

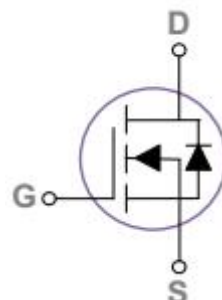
N-Channel Power MOSFET

General Features

- $V_{DS} = 30V, I_D = 150A$
 $R_{DS(ON)} < 1.6 m\Omega @ V_{GS}=10V$
 $R_{DS(ON)} < 2.4 m\Omega @ V_{GS}=4.5V$
- Improved dv/dt capability
- High density cell design for ultra low Rdson
- Good stability and uniformity with high EAs
- Excellent package for good heat dissipation

Applications

- Power switching application
- MB/VGA/Server Vcore
- POL Applications



Schematic diagram



DFN5X6-8L top view

Absolute Maximum Ratings ($T_C=25^\circ C$ unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current-Continuous ($T_C=25^\circ C$)	$I_D(25^\circ C)$	150	A
Drain Current-Continuous ($T_C=100^\circ C$)	$I_D(100^\circ C)$	82	A
Pulsed Drain Current	I_{DM}	520	A
Maximum Power Dissipation	P_D	166	W
Derating factor		1.33	W/ $^\circ C$
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 175	$^\circ C$

Thermal Characteristic

Thermal Resistance, Junction-to-Case ^(Note 2)	$R_{\theta JC}$	1.5	°C/W
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Electrical Characteristics ($T_C=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	30	-	-	V
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=27V, V_{GS}=0V, T_J=25^\circ\text{C}$	-	-	1	μA
		$V_{DS}=24V, V_{GS}=0V, T_J=85^\circ\text{C}$	-	-	10	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 100	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1.0	1.6	2.5	V
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=30A$	-	1.2	1.6	m Ω
		$V_{GS}=4.5V, I_D=15A$	-	1.8	2.4	
Forward Transconductance	g_{FS}	$V_{DS}=10V, I_D=15A$	-	30	-	S
Dynamic Characteristics (Note 4)						
Input Capacitance	C_{iss}	$V_{DS}=25V, V_{GS}=0V,$ $F=1.0\text{MHz}$	-	7720	11000	PF
Output Capacitance	C_{oss}		-	945	1400	PF
Reverse Transfer Capacitance	C_{rss}		-	435	650	PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=15V, I_D=1A$ $V_{GS}=10V, R_G=3.3\Omega$	-	28	56	nS
Turn-on Rise Time	t_r		-	45	90	nS
Turn-Off Delay Time	$t_{d(off)}$		-	105	200	nS
Turn-Off Fall Time	t_f		-	40	80	nS
Total Gate Charge	Q_g	$V_{DS}=15V, I_D=10A,$ $V_{GS}=4.5V$	-	65	120	nC
Gate-Source Charge	Q_{gs}		-	16	30	nC
Gate-Drain Charge	Q_{gd}		-	21	40	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage ^(Note 3)	V_{SD}	$V_{GS}=0V, I_S=1A, T_J=25^\circ\text{C}$	-	-	1.0	V
Continuous Source Current ^(Note 2)	I_S	$V_G=V_D=0V, \text{Force Current}$	-	-	130	A
Pulsed Source Current ^(Note 3)	I_{Sm}		-	-	260	A

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, $t \leq 10$ sec.
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design, not subject to production

Typical Electrical and Thermal Characteristics (Curves)

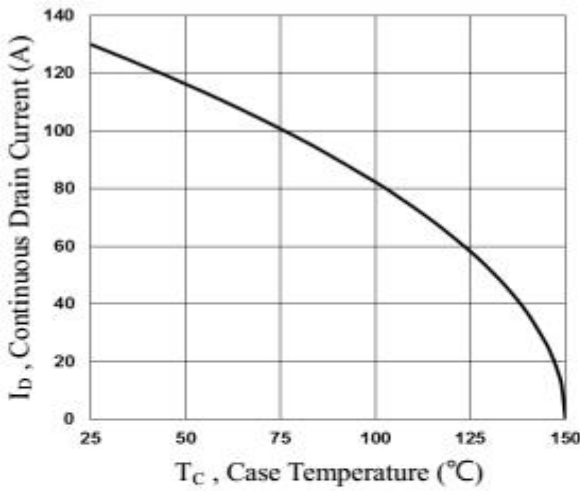


Fig.1 Continuous Drain Current vs. T_c

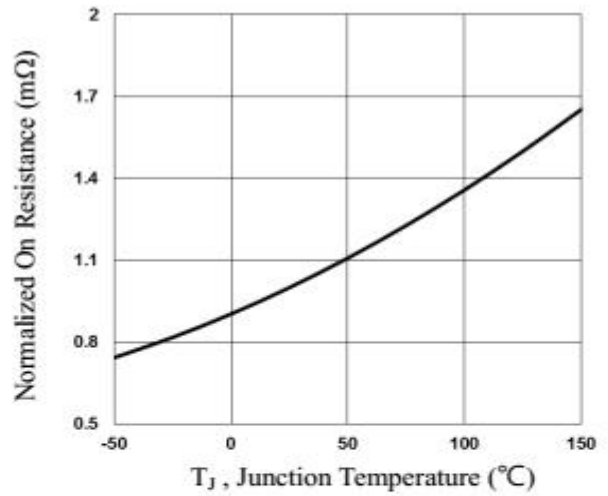


Fig.2 Normalized $R_{DS(ON)}$ vs. T_j

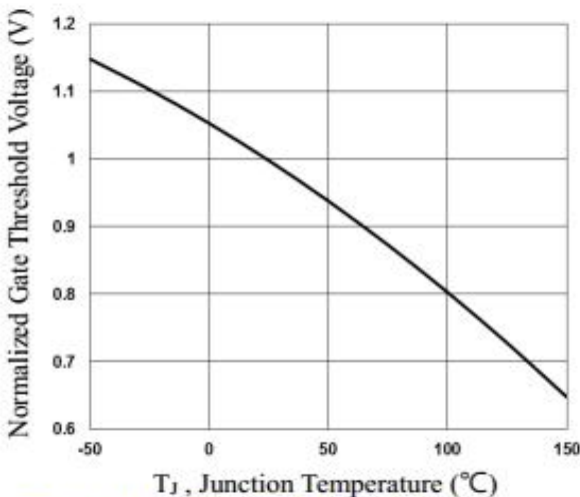


Fig.3 Normalized V_{th} vs. T_j

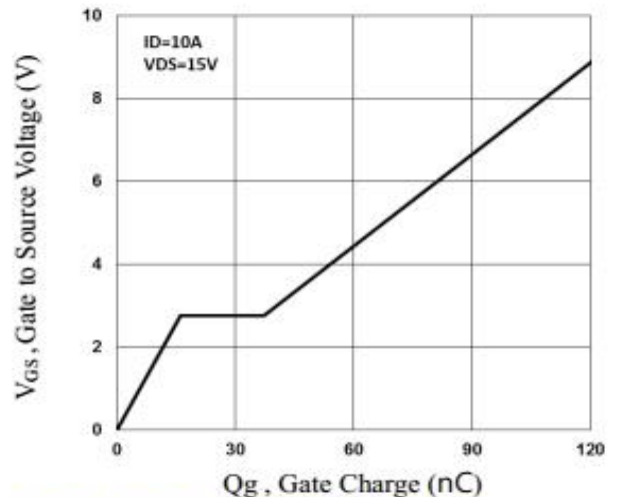


Fig.4 Gate Charge Waveform

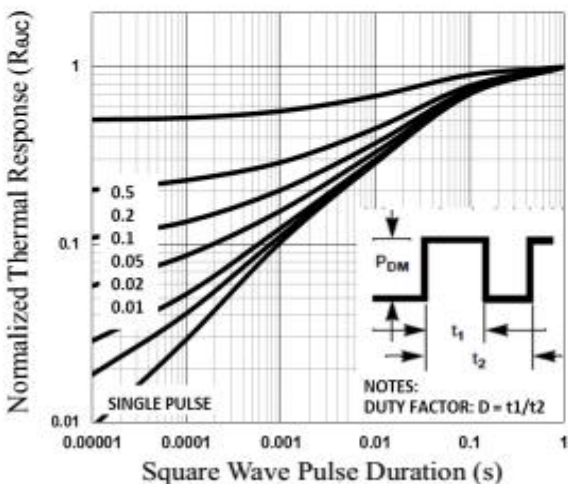


Fig.5 Normalized Transient Impedance

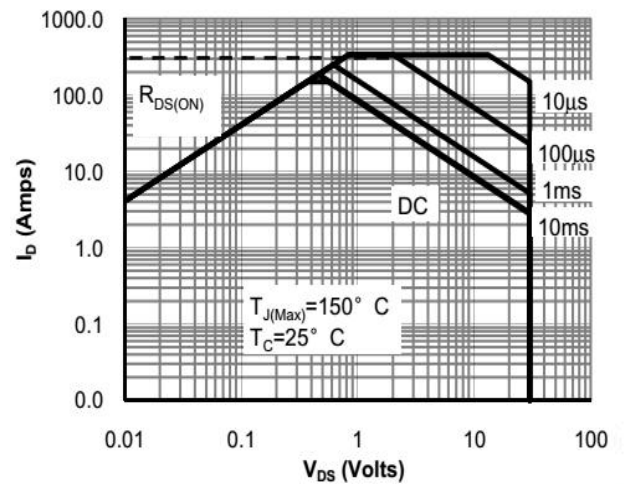


Fig.6 Maximum Safe Operation Area

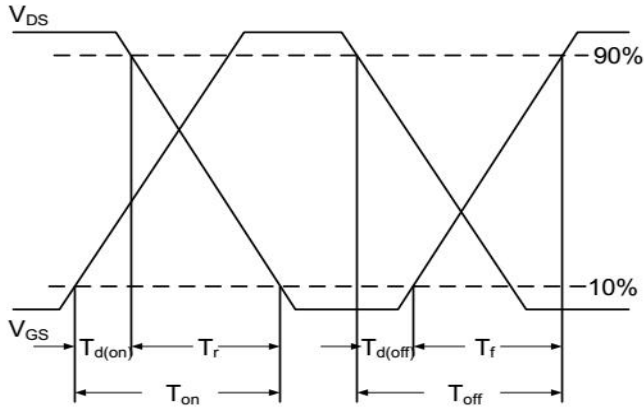


Fig.7 Switching Time Waveform

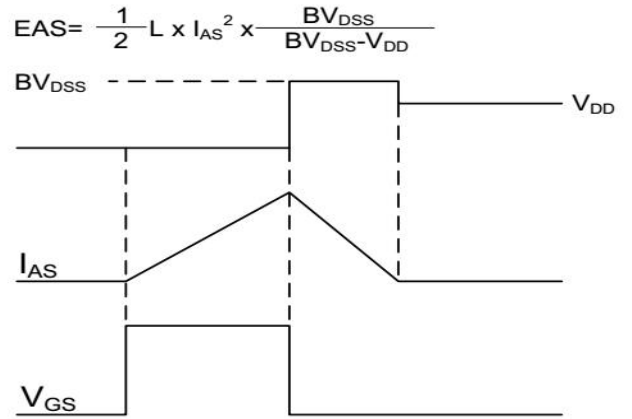
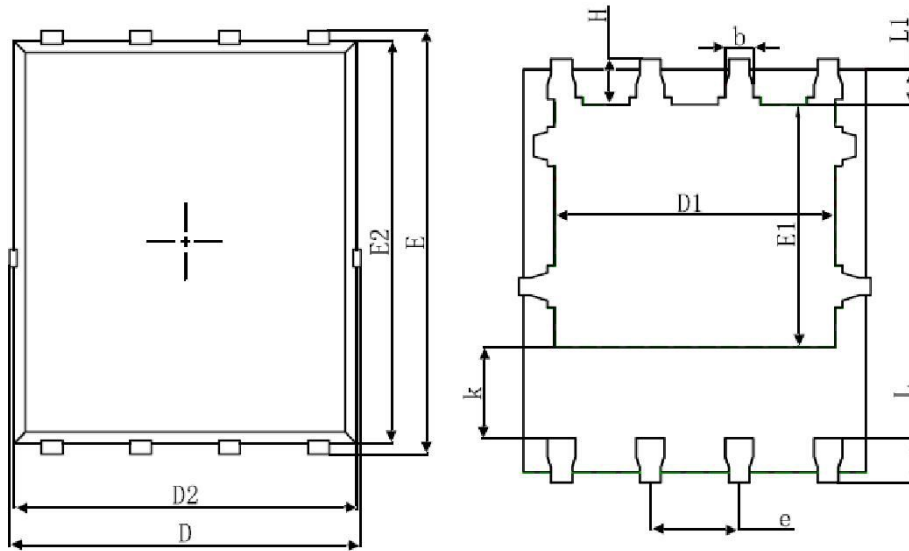
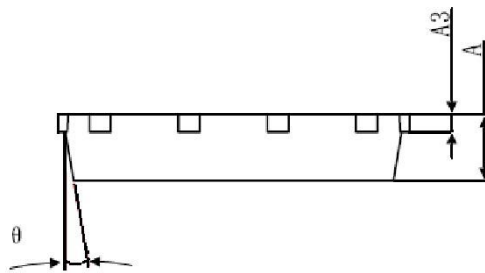


Fig.8 EAS Waveform

DFN5X6-8L Package Information

Top View
Bottom View

Side View

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
θ	8°	12°	8°	12°