



### General Features

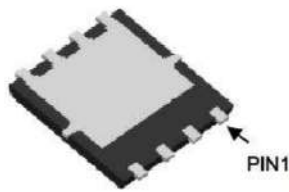
- Advanced Trench MOS Technology
- Low On-Resistance
- 100% avalanche tested
- Fast Switching Speed
- Excellent package for good heat dissipation

### Product Summary

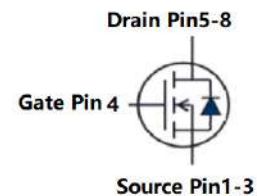
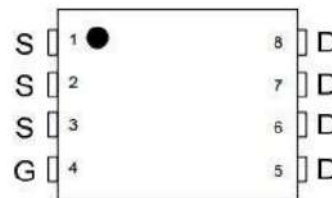
V <sub>DS</sub>	60	V
R <sub>DS(on)</sub> .Typ@ V <sub>GS</sub> =10 V	4.4	mΩ
I <sub>D</sub>	116	A

### Application

- DC/DC Converters
- On board power for server
- Synchronous rectification



DFN5x6-8



### Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V <sub>DS</sub>	Drain-Source Voltage	60	V
V <sub>GS</sub>	Gate-Source Voltage	±20	V
I <sub>D</sub> @T <sub>C</sub> =25°C	Continuous Drain Current <sup>1,6</sup>	116	A
I <sub>D</sub> @T <sub>C</sub> =100°C		74	A
I <sub>DM</sub>	Pulsed Drain Current <sup>2</sup>	464	A
EAS	Single Pulse Avalanche Energy <sup>3</sup>	125	mJ
I <sub>S</sub>	Avalanche Current	116	A
P <sub>D</sub> @T <sub>C</sub> =25°C	Total Power Dissipation <sup>4</sup>	113	W
T <sub>STG</sub>	Storage Temperature Range	-55 to 150	°C
T <sub>J</sub>	Operating Junction Temperature Range	-55 to 150	°C

### Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
R <sub>θJA</sub>	Thermal Resistance Junction-ambient <sup>1</sup> (t ≤ 10S)	---	26	°C/W
	Thermal Resistance Junction-ambient <sup>1</sup> (Steady State)	---	62	°C/W
R <sub>θJC</sub>	Thermal Resistance Junction-case <sup>1</sup>	---	1.1	°C/W

### Electrical Characteristics (T<sub>J</sub>=25 °C, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	60	---	---	V
R <sub>DS(ON)</sub>	Static Drain-Source On-Resistance <sup>2</sup>	V <sub>GS</sub> =10V, I <sub>D</sub> =20A	---	4.4	5.2	mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =10A	---	6.4	7.8	mΩ
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =250μA	1.2	1.4	2.3	V
I <sub>DSS</sub>	Drain-Source Leakage Current	V <sub>DS</sub> =48V, V <sub>GS</sub> =0V, T <sub>J</sub> =25°C	---	---	1	μA
		V <sub>DS</sub> =48V, V <sub>GS</sub> =0V, T <sub>J</sub> =55°C	---	---	5	
I <sub>GSS</sub>	Gate-Source Leakage Current	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V	---	---	±100	nA
R <sub>g</sub>	Gate Resistance	V <sub>DS</sub> =0V, V <sub>GS</sub> =0V, f=1MHz	---	1.3	---	Ω
Q <sub>g</sub>	Total Gate Charge (10V)	V <sub>DS</sub> =30V, V <sub>GS</sub> =10V, I <sub>D</sub> =20A	---	33.4	---	nC
Q <sub>g</sub>	Total Gate Charge (4.5V)		---	17.8	---	
Q <sub>gs</sub>	Gate-Source Charge		---	5.8	---	
Q <sub>gd</sub>	Gate-Drain Charge		---	7.9	---	
T <sub>d(on)</sub>	Turn-On Delay Time	V <sub>DD</sub> =30V, V <sub>GS</sub> =10V, R <sub>G</sub> =3.3Ω, I <sub>D</sub> =20A	---	7.5	---	ns
T <sub>r</sub>	Rise Time		---	6	---	
T <sub>d(off)</sub>	Turn-Off Delay Time		---	29	---	
T <sub>f</sub>	Fall Time		---	7.5	---	
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =30V, V <sub>GS</sub> =0V, f=1MHz	---	1625	---	pF
C <sub>oss</sub>	Output Capacitance		---	438	---	
C <sub>rss</sub>	Reverse Transfer Capacitance		---	25	---	

### Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I <sub>S</sub>	Continuous Source Current <sup>1,5,6</sup>	V <sub>G</sub> =V <sub>D</sub> =0V, Force Current	---	---	116	A
V <sub>SD</sub>	Diode Forward Voltage <sup>2</sup>	V <sub>GS</sub> =0V, I <sub>S</sub> =1A, T <sub>J</sub> =25°C	---	---	1.2	V
t <sub>rr</sub>	Reverse Recovery Time	I <sub>F</sub> =20A, dI/dt=400A/μs,	---	23	---	nS
Q <sub>rr</sub>	Reverse Recovery Charge	T <sub>J</sub> =25°C	---	60	---	

Note :

- 1.The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 2OZ copper.
2. Single pulse width limited by junction temperature T<sub>J(MAX)</sub>=150°C.
- 3.The EAS data shows Max. rating . The test condition is V<sub>DD</sub>=25V, V<sub>GS</sub>=10V, L=0.1mH, I<sub>AS</sub>=43A
- 4.The power dissipation is limited by 150°C junction temperature
- 5.The data is theoretically the same as I<sub>D</sub> and I<sub>DM</sub>, in real applications, should be limited by total power dissipation.
- 6.The maximum current rating is package limited.

### Test Circuit

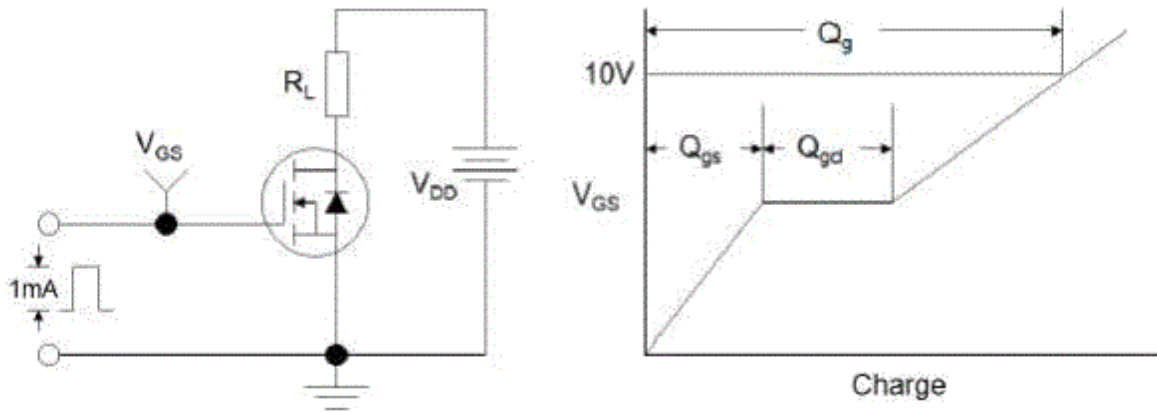


Figure1:Gate Charge Test Circuit & Waveform

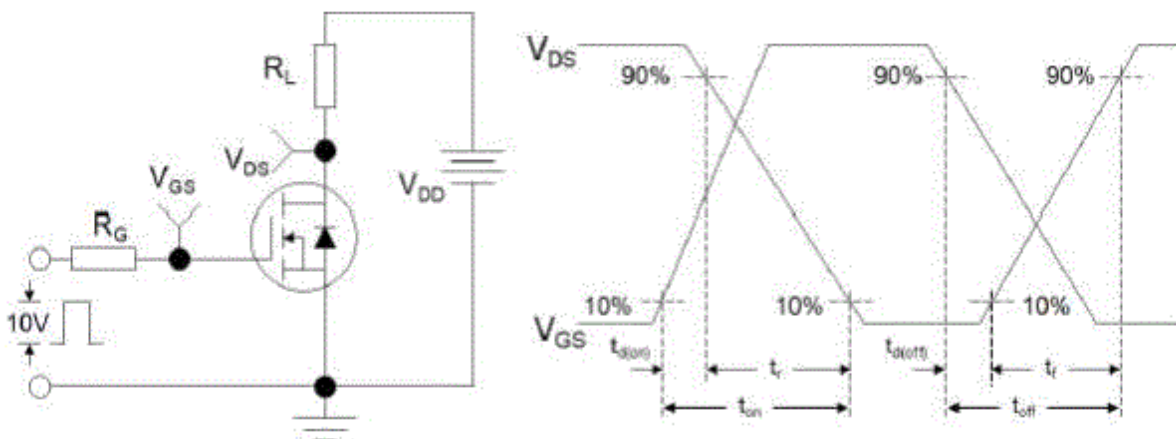


Figure 2: Resistive Switching Test Circuit & Waveforms

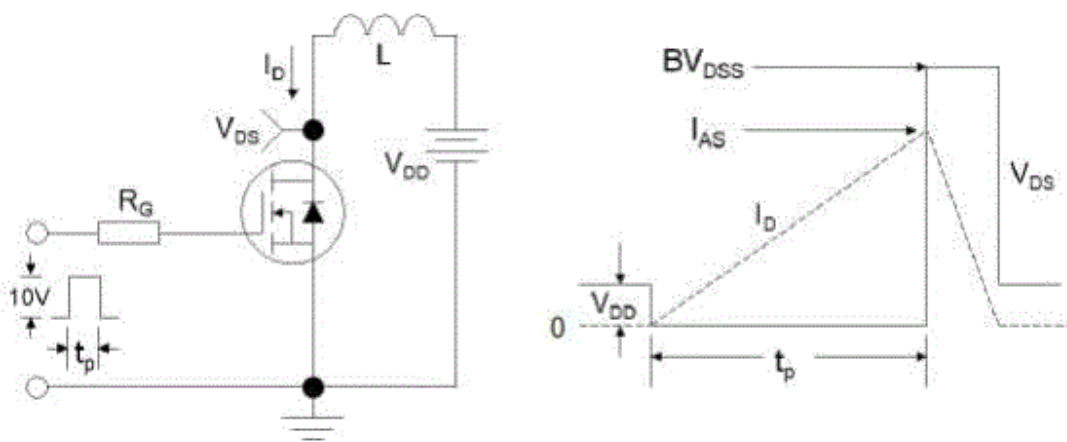


Figure 3:Unclamped Inductive Switching Test Circuit & Waveforms



### Typical Characteristics

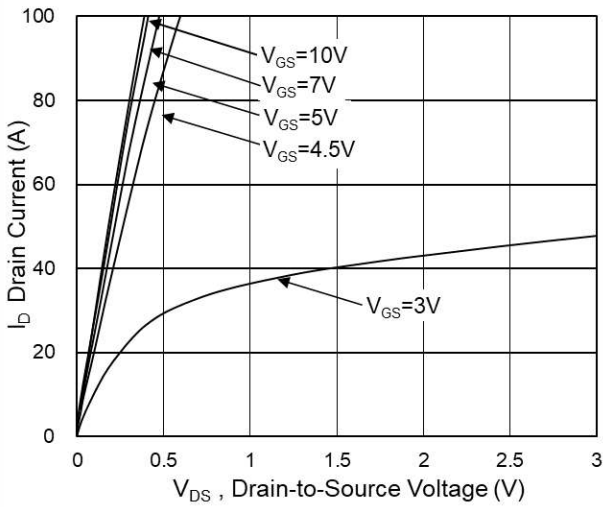


Fig.1 Typical Output Characteristics

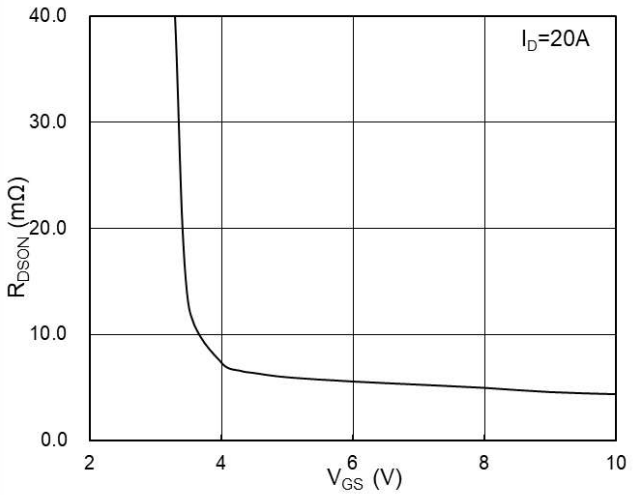


Fig.2 On-Resistance vs G-S Voltage

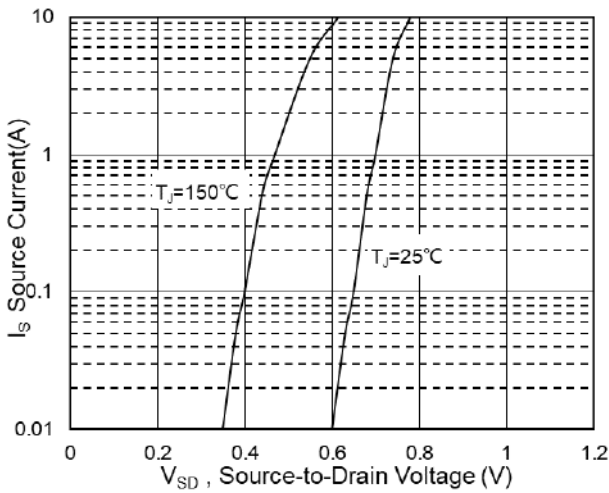


Fig.3 Source Drain Forward Characteristics

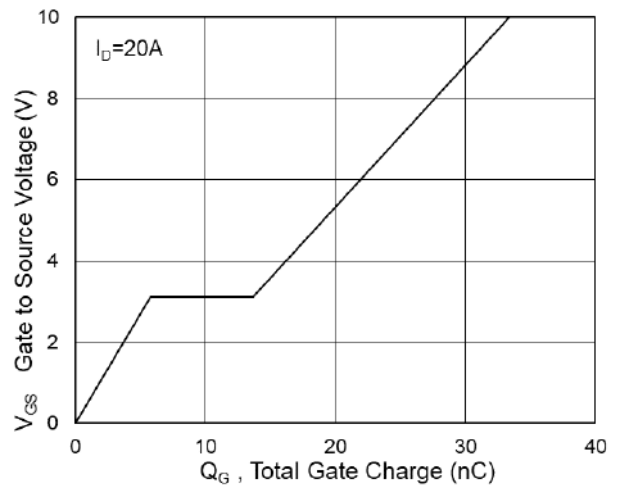


Fig.4 Gate-Charge Characteristics

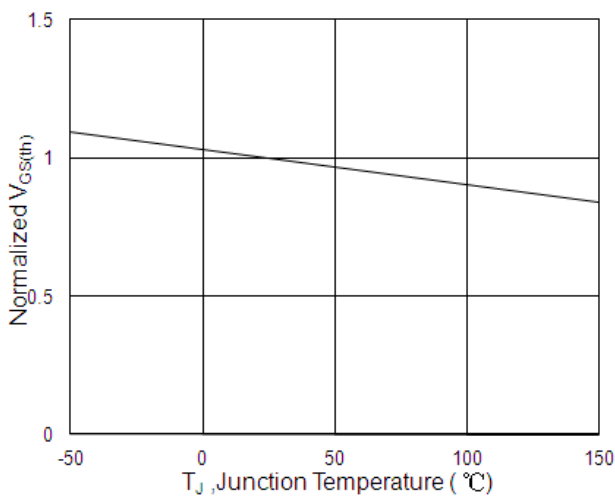


Fig.5 Normalized  $V_{GS(th)}$  vs  $T_J$

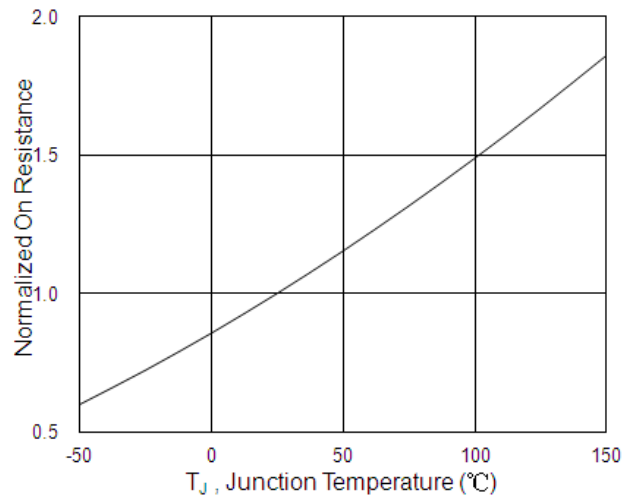


Fig.6 Normalized  $R_{DSON}$  vs  $T_J$

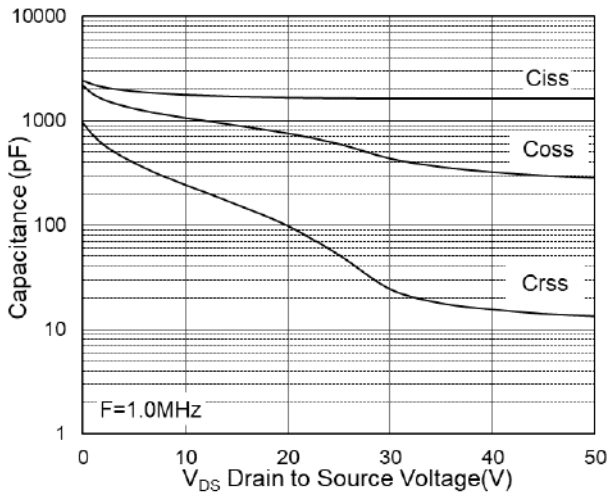


Fig.7 Capacitance

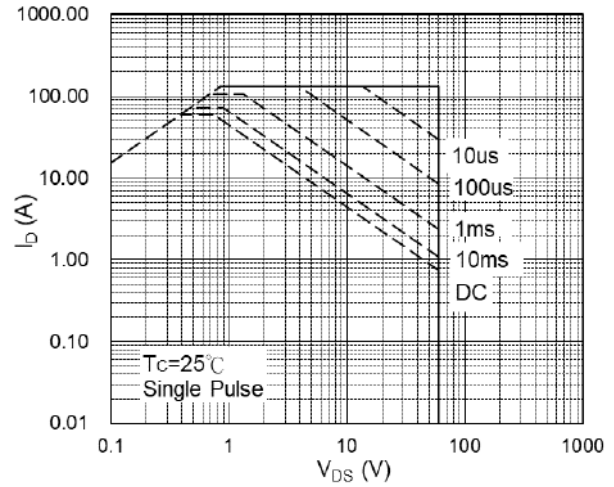


Fig.8 Safe Operating Area

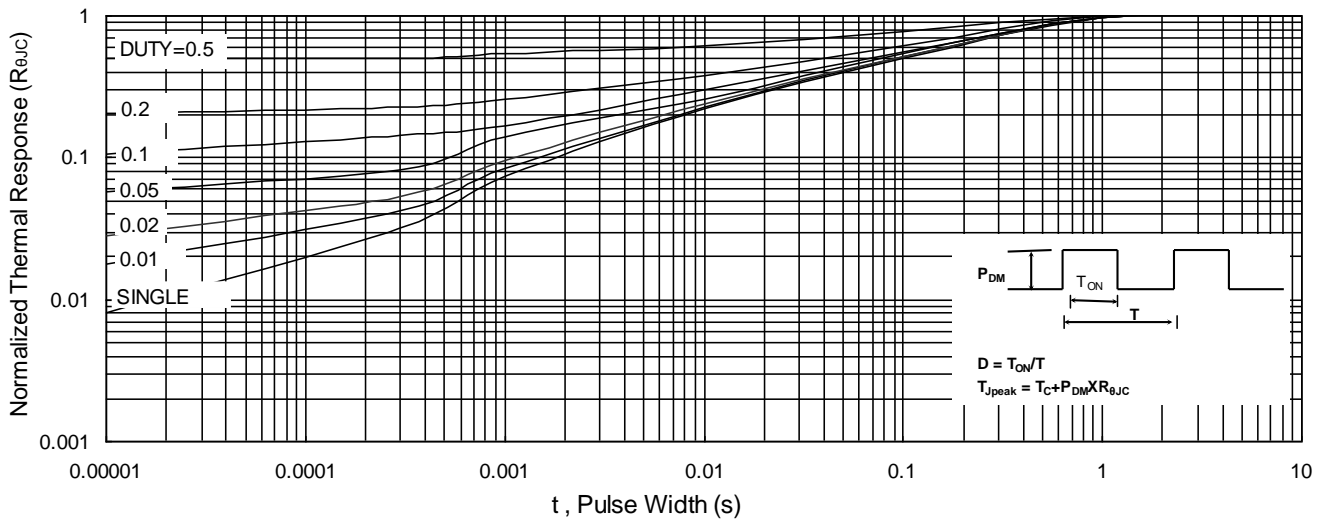


Fig.9 Normalized Maximum Transient Thermal Impedance

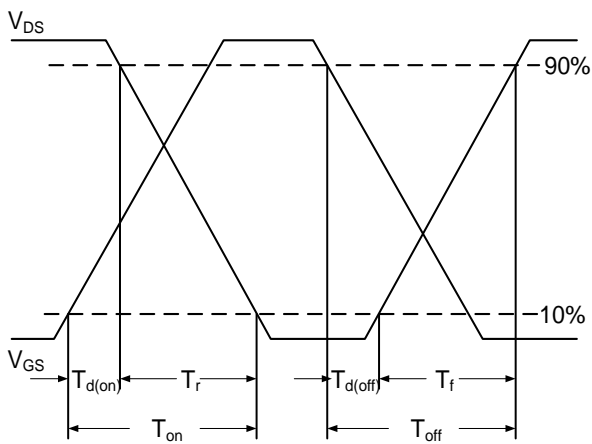


Fig.10 Switching Time Waveform

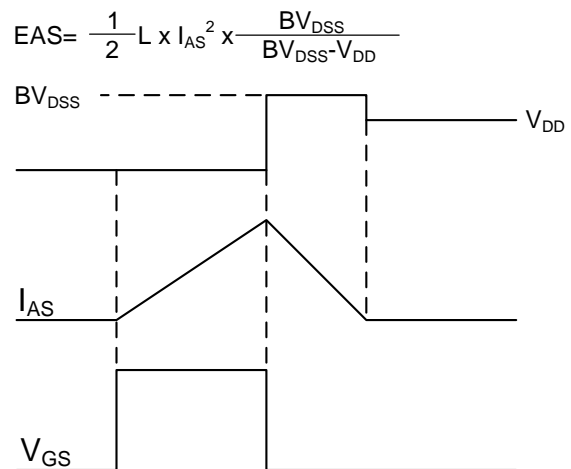


Fig.11 Unclamped Inductive Switching Waveform

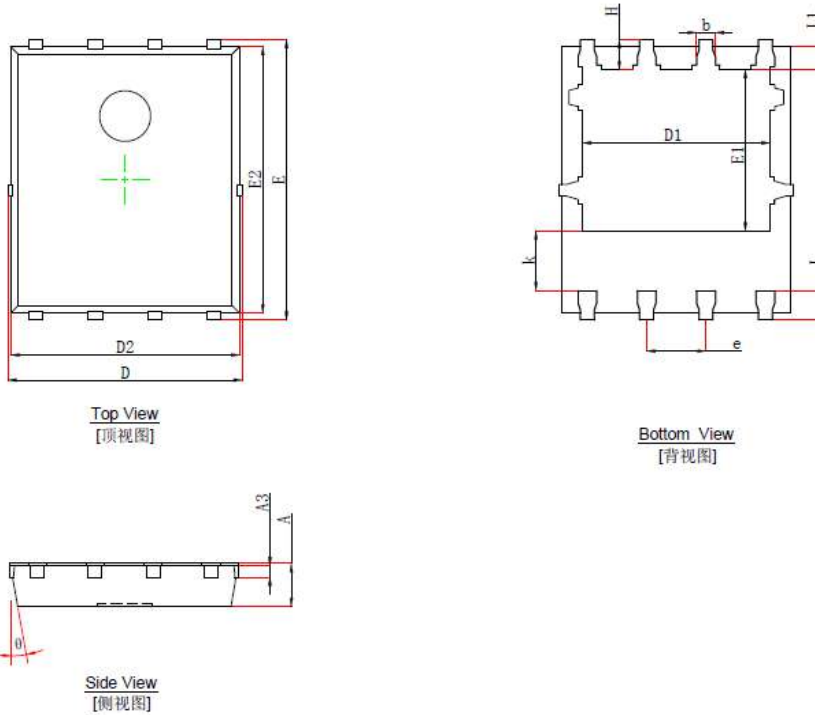


### Ordering and Marking Information

Ordering Device No.	Marking	Package	Packing	Quantity
ASDM60R042NQ-R	60R042N	DFN5x6-8	Tape&Reel	4000/Reel

PACKAGE	MARKING
DFN5x6-8	

### Dimensions(DFN5x6-8)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.900	1.000	0.035	0.039
A3	0.254REF.		0.010REF.	
D	4.944	5.096	0.195	0.201
E	5.974	6.126	0.235	0.241
D1	3.910	4.110	0.154	0.162
E1	3.375	3.575	0.133	0.141
D2	4.824	4.976	0.190	0.196
E2	5.674	5.826	0.223	0.229
k	1.190	1.390	0.047	0.055
b	0.350	0.450	0.014	0.018
e	1.270TYP.		0.050TYP.	
L	0.559	0.711	0.022	0.028
L1	0.424	0.576	0.017	0.023
H	0.574	0.726	0.023	0.029
$\theta$	10°	12°	10°	12°



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