

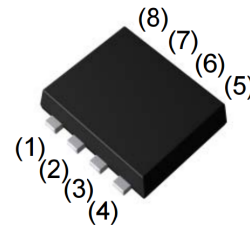
## Features

- 30V/40A,
  - $R_{DS(ON)} = 10.8m\Omega$  (max.) @  $V_{GS}=10V$
  - $R_{DS(ON)} = 12m\Omega$  (max.) @  $V_{GS}=4.5V$
  - $R_{DS(ON)} = 16m\Omega$  (max.) @  $V_{GS}=2.5V$
- 100% UIS+Rg tested
- Reliable and Rugged
- Lead Free and Green Devices Available (RoHS Compliant)

## Applications

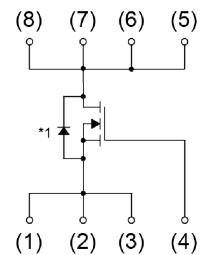
- Power Management in Notebook Computer, Portable Equipment and Battery Powered Systems.
- Application for NB Adapter in.

## Pin Description



DFN5x6A-8\_EP

- (1) Source
  - (2) Source
  - (3) Source
  - (4) Gate
  - (5) Drain
  - (6) Drain
  - (7) Drain
  - (8) Drain
- \*1 Body Diode



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

Symbol	Parameter	Rating	Unit	
<b>Common Ratings</b>				
$V_{DSS}$	Drain-Source Voltage	30	V	
$V_{GSS}$	Gate-Source Voltage	$\pm 12$		
$T_J$	Maximum Junction Temperature	150	$^\circ\text{C}$	
$T_{STG}$	Storage Temperature Range	-55 to 150		
$I_S$	Diode Continuous Forward Current	$T_C=25^\circ\text{C}$	A	
$I_D$	Continuous Drain Current	$T_C=25^\circ\text{C}$		40
		$T_C=100^\circ\text{C}$		26
$I_{DM}$	Pulsed Drain Current	$T_C=25^\circ\text{C}$	90	
$P_D$	Maximum Power Dissipation	$T_C=25^\circ\text{C}$	32	W
		$T_C=100^\circ\text{C}$	12.8	
$R_{\theta JC}$	Thermal Resistance-Junction to Case	Steady State	3.9	$^\circ\text{C/W}$
$I_D$	Continuous Drain Current	$T_A=25^\circ\text{C}$	9	A
		$T_A=70^\circ\text{C}$	7	
$I_{DM}$	Pulsed Drain Current	$T_A=25^\circ\text{C}$	36	
$P_D^a$	Maximum Power Dissipation	$T_A=25^\circ\text{C}$	1.5	W
		$T_A=70^\circ\text{C}$	1	
$R_{\theta JA}^{b,c}$	Thermal Resistance-Junction to Ambient	$t \leq 10s$	34	$^\circ\text{C/W}$
		Steady State	84	
$I_{AS}^d$	Avalanche Current, Single pulse	$L=0.1mH$	20	A
$E_{AS}^d$	Avalanche Energy, Single pulse	$L=0.1mH$	20	mJ

Note a :  $R_{\theta JA}$  steady state  $t=999s$ .

Note b :  $t \leq 10s$  and surface mounted on FR-4 board using  $1in^2$  pad, 2 oz Cu.

Note c : Steady time = 999s and surface mounted on FR-4 board using  $1in^2$  pad, 2 oz Cu.

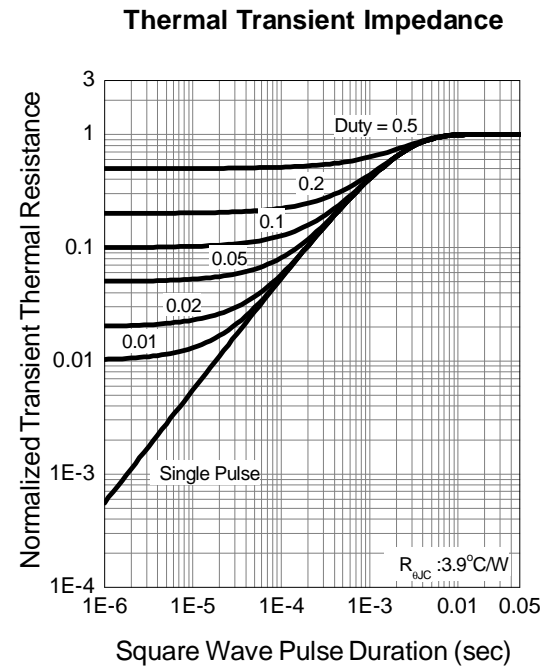
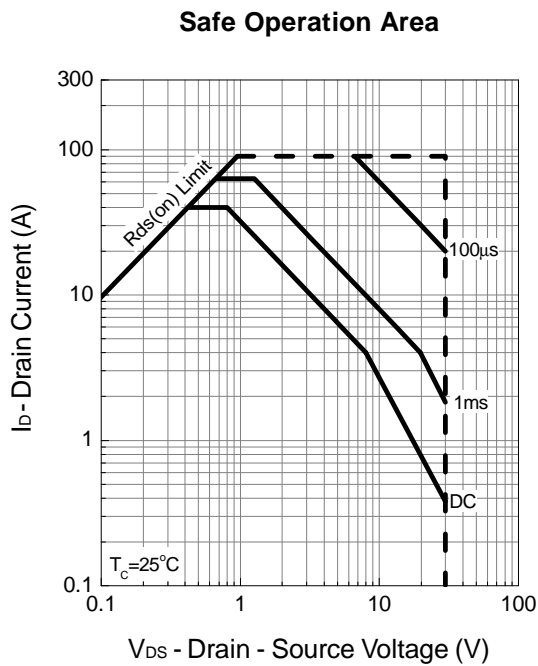
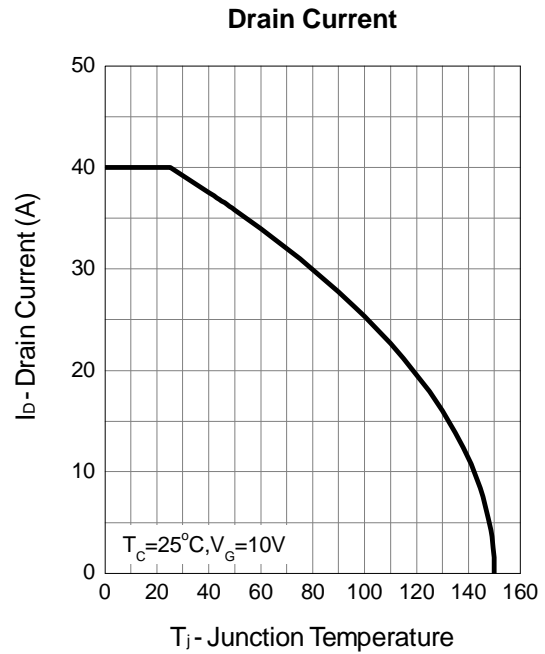
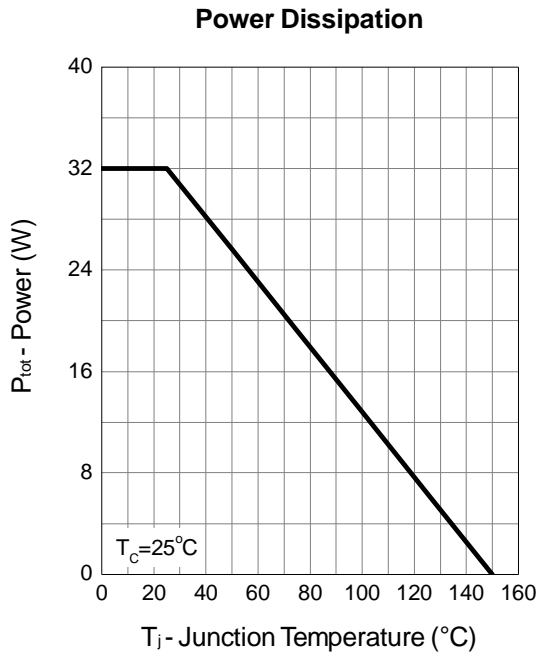
Note d : UIS tested and pulse width limited by maximum junction temperature  $150^\circ\text{C}$  (initial temperature  $T_J=25^\circ\text{C}$ ).

**Electrical Characteristics** ( $T_A = 25^\circ\text{C}$  unless otherwise noted)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
<b>Static Characteristics</b>						
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_{DS}=250\mu A$	30	-	-	V
$BV_{DSS(t)}$	Drain-Source Breakdown Voltage (transient)	$V_{GS}=0V, I_{D(av)}=20A$ $T_{case}=25^\circ\text{C}, t_{transient}=100ns$	34	-	-	V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS}=24V, V_{GS}=0V$	-	-	1	$\mu A$
		$T_J=85^\circ\text{C}$	-	-	30	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_{DS}=250\mu A$	0.5	0.85	1.3	V
$I_{GSS}$	Gate Leakage Current	$V_{GS}=\pm 12V, V_{DS}=0V$	-	-	$\pm 100$	nA
$R_{DS(ON)}^e$	Drain-Source On-state Resistance	$V_{GS}=10V, I_{DS}=10A$	-	9	10.8	m $\Omega$
		$V_{GS}=4.5V, I_{DS}=7A$	-	9.6	12	
		$V_{GS}=2.5V, I_{DS}=5A$	-	12	16	
Gfs	Forward Transconductance	$V_{DS}=25V, I_{DS}=20A$	-	45	-	S
<b>Diode Characteristics</b>						
$V_{SD}^e$	Diode Forward Voltage	$I_{SD}=3A, V_{GS}=0V$	-	0.75	1.3	V
$t_{rr}$	Reverse Recovery Time	$I_{SD}=10A, di_{SD}/dt=100A/\mu s$	-	12.2	-	ns
$t_a$	Charge Time		-	7.5	-	
$t_b$	Discharge Time		-	4.6	-	
$Q_{rr}$	Reverse Recovery Charge		-	5.6	-	
<b>Dynamic Characteristics</b>						
$R_G$	Gate Resistance	$V_{GS}=0V, V_{DS}=0V, F=1MHz$	-	2.4	4.3	$\Omega$
$C_{iss}$	Input Capacitance	$V_{GS}=0V,$ $V_{DS}=15V,$ Frequency=1.0MHz	-	1150	1500	pF
$C_{oss}$	Output Capacitance		-	120	-	
$C_{rss}$	Reverse Transfer Capacitance		-	85	-	
$t_{d(ON)}$	Turn-on Delay Time	$V_{DD}=15V, R_L=15\Omega,$ $I_{DS}=1A, V_{GEN}=10V,$ $R_G=6\Omega$	-	9.6	18	ns
$t_r$	Turn-on Rise Time		-	10	18	
$t_{d(OFF)}$	Turn-off Delay Time		-	29	53	
$t_f$	Turn-off Fall Time		-	4.5	8	
<b>Gate Charge Characteristics</b>						
$Q_g$	Total Gate Charge	$V_{DS}=15V, V_{GS}=10V,$ $I_{DS}=10A$	-	25.5	36	nC
$Q_g$	Total Gate Charge	$V_{DS}=15V, V_{GS}=4.5V,$ $I_{DS}=10A$	-	11	12	
$Q_{gth}$	Threshold Gate Charge		-	0.85	-	
$Q_{gs}$	Gate-Source Charge		-	2.4	-	
$Q_{gd}$	Gate-Drain Charge		-	3.4	-	

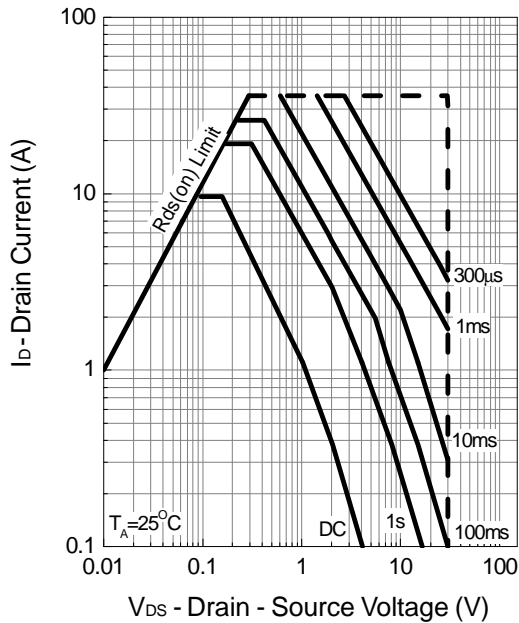
 Note e : Pulse test ; pulse width $\leq 300\mu s$ , duty cycle $\leq 2\%$ .

## Typical Operating Characteristics

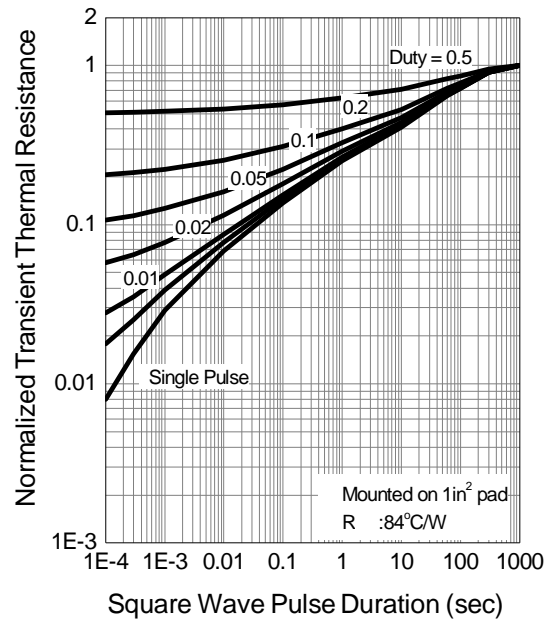


Typical Operating Characteristics (Cont.)

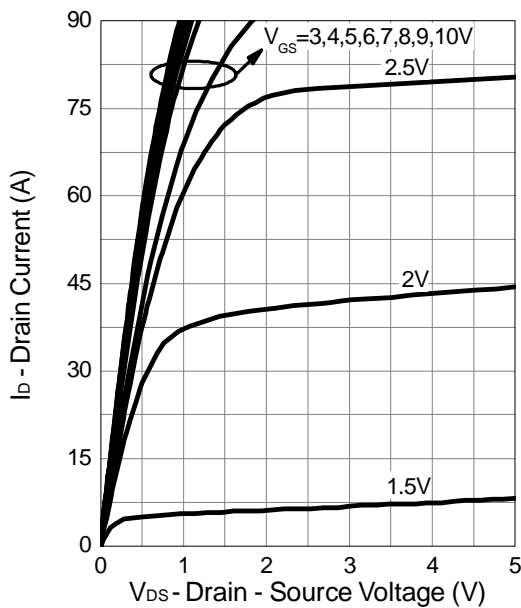
Safe Operation Area



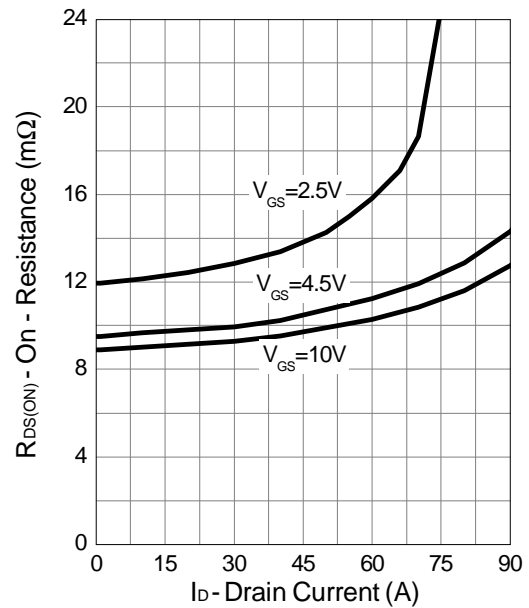
Thermal Transient Impedance



Output Characteristics

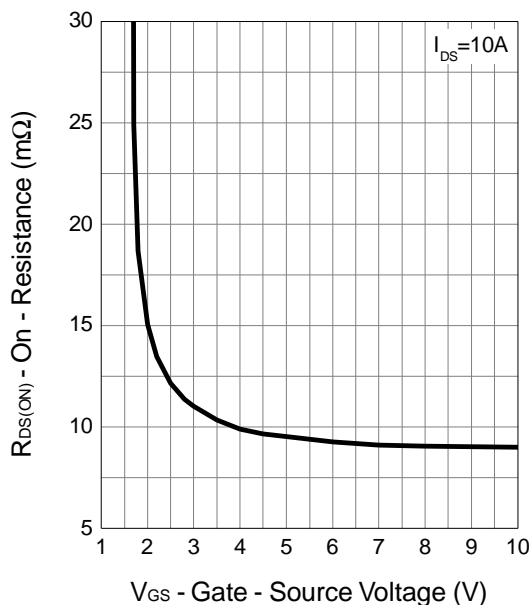


Drain-Source On Resistance

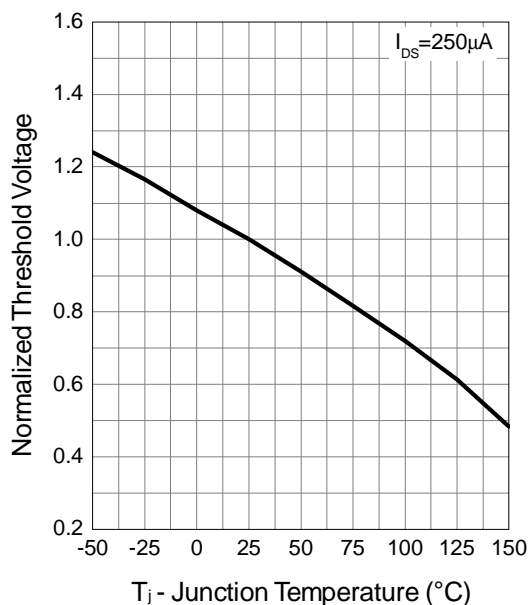


**Typical Operating Characteristics (Cont.)**

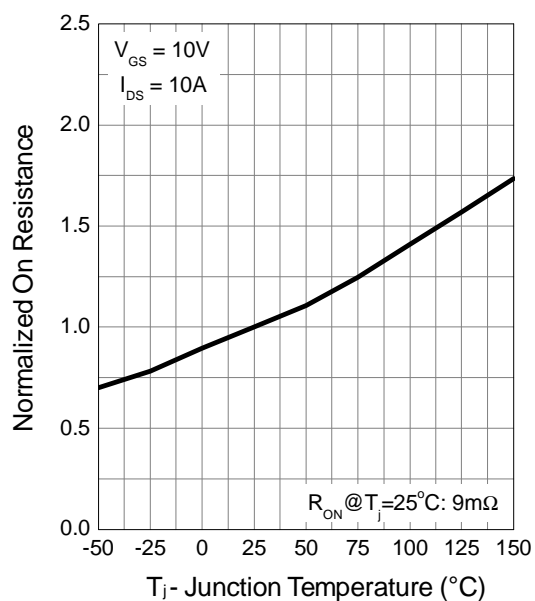
**Gate-Source On Resistance**



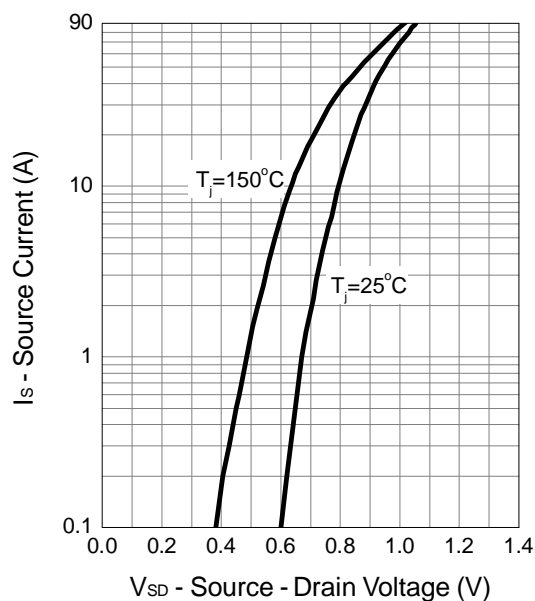
**Gate Threshold Voltage**



**Drain-Source On Resistance**

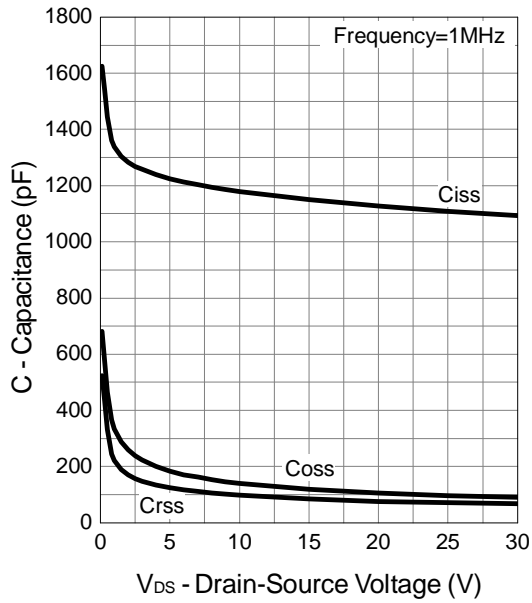


**Source-Drain Diode Forward**

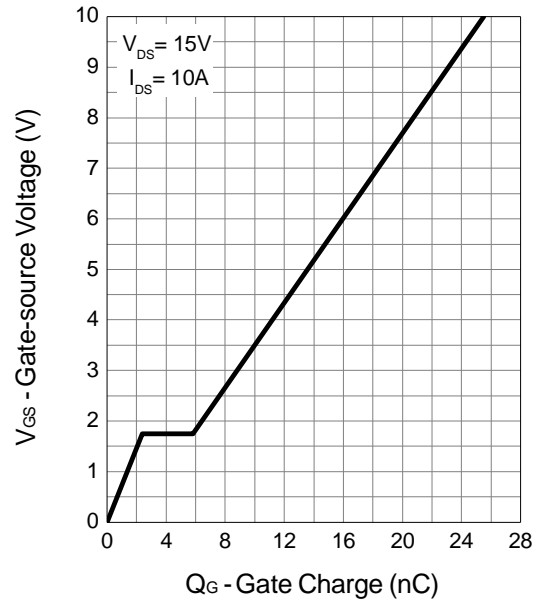


**Typical Operating Characteristics (Cont.)**

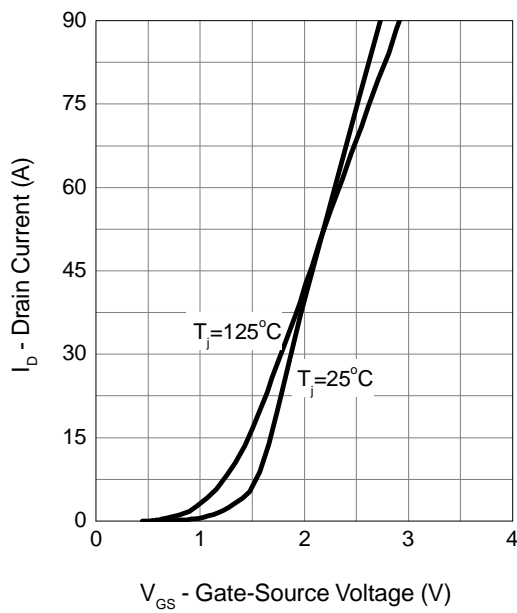
**Capacitance**



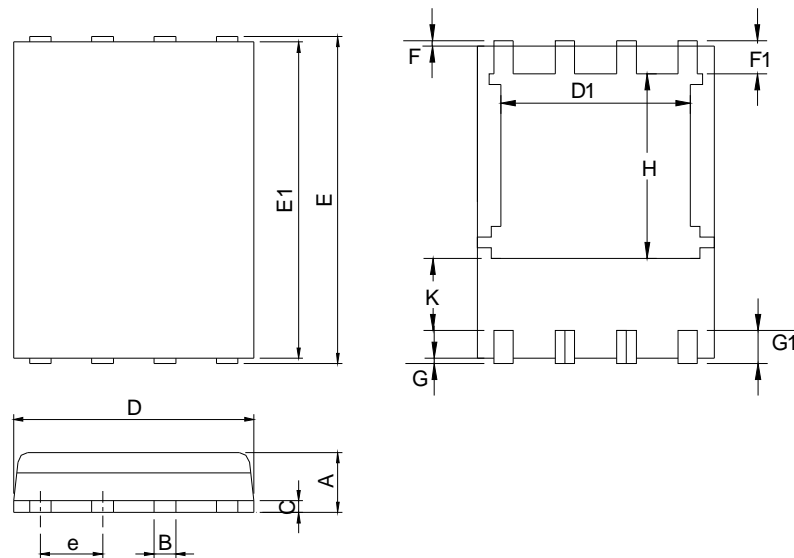
**Gate Charge**



**Transfer Characteristics**

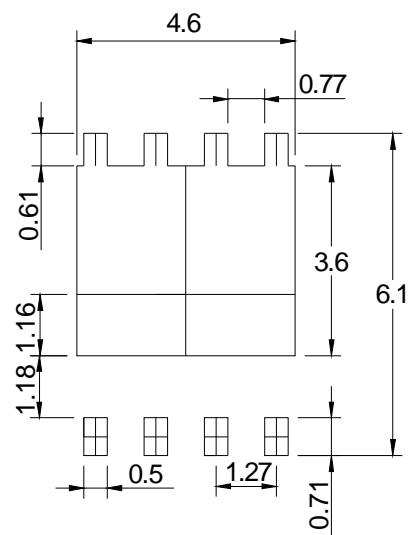


### Package Information



SYMBOL	DFN5x6A-8_EP			
	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	0.90	1.20	0.035	0.047
B	0.3	0.51	0.012	0.020
C	0.19	0.25	0.007	0.010
D	4.80	5.30	0.189	0.209
D1	4.00	4.40	0.157	0.173
E	5.90	6.20	0.232	0.244
E1	5.50	5.80	0.217	0.228
e	1.27 BSC		0.050 BSC	
F	0.05	0.30	0.002	0.012
F1	0.35	0.75	0.014	0.030
G	0.05	0.30	0.002	0.012
G1	0.35	0.75	0.014	0.030
H	3.34	3.9	0.131	0.154
K	0.762	-	0.03	-

### RECOMMENDED LAND PATTERN



UNIT: mm

Note : 1.Dimension D, D1,D2 and E1 do not include mold flash or protrusions.  
Mold flash or protrusions shall not exceed 10 mil.

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