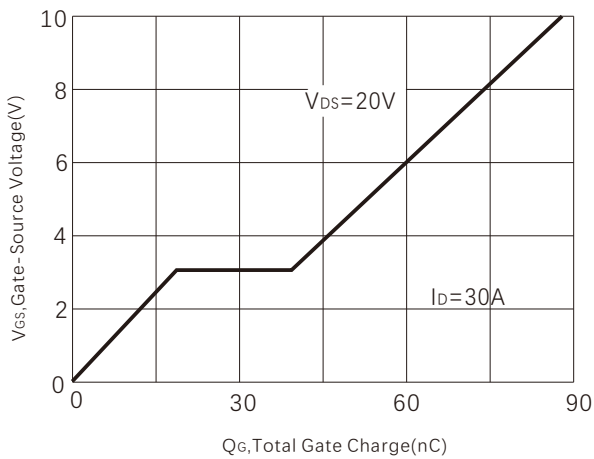


Figure 6. Source-Drain Diode Forward Voltage

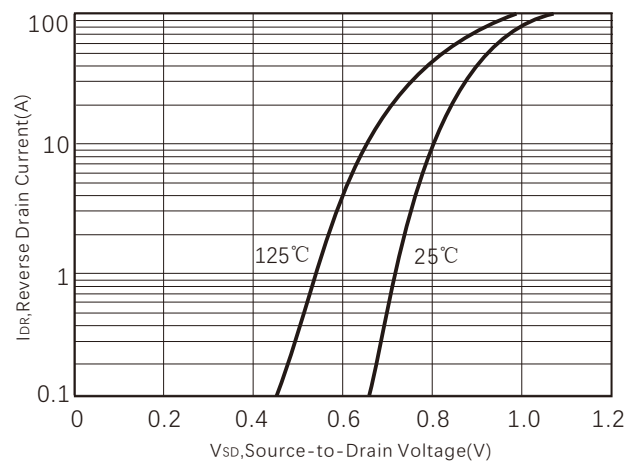


Figure7.Maximum Drain Current vs Temperature

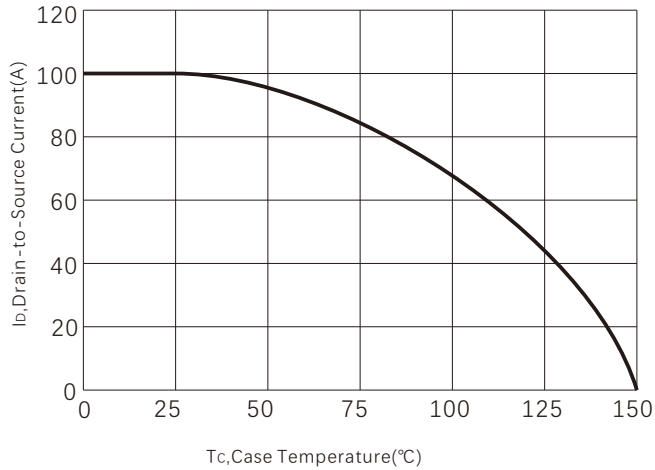


Figure 8. Transfer Characteristics

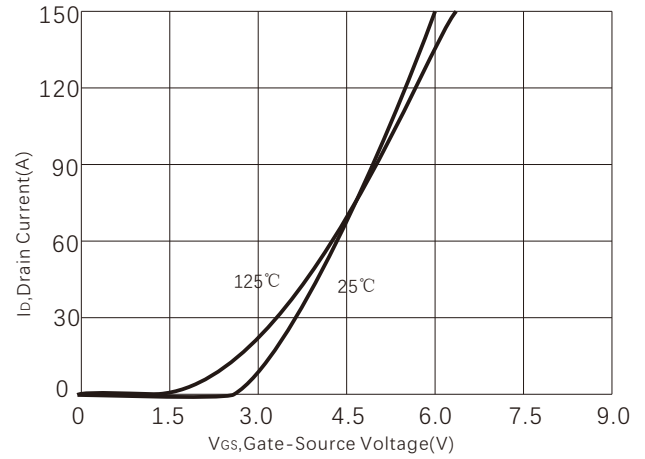


Figure 9. Safe operating area

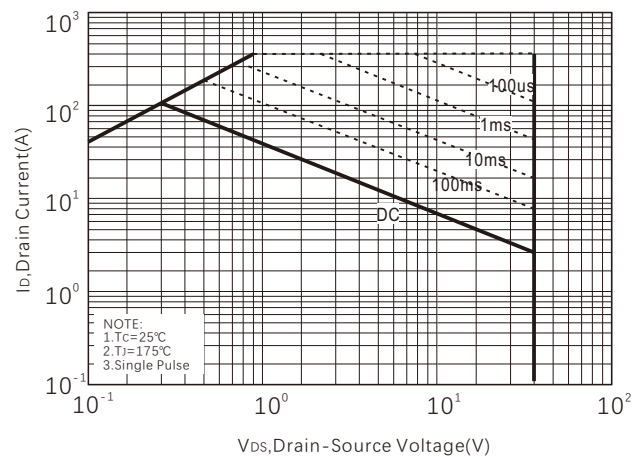
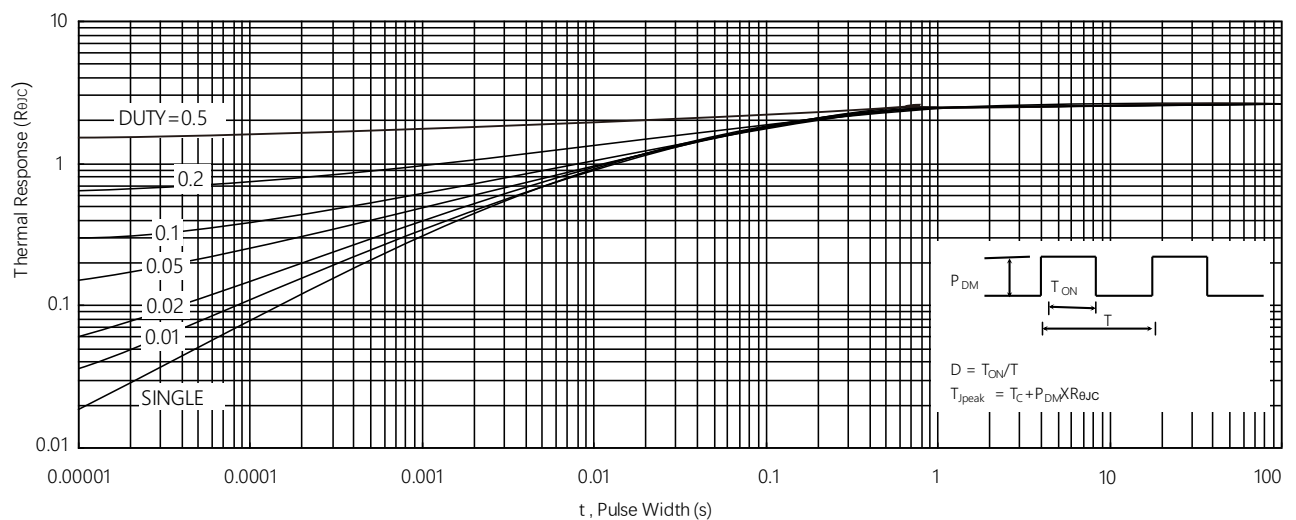
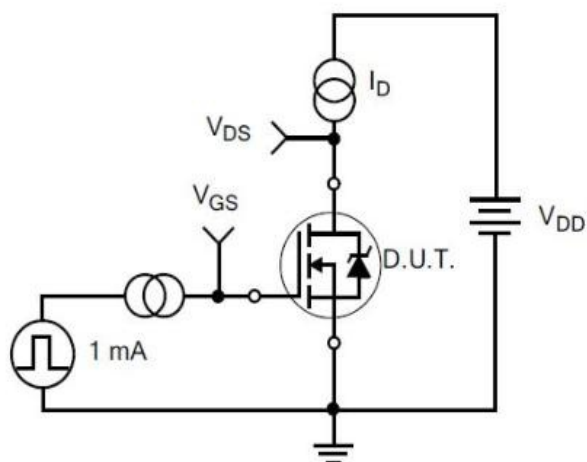


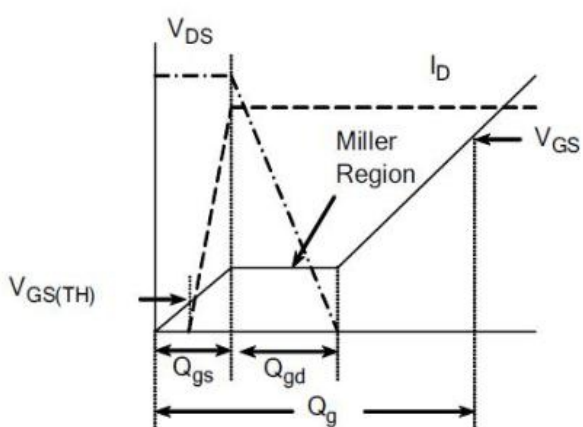
Figure 10. Maximum Transient Thermal Impedance



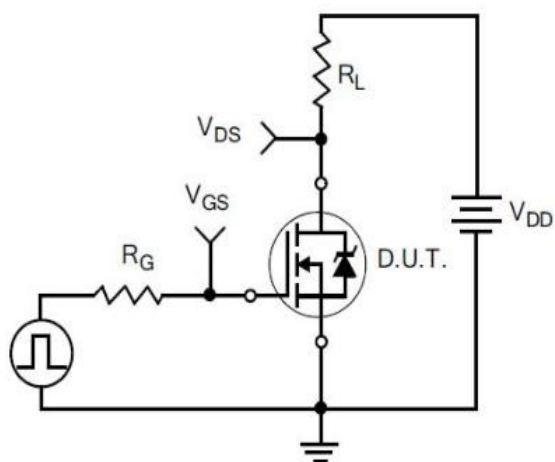
Typical Test Circuit



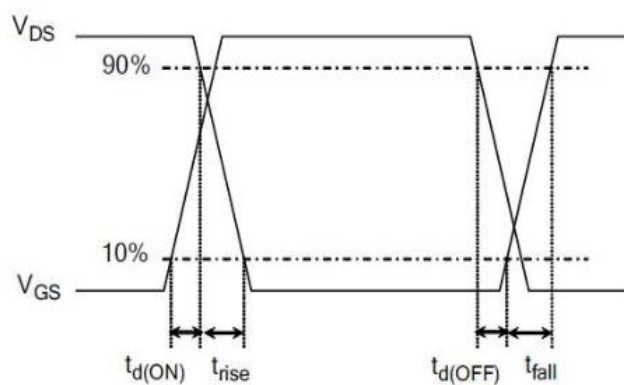
1) Gate Charge Test Circuit



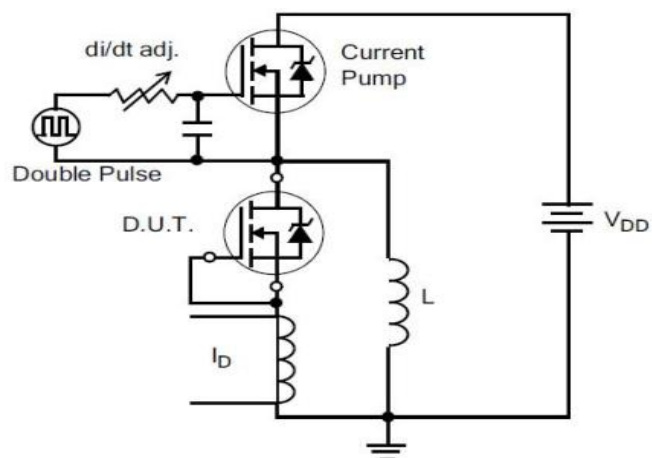
2) Gate Charge Waveform



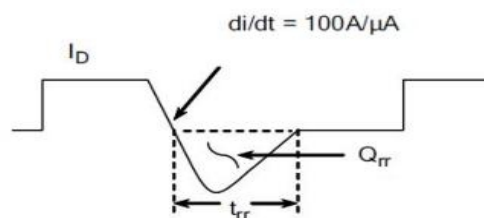
3) Resistive Switching Test Circuit



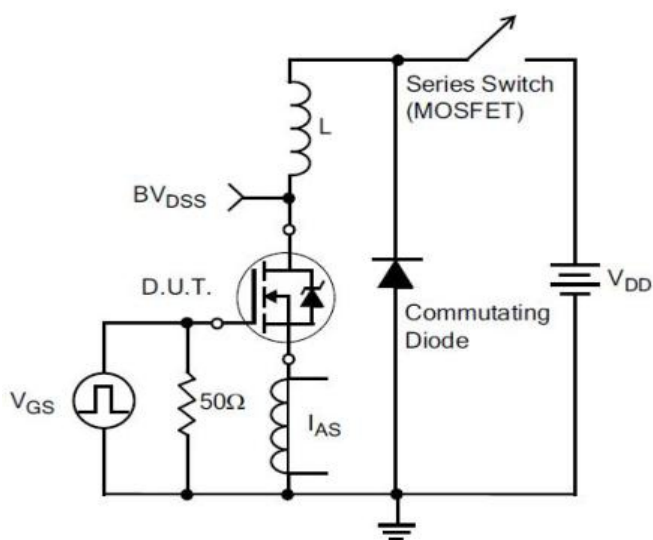
4) Resistive Switching Waveforms



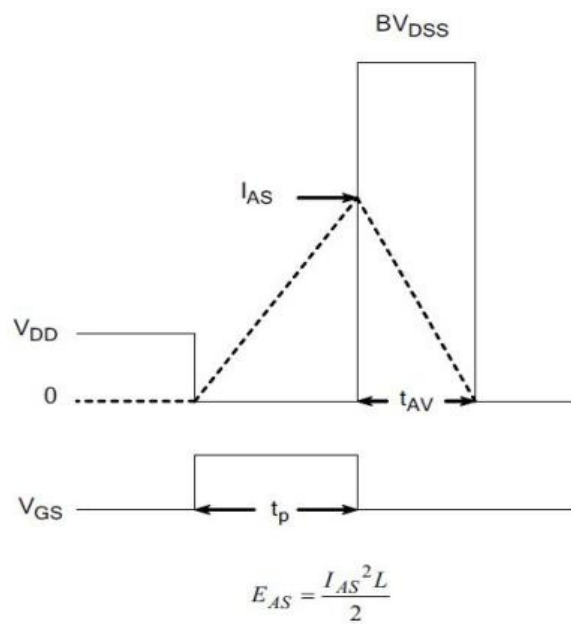
5) Diode Reverse Recovery Test Circuit



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

Rated Current Code
With 3 Digital,
For Example:
6.7mΩ:067,
10mΩ:010,

Channel Code
N channel:N
P channel:P

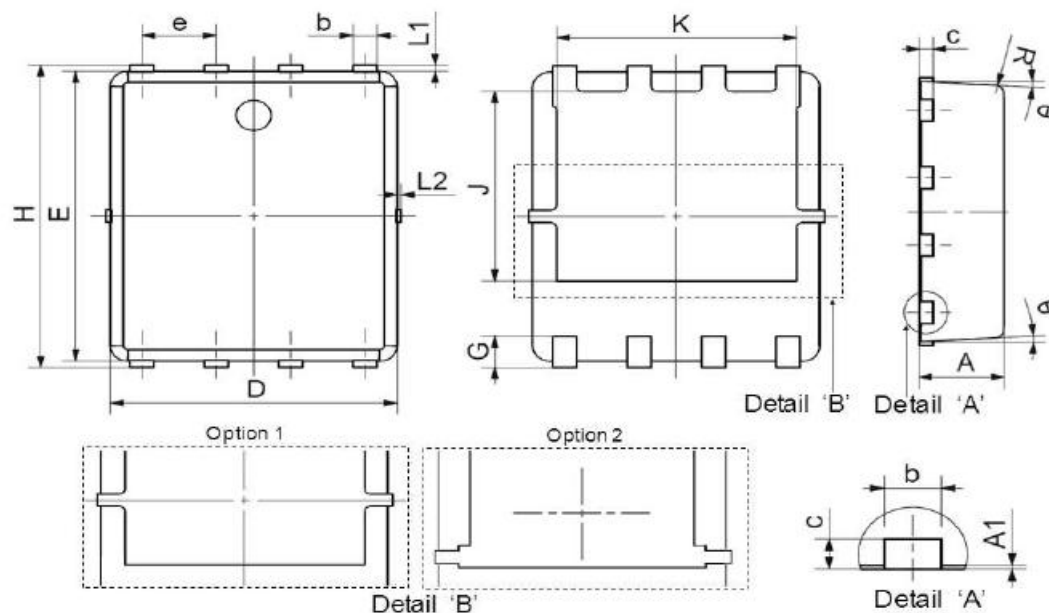
Package Code
TO-220:Default
ITO-220:F
TO-262:E
TO-263:D
TO-252:M
TO-251:N
TO-263-7L:D7
TOLL:T
DFN5×6:G

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



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0,80	1,20	0,031	0,047
A1	0,00	0,05	0,000	0,002
b	0,30	0,51	0,012	0,020
c	0,15	0,35	0,006	0,014
D	4,80	5,40	0,189	0,213
e	1,27 BSC		0,050 BSC	
E	5,66	6,06	0,223	0,239
G	0,30	0,71	0,012	0,028
H	5,90	6,35	0,232	0,250
J	3,32	3,92	0,131	0,154
K	3,61	4,25	0,142	0,167
L1	0,05	0,25	0,002	0,010
L2	0,00	0,15	0,000	0,006
R	0,25 REF		0,010 REF	
θ	0°	12°	0°	12°

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