

## N-Channel Enhancement Mode MOSFET

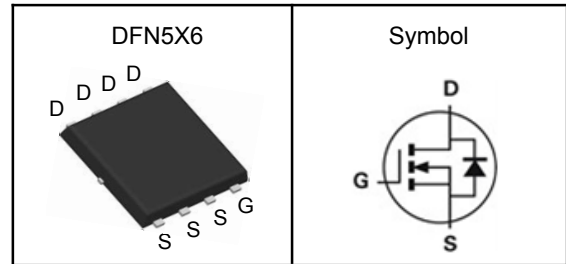
### Features

- Low  $R_{ds(on)}$  for low conduction loss
- Reliable and Rugged
- ROHS Compliant & Halogen-Free

### Applications

- Power Management in Desktop Computer
- DC/DC Converters

### Pin Description



$V_{DSS}$	40	V
$R_{DS(ON)-Typ}$	11	m $\Omega$
$I_D$	25	A

### Absolute Maximum Ratings ( $T_C=25^\circ\text{C}$ , Unless Otherwise Noted)

Symbol	Parameter	Rating	Unit
$V_{DSS}$	Drain-Source Voltage	40	V
$V_{GSS}$	Gate-Source Voltage	$\pm 20$	V
$T_J$	Maximum Junction Temperature	-55 to 150	$^\circ\text{C}$
$T_{STG}$	Storage Temperature Range	-55 to 150	$^\circ\text{C}$
$I_{DM}^{(1)}$	Pulse Drain Current Tested	100	A
$I_D$	Continuous Drain Current	25	A
$P_D$	Maximum Power Dissipation	35	W
$E_{AS}^{(2)}$	Avalanche Energy, Single pulse $L=0.5\text{mH}$	15	mJ

### Thermal Characteristics

Symbol	Parameter	Rating	Unit
$R_{\theta JA}^{(3)}$	Thermal Resistance-Junction to Ambient	50	$^\circ\text{C/W}$
$R_{\theta JC}$	Thermal Resistance-Junction to Case	3.5	$^\circ\text{C/W}$

Note ① : Max. current is limited by bonding wire.

Note ② : UIS tested and pulse width are limited by maximum junction temperature  $150^\circ\text{C}$ .

Note ③ : Surface Mounted on  $1\text{in}^2$  FR-4 board with 1oz.



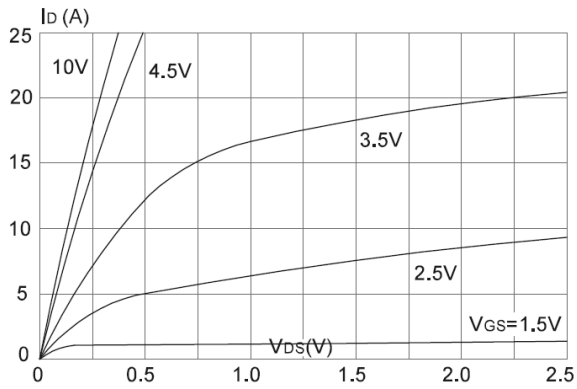
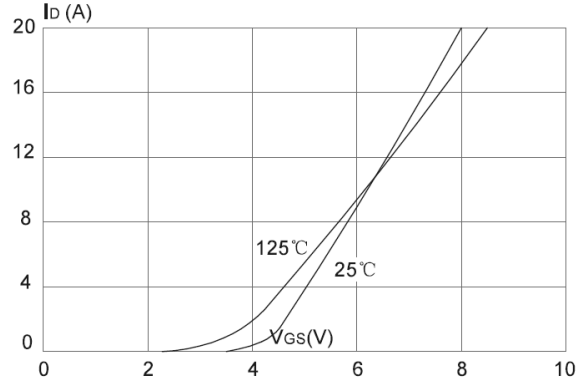
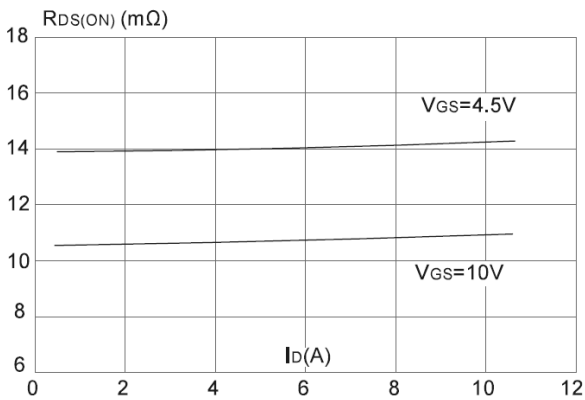
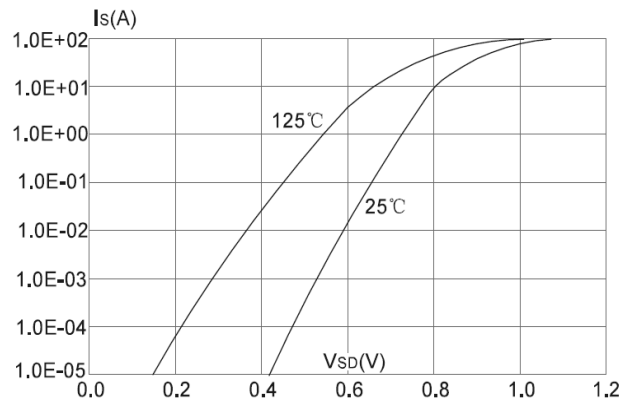
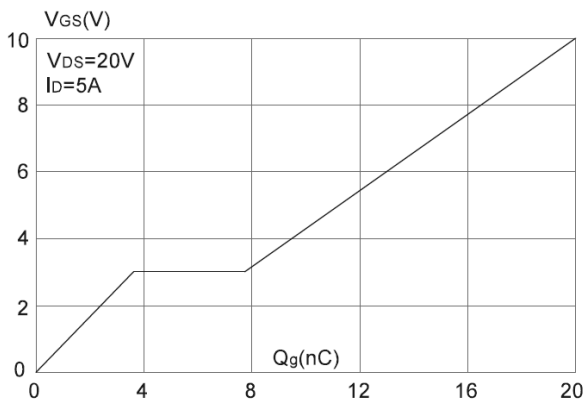
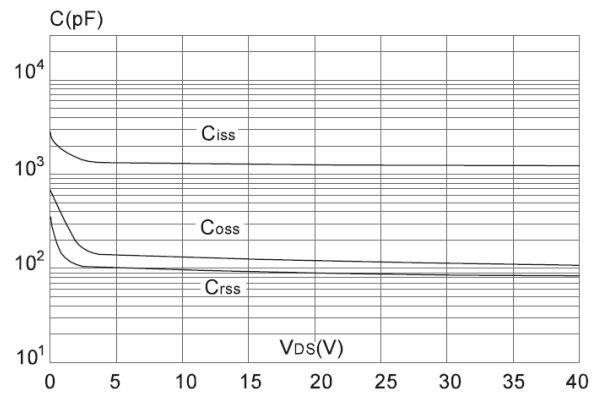
**N-Channel Enhancement Mode MOSFET**

**Electrical Characteristics** ( $T_J=25^{\circ}\text{C}$ , Unless Otherwise Noted)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
<b>Static Electrical Characteristics</b>						
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	40	---	---	V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS}=40V, V_{GS}=0V$	---	---	1	$\mu A$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	1.1	---	2.2	V
$I_{GSS}$	Gate Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	---	---	$\pm 100$	nA
$R_{DS(on)}$	Drain-Source On-state Resistance	$V_{GS}=10V, I_D=8A$	---	11	13.8	m $\Omega$
		$V_{GS}=4.5V, I_D=5A$	---	15.2	20	
<b>Dynamic Characteristics<sup>⑤</sup></b>						
$C_{iss}$	Input Capacitance	$V_{GS}=0V, V_{DS}=20V, \text{Freq.}=1\text{MHz}$	---	780	---	pF
$C_{oss}$	Output Capacitance		---	55	---	
$C_{riss}$	Reverse Transfer Capacitance		---	48	---	
$T_{d(on)}$	Turn-on Delay Time	$V_{DS}=20V, V_{GS}=10V, R_G=3\Omega, R_L=1\Omega, I_D=8A$	---	14	---	nS
$T_r$	Turn-on Rise Time		---	2	---	
$T_{d(off)}$	Turn-off Delay Time		---	18	---	
$T_f$	Turn-off Fall Time		---	4	---	
$Q_g$	Total Gate Charge	$V_{DS}=20V, V_{GS}=10V, I_D=5A$	---	20	---	nC
$Q_{gs}$	Gate-Source Charge		---	1.7	---	
$Q_{gd}$	Gate-Drain Charge		---	2.5	---	
<b>Source-Drain Characteristics</b>						
$V_{SD}^{④}$	Diode Forward Voltage	$V_{GS}=0V, I_S=8A, T_J=25^{\circ}\text{C}$	---	---	1.2	V
$t_{rr}$	Reverse Recovery Time	$I_F=8A, di/dt=100A/\mu s, T_J=25^{\circ}\text{C}$	---	20	---	nS
$Q_{rr}$	Reverse Recovery Charge		---	10	---	nC

Note ④: Pulse test (pulse width 300us, duty cycle 2%).

Note ⑤: Guaranteed by design, not subject to production testing.

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**Typical Characteristics**

**Fig.1 Output Characteristics**

**Fig.2 Typical Transfer Characteristics**

**Fig.3 On-resistance VS Drain Current**

**Fig.4 Body Diode Characteristics**

**Fig.5 Gate Charge Characteristics**

**Fig.6 Capacitance Characteristics**

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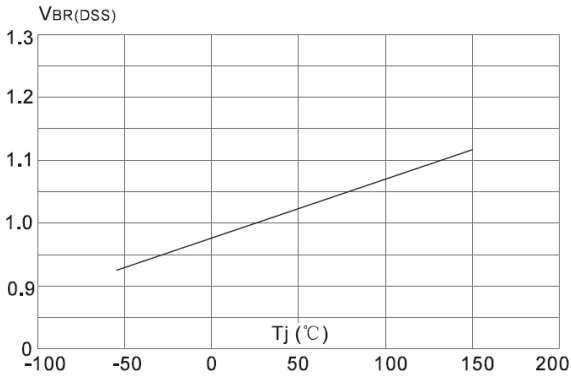


Fig.7 Normalized Breakdown Voltage VS Junction Temperature

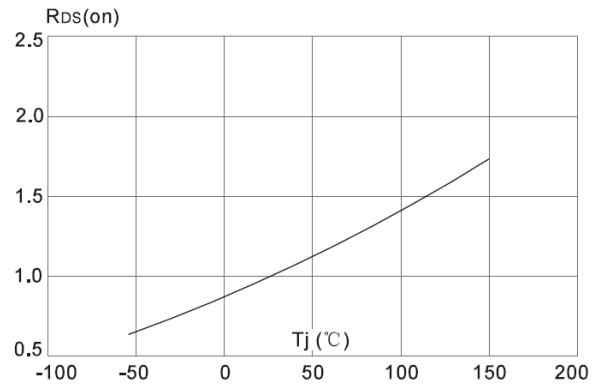


Fig. 8 Normalized On-Resistance Variation VS Junction Temperature

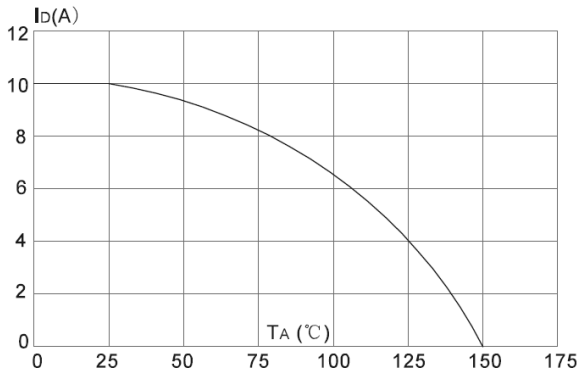


Fig.9 Maximum Continuous Drain Current VS. Ambient Temperature

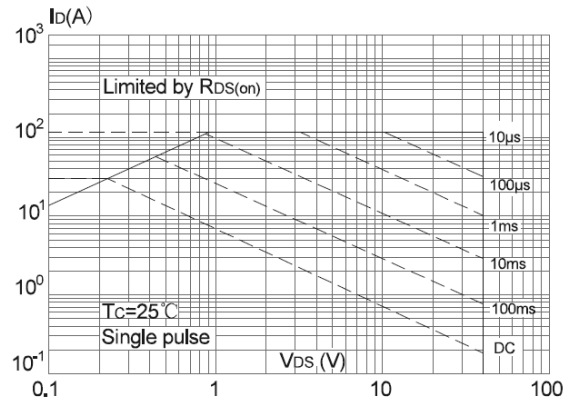


Fig.10 Safe Operating Area

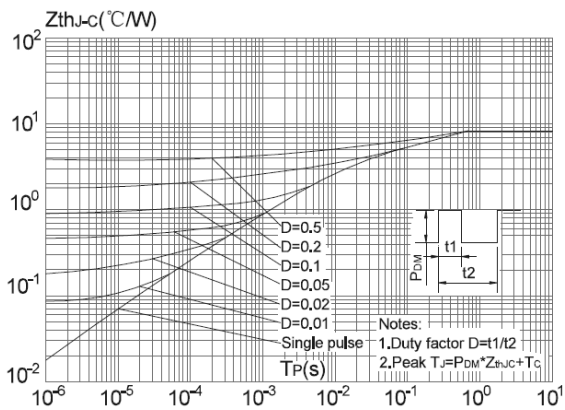
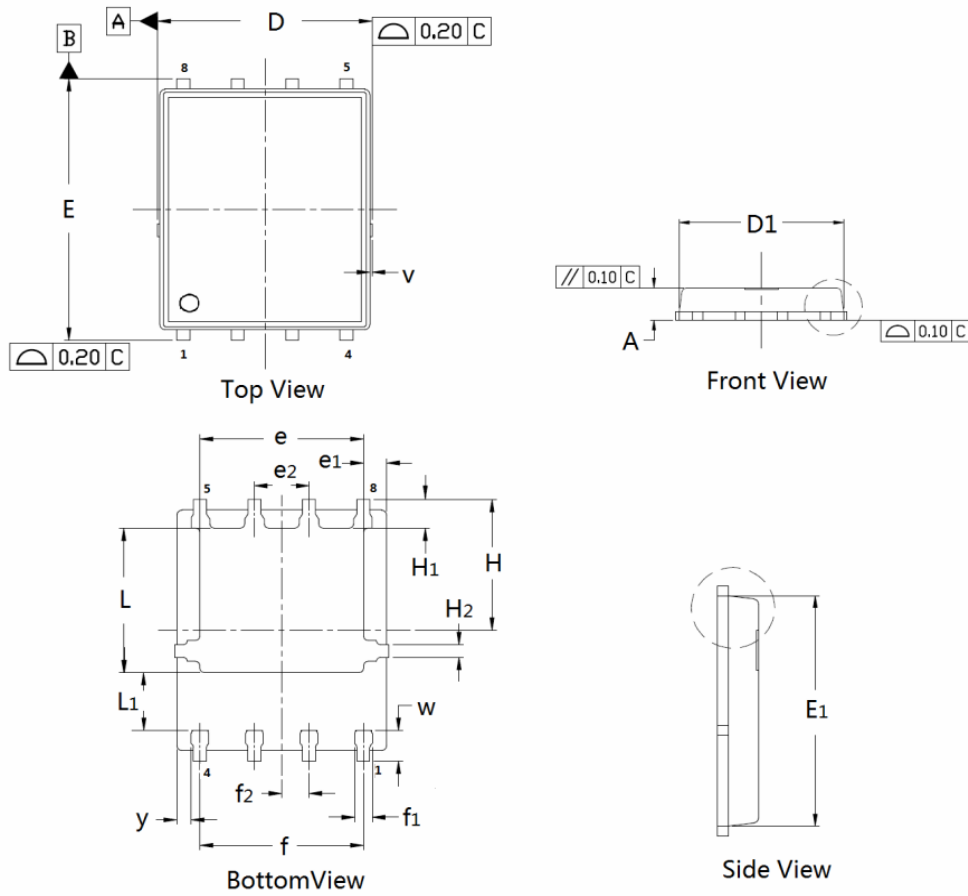


Fig. 11 Transient Thermal Response Curve

**N-Channel Enhancement Mode MOSFET**
**DFN5×6 Package Outline Data**

**DIMENSIONS ( unit : mm )**

Symbol	Min	Typ	Max	Symbol	Min	Typ	Max
A	0.90	1.02	1.10	D	4.90	4.98	5.10
D <sub>1</sub>	4.80	4.89	5.10	E	5.90	6.11	6.25
E <sub>1</sub>	5.65	5.74	5.95	e	3.72	3.80	3.92
e <sub>1</sub>	--	0.5	--	e <sub>2</sub>	--	1.	--
f	--	3.8	--	f <sub>1</sub>	0.31	0.37	0.51
f <sub>2</sub>	--	0.6	--	H	--	3.	--
H <sub>1</sub>	0.59	0.63	0.79	H <sub>2</sub>	0.26	0.28	0.32
L	3.35	3.45	3.65	L <sub>1</sub>	--	1.	--
v	--	0.1	--	w	0.64	0.68	0.84
y	--	0.3	--				