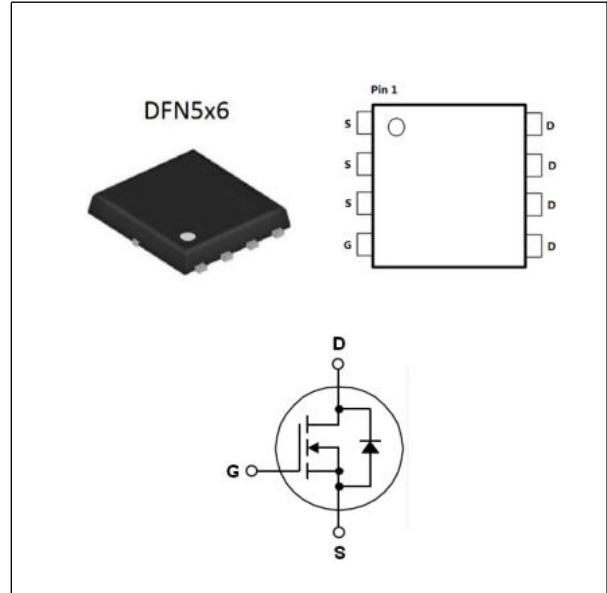


## 120V N-Channel Power MOSFET

### Description

$V_{DS}$		120	V
$R_{DS(on),typ}$	$V_{GS}=10V$	6	m $\Omega$
$R_{DS(on),typ}$	$V_{GS}=4.5V$	7.5	m $\Omega$
$I_D$ (Silicon Limited)		94.7	A
$I_D$ (Package Limited)		60	A



### Features

- High Speed Power Switching, Logic Level
- 100% UIS Tested, 100% Rg Tested
- Enhanced Avalanche Ruggedness
- Enhanced Body diode dv/dt capability
- Lead Free, Halogen Free

### Applications

- Synchronous Rectification in SMPS
- Hard Switching and High Speed Circuit
- DC/DC in Telecoms and Industrial

### Absolute Maximum Ratings @ $T_C=25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Ratings	Unit	
$V_{DSS}$	Drain to Source Voltage	120	V	
$V_{GSS}$	Gate to Source Voltage	$\pm 20$	V	
$I_D$	Drain Current	$T_C=25^\circ\text{C}$	95	A
		$T_C=100^\circ\text{C}$	60	A
	Continuous Drain Current(Package Limited)	$T_C=25^\circ\text{C}$	60	A
$I_{DM}$	Pulsed Drain Current (Note1)	320	A	
$P_D$	Maximum Power Dissipation	$T_C=25^\circ\text{C}$	114	W
	Derate above $25^\circ\text{C}$		0.91	W/ $^\circ\text{C}$
$E_{AS}$	Single Pulsed Avalanche Energy (Note 2)	500	mJ	
$T_J$	Operating Junction Temperature Range	-55~+150	$^\circ\text{C}$	
$T_{STG}$	Storage Temperature Range	-55~+150	$^\circ\text{C}$	

### Thermal Characteristics

Symbol	Parameter	Ratings	Unit
$R_{th(J-C)}$	Thermal Resistance, Junction to case	1.1	$^\circ\text{C}/\text{W}$
$R_{th(J-A)}$	Thermal Resistance, Junction to Ambient	55	$^\circ\text{C}/\text{W}$

## Electrical Characteristics @T<sub>c</sub>=25 °C unless otherwise noted

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV <sub>DSS</sub>	Drain to Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250uA	120	-	-	V
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250uA	1.4	2	2.4	V
R <sub>DS(on)</sub>	Static Drain-Source On-Resistance	V <sub>GS</sub> =10V, I <sub>D</sub> =20A	-	6	7.5	mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =20A	-	7.5	10	
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> =120V, V <sub>GS</sub> =0V, T <sub>J</sub> =25°C	-	-	1	uA
		V <sub>DS</sub> =120V, V <sub>GS</sub> =0V, T <sub>J</sub> =125°C	-	-	100	
I <sub>GSS</sub>	Gate to Source Leakage Current	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V	-	-	±100	nA
g <sub>fs</sub>	Transconductance	V <sub>DS</sub> =5V, I <sub>D</sub> =20A	-	75	-	S
R <sub>g</sub>	Gate Resistance	VGS=0V, VDS Open, f=1MHz	-	2.56	-	Ω

## D-S Diode Characteristics and Maximum Rating @T<sub>c</sub>=25 °C unless otherwise noted

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V <sub>SD</sub>	Drain-Source Diode Forward Voltage	V <sub>GS</sub> =0V, I <sub>S</sub> =20A	-	0.9	1.2	V
t <sub>rr</sub>	Reverse Recovery Time	V <sub>R</sub> =60V, I <sub>S</sub> =20A, di/dt=500A/us	-	45	-	ns
Q <sub>rr</sub>	Reverse Recovery Charge		-	270	-	nC

## Switching Characteristics @T<sub>c</sub>=25 °C unless otherwise noted

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
t <sub>d(on)</sub>	Turn-on Delay Time	I <sub>D</sub> =20A, V <sub>DD</sub> =60V, V <sub>GS</sub> =10V R <sub>G</sub> =10Ω (Note 3)	-	15	-	ns
t <sub>r</sub>	Rise Time		-	8	-	ns
t <sub>d(off)</sub>	Turn-off Delay Time		-	30	-	ns
t <sub>f</sub>	Fall Time		-	9	-	ns
C <sub>iss</sub>	Input Capacitance	V <sub>GS</sub> =0V, V <sub>DS</sub> =60V, f=1.0MHz	-	3510	-	pF
C <sub>oss</sub>	Output Capacitance		-	380	-	pF
C <sub>rss</sub>	Reverse Transfer Capacitance		-	6.5	-	pF
Q <sub>g(10V)</sub>	Total Gate Charge	I <sub>D</sub> =20A, V <sub>DS</sub> =60V V <sub>GS</sub> =10V (Note 3)	-	45	-	nC
Q <sub>g(4.5V)</sub>	Total Gate Charge		-	20	-	nC
Q <sub>gs</sub>	Gate to Source Charge		-	8	-	nC
Q <sub>gd</sub>	Gate to Drain Charge		-	6	-	nC

### Note:

1. Repetitive rating: pulse-width limited by maximum junction temperature
2. V<sub>DD</sub>=50V, L=0.4mH
3. Essentially independent of operating temperature typical characteristics

**Typical Performance Characteristics**

Fig. 1. Typical on-Resistance Characteristics

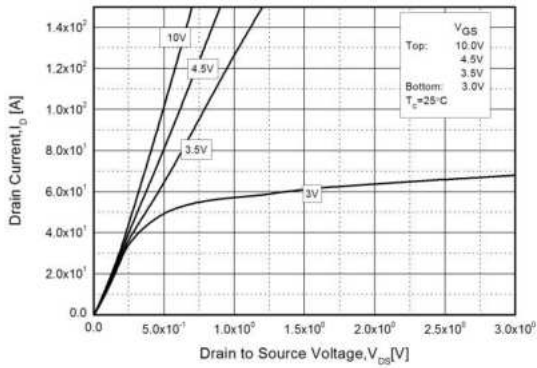


Fig. 2. Typical Transfer Characteristics

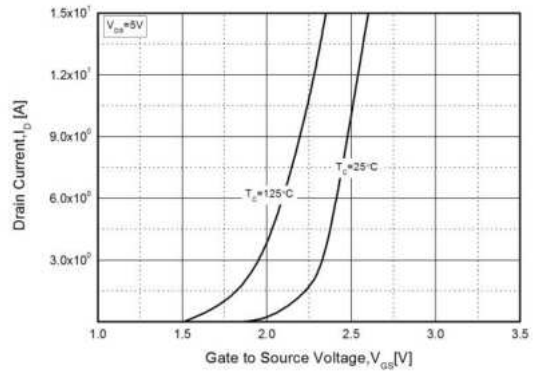


Fig. 3. Static on-Resistance vs.  $I_D$

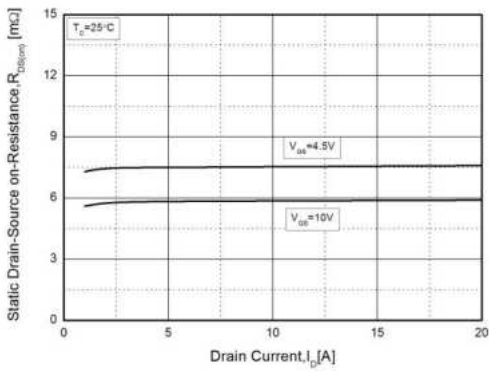


Fig. 4. Body Diode Forward Voltage vs.  $I_{DR}$

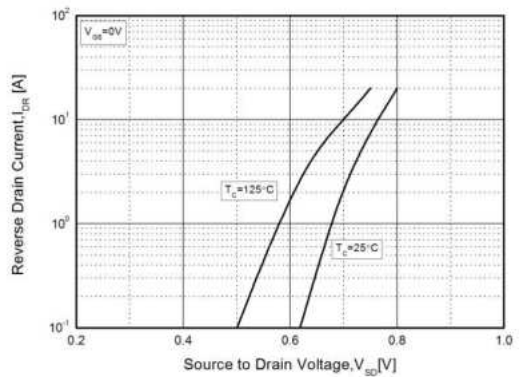


Fig. 5. Capacitance Characteristics

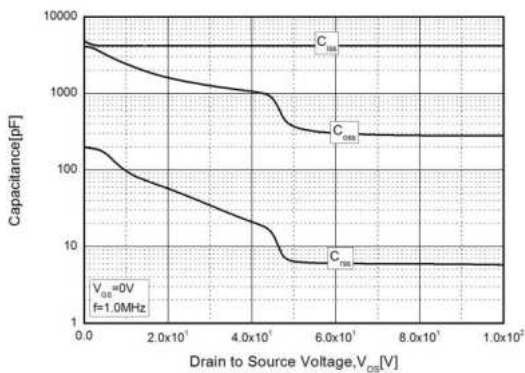
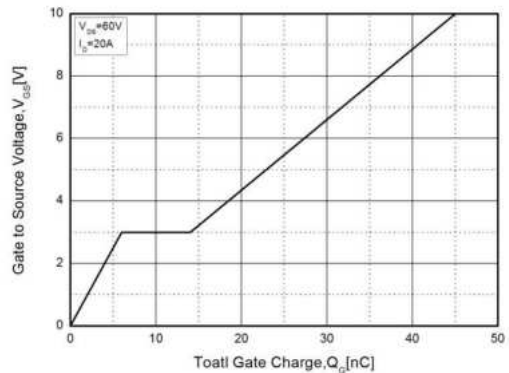


Fig. 6. Gate Charge Characteristics



**Typical Performance Characteristics**

Fig. 7. On-Resistance vs. Gate-Source Voltage

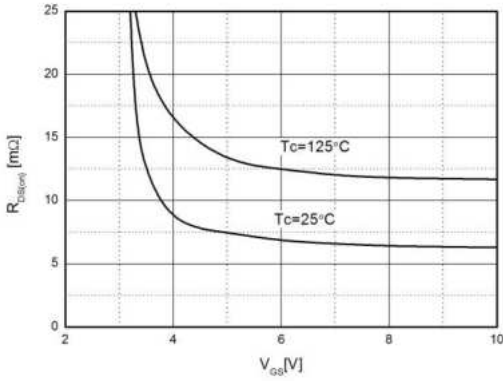


Fig. 8. Static on-Resistance vs. Temperature

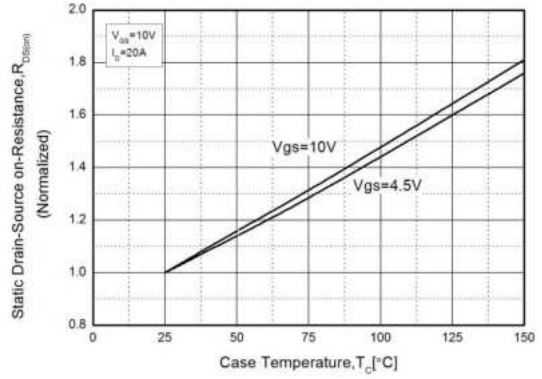


Fig. 9. Maximum Safe Operating Area

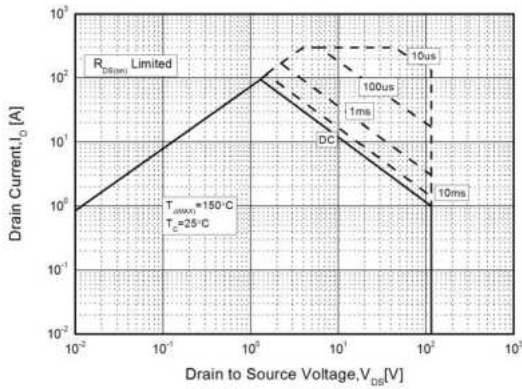


Fig. 10. Maximum Drain Current vs. Case Temperature

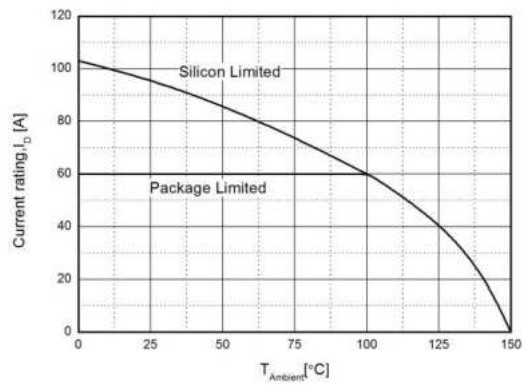
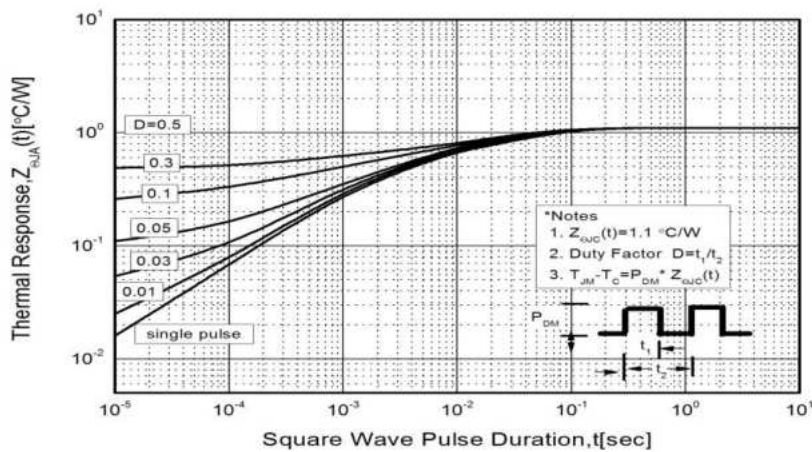
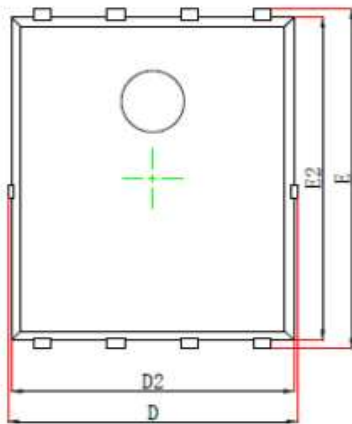
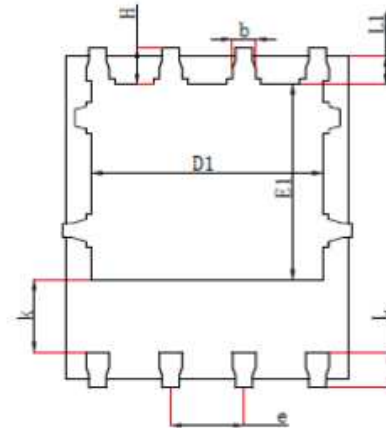
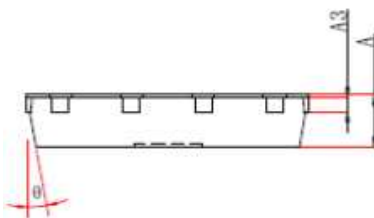


Fig. 11. Normalized Maximum Transient Thermal Impedance, Junction-to-Ambient



**Package Dimensions**
**DFN5\*6**

(Dimensions in Millimeters)


 Top View  
[顶视图]

 Bottom View  
[背视图]

 Side View  
[侧视图]

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.100	0.035	0.043
A3	0.254 REF		0.010REF	
D	4.680	5.120	0.184	0.202
E	5.900	6.126	0.232	0.241
D1	3.610	4.110	0.142	0.162
E1	3.380	3.780	0.133	0.149
D2	4.800	5.000	0.189	0.197
E2	5.674	5.826	0.223	0.229
k	1.100	1.390	0.043	0.055
b	0.330	0.510	0.013	0.020
e	1.270TYP		1.270TYP	
L	0.510	0.711	0.020	0.028
L1	0.424	0.576	0.017	0.023
H	0.410	0.726	0.016	0.029
θ	0°	12°	0°	12°