

# N-Channel Enhancement Mode MOSFET

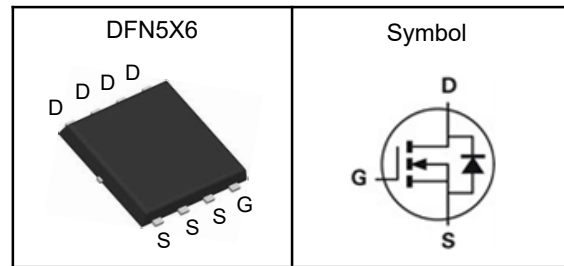
## Features

- High Speed Power Switching
- Reliable and Rugged
- ROHS Compliant
- 100% Avalanche Tested

## Applications

- Power Management in Desktop Computer
- DC/DC Converters

## Pin Description



$V_{DSS}$	100	V
$R_{DS(ON)-Typ}$	8.5	m $\Omega$
$I_D$	60	A

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

Symbol	Parameter	N-Channel	Unit
$V_{DSS}$	Drain-Source Voltage	100	V
$V_{GSS}$	Gate-Source Voltage	$\pm 20$	V
$T_J$	Maximum Junction Temperature	-55 to 150	$^{\circ}C$
$T_{STG}$	Storage Temperature Range	-55 to 150	$^{\circ}C$
$I_{DM}^{①}$	Pulse Drain Current Tested	210	A
$I_D$	Continuous Drain Current	60	A
$P_D$	Maximum Power Dissipation	125	W
$E_{AS}$	Avalanche Energy, Single pulse	100	mJ

## Thermal Characteristics

Symbol	Parameter	Rating	Unit
$R_{\theta JA}$	Thermal Resistance-Junction to Ambient	62	$^{\circ}C/W$
$R_{\theta JC}$	Thermal Resistance-Junction to Case	1	$^{\circ}C/W$

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

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

Note ③ : Surface Mounted on 1in<sup>2</sup> FR-4 board with 1oz.



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**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	$V_{GS}=0V, I_D=250\mu A$	100	---	---	V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS}=100V, V_{GS}=0V$	---	---	1	$\mu A$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	1.2	---	2.5	V
$I_{GSS}$	Gate Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	---	---	$\pm 100$	nA
$R_{DS(ON)}$	Drain-Source On-state Resistance	$V_{GS}=10V, I_D=10A$	---	8.5	10	$m\Omega$
		$V_{GS}=4.5V, I_D=8A$	---	10	13	$m\Omega$
<b>Dynamic Characteristics</b> <sup>⑤</sup>						
$C_{iss}$	Input Capacitance	$V_{DS}=50V, V_{GS}=0V, \text{Freq.}=1\text{MHz}$	---	2600	---	pF
$C_{oss}$	Output Capacitance		---	361	---	
$C_{rSS}$	Reverse Transfer Capacitance		---	6.5	---	
$T_{d(on)}$	Turn-on Delay Time	$V_{DS}=50V, V_{GS}=10V, I_D=25A, R_G=2.2\Omega$	---	20	---	nS
$T_r$	Turn-on Rise Time		---	5	---	
$T_{d(off)}$	Turn-off Delay Time		---	51	---	
$T_f$	Turn-off Fall Time		---	9	---	
$Q_g$	Total Gate Charge	$V_{DS}=50V, V_{GS}=10V, I_D=25A$	---	49	---	nC
$Q_{gs}$	Gate-Source Charge		---	6.5	---	
$Q_{gd}$	Gate-Drain Charge		---	12	---	
<b>Source-Drain Characteristics</b>						
$V_{SD}$	Diode Forward Voltage	$I_S=12A, V_{GS}=0V$	---	---	1.3	V
$t_{rr}$	Reverse Recovery Time	$I_F=12A, dI_F/dt=100A/\mu s$	---	60	---	nS
$Q_{rr}$	Reverse Recovery Charge		---	106	---	nC

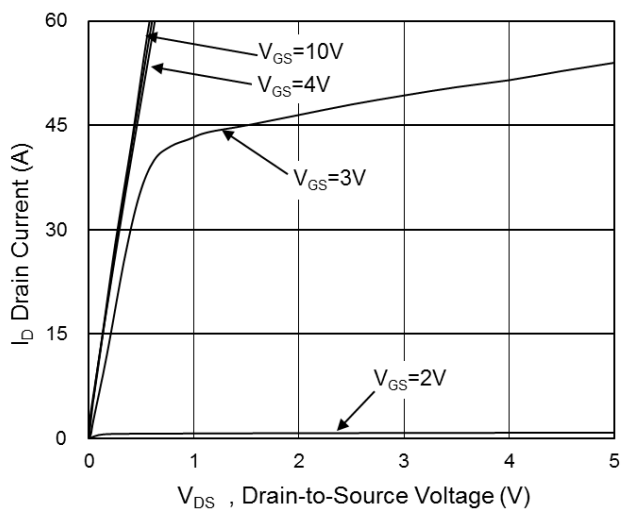
Note ④: Pulse test (pulse width $\leq 300\mu s$ , duty cycle $\leq 2\%$ ).

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

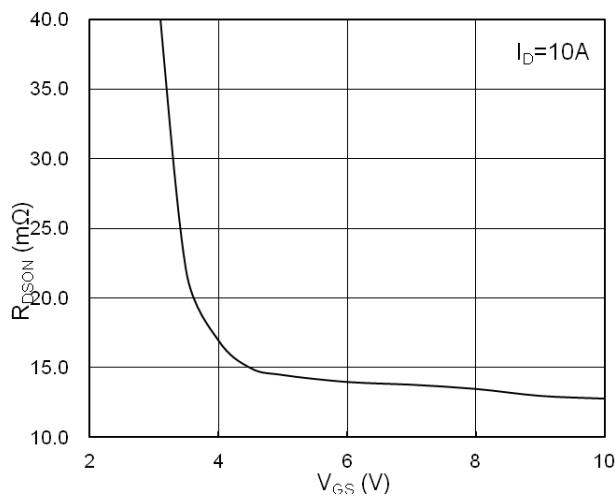


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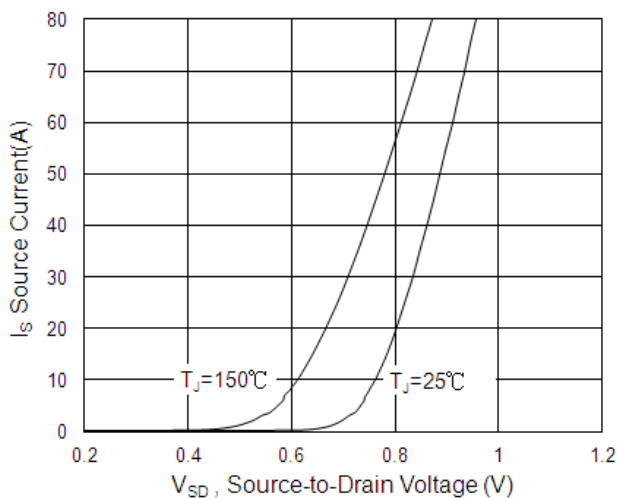
**Typical Characteristics**



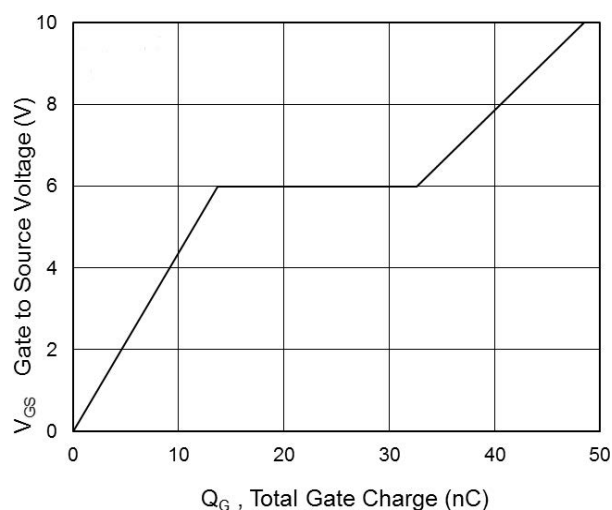
**Fig.1 Typical Output Characteristics**



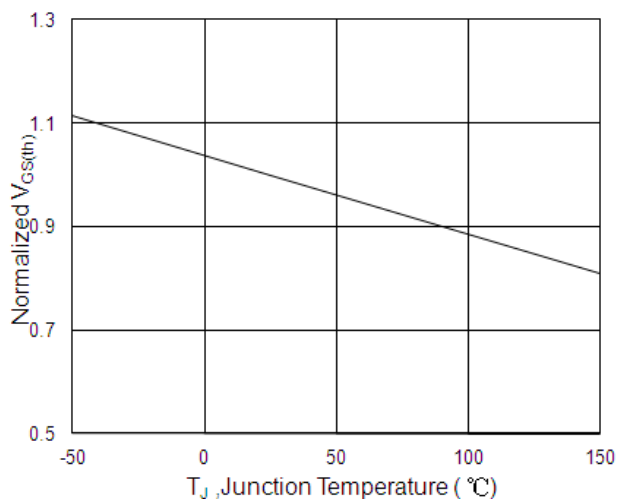
**Fig.2 On-Resistance vs. Gate-Source Voltage**



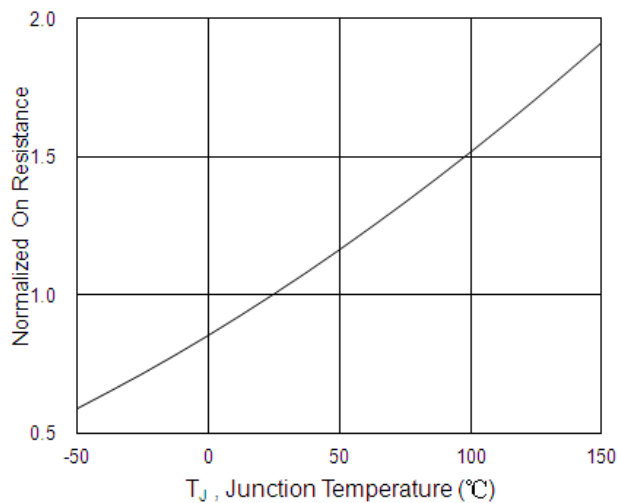
**Fig.3 Forward Characteristics of Reverse**



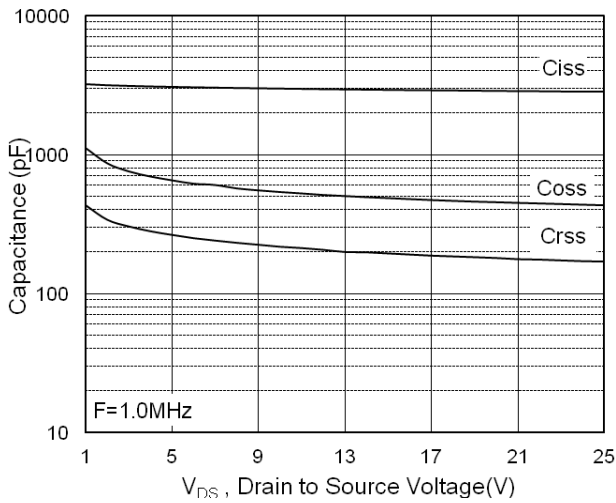
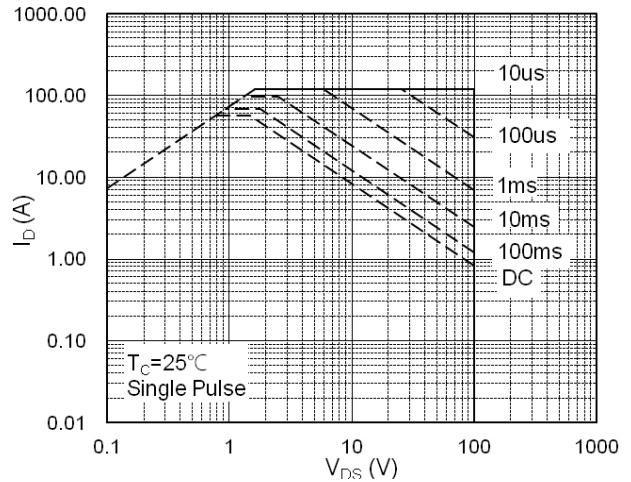
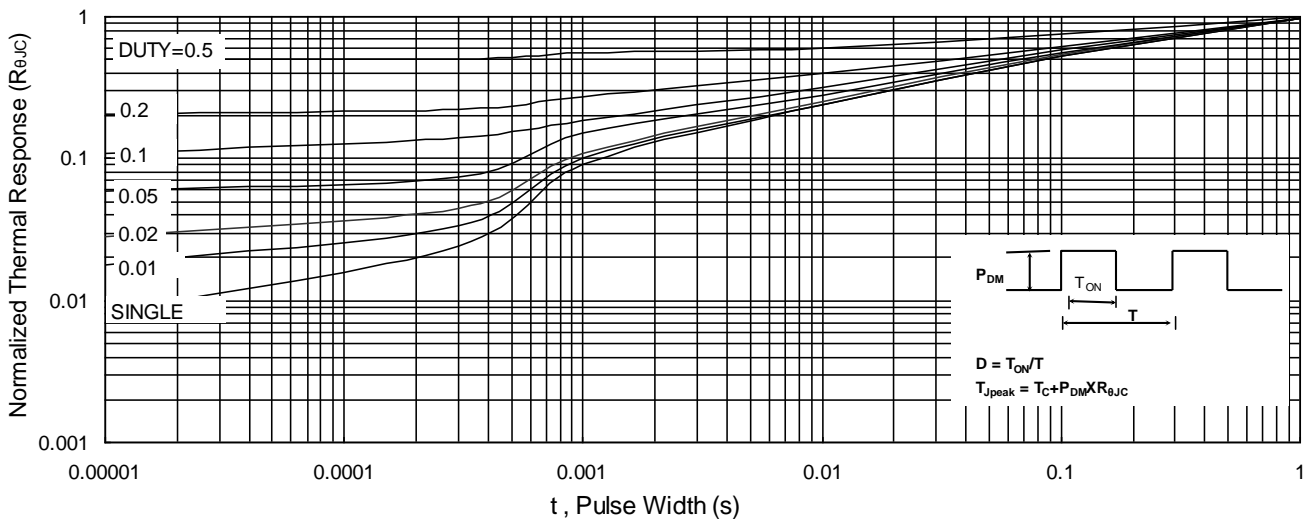
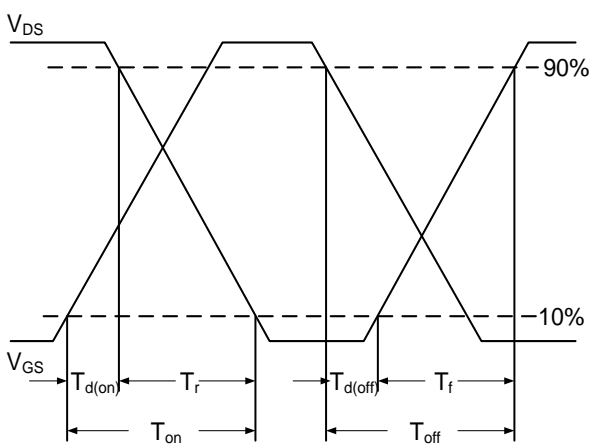
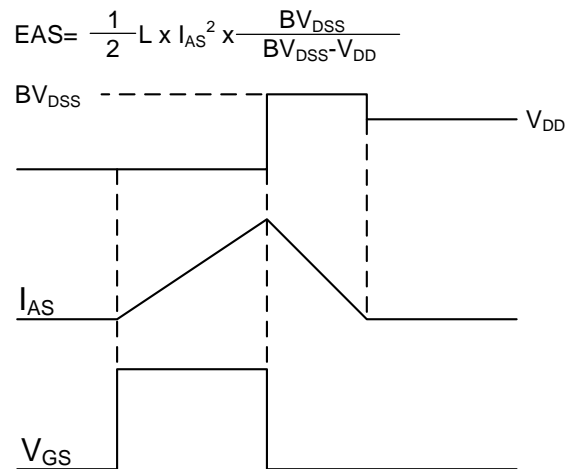
**Fig.4 Gate-Charge Characteristics**

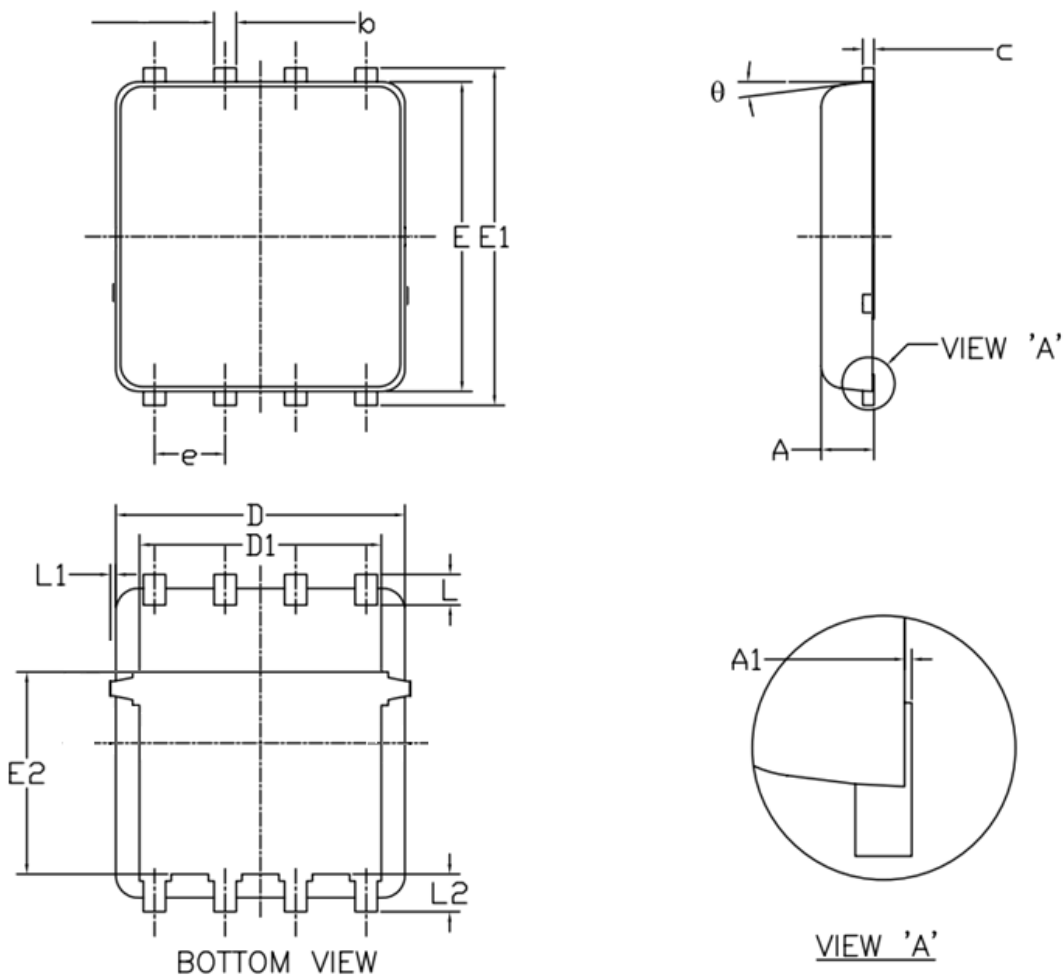


**Fig.5 Normalized  $V_{GS(th)}$  vs.  $T_J$**



**Fig.6 Normalized  $R_{DS(on)}$  vs.  $T_J$**

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**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**

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**DFN5X6-8L Package Outline Dimensions**


Symbol	Dimensions (unit:mm)			Symbol	Dimensions (unit:mm)		
	Min	Typ	Max		Min	Typ	Max
<b>A</b>	0.90	1.00	1.20	<b>E1</b>	5.90	6.10	6.35
<b>A1</b>	0.00	--	0.05	<b>E2</b>	3.38	3.58	3.92
<b>b</b>	0.30	0.40	0.51	<b>e</b>	1.27 BSC		
<b>c</b>	0.20	0.25	0.33	<b>L</b>	0.51	0.61	0.71
<b>D</b>	4.80	4.90	5.40	<b>L1</b>	--	--	0.15
<b>D1</b>	3.61	4.00	4.25	<b>L2</b>	0.41	0.51	0.61
<b>E</b>	5.65	5.80	6.06	<b>theta</b>	0°	--	12°