

## 30V Single N-Channel Enhancement-Mode MOSFET

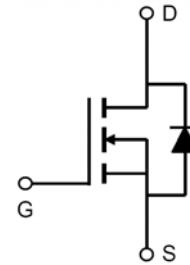
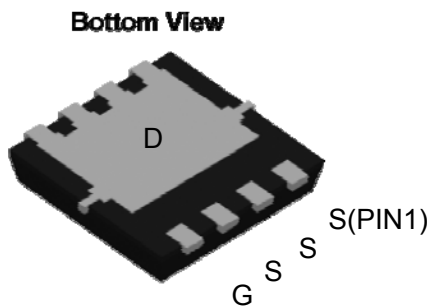
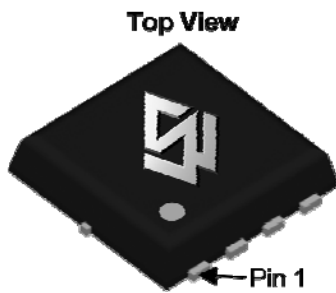
### General Description

- Low resistance.
- Use as a load switch.
- Use in PWM applications

### Product Summary

- $BV_{DSS}$  30V
- $R_{DS(on)}$  @VGS = 10V < 10.5mΩ
- $R_{DS(on)}$  @VGS = 4.5V < 15mΩ

DFN3X3EP-8L



### Absolute Maximum Ratings ( $T_A = 25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Maximum	Units
Drain-Source Voltage	$V_{DS}$	30	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Drain Current ( $T_A=25^\circ\text{C}$ )	$I_D$	12	A
Drain Current ( $T_A=75^\circ\text{C}$ )		9.5	A
Pulsed Drain Current <sup>a</sup>	$I_{DM}$	40	A
Avalanche Energy (L= 0.1 mH)	$E_{AS}$	28	mJ
Power Dissipation <sup>b</sup> ( $T_A=25^\circ\text{C}$ )	$P_D$	2.2	W
Power Dissipation <sup>b</sup> ( $T_A=75^\circ\text{C}$ )		1.3	W
Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 ~ +150	$^\circ\text{C}$

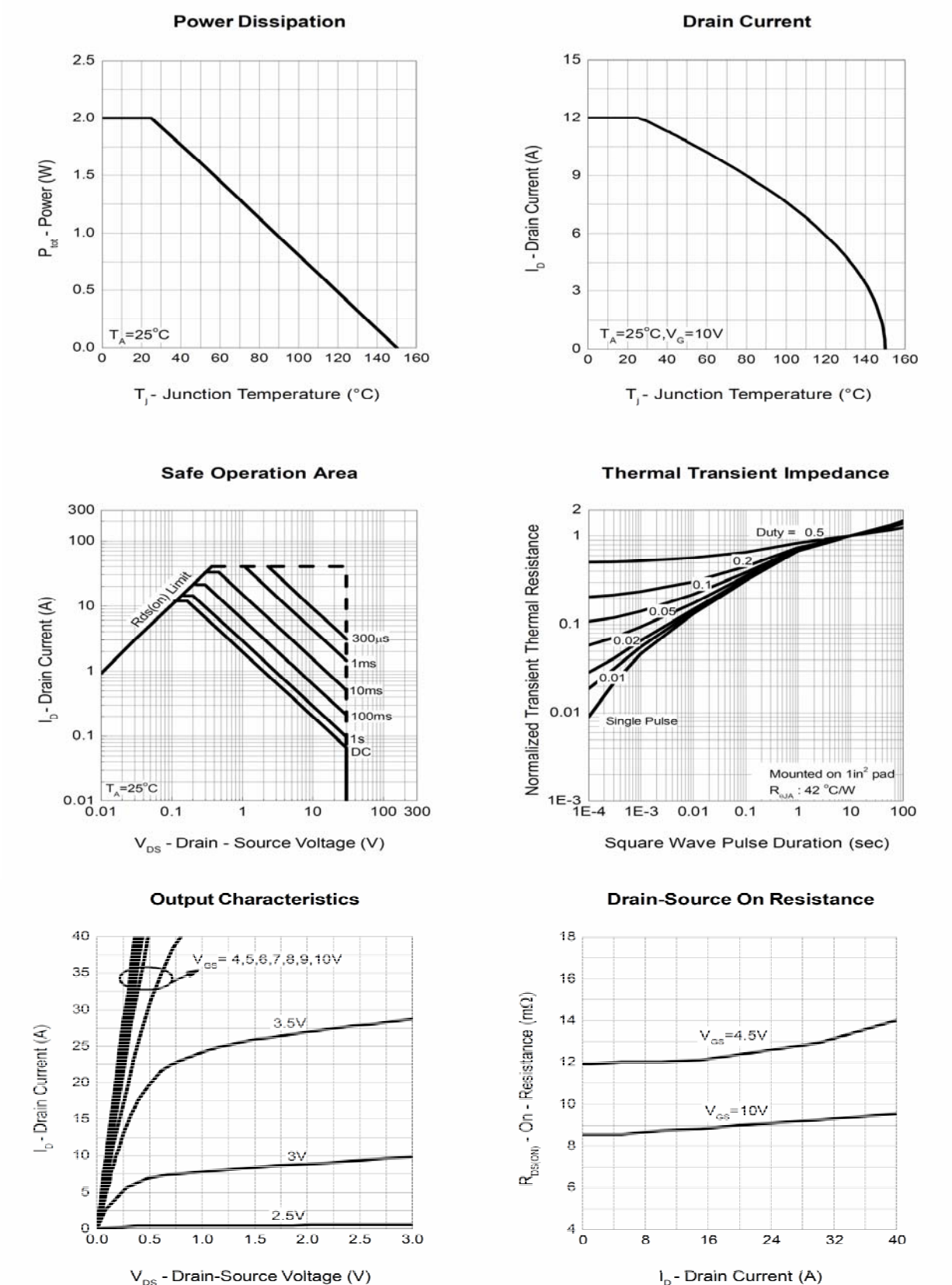
### Thermal Characteristics

Parameter	Symbol	Maximum	Units
Junction-to-Ambient <sup>a</sup> ( $t \leq 10\text{s}$ )	$R_{\theta JA}$	42	$^\circ\text{C/W}$
Junction-to-Ambient <sup>a,d</sup> (Steady-State)		62	$^\circ\text{C/W}$
Junction-to-Lead (Steady-State)	$R_{\theta JL}$	5.5	$^\circ\text{C/W}$

Electrical Characteristics ( $T_A = 25^\circ\text{C}$ unless otherwise noted)						
Symbol	Parameter	Conditions	Min	Typ	Max	Units
<b>Off Characteristics</b>						
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = 250\mu\text{A}$	30			V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS} = 30V, V_{GS} = 0V$			1	$\mu\text{A}$
$I_{GSS}$	Gate-Body Leakage Current	$V_{GS} = \pm 20V, V_{DS} = 0V$			$\pm 100$	nA
<b>On Characteristics</b>						
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$	1.0	1.8	2.5	V
$R_{DS(ON)}$	Drain-Source On-State Resistance	$V_{GS} = 10V, I_D = 12A$		7.0	10.5	$\text{m}\Omega$
		$V_{GS} = 4.5V, I_D = 9A$		9	15	$\text{m}\Omega$
$g_{FS}$	Forward Transconductance	$V_{DS} = 5.0V, I_D = 12A$		40		S
<b>Drain-Source Diode Characteristics</b>						
$V_{SD}$	Diode Forward Voltage	$V_{GS} = 0V, I_S = 1.0A$			1.1	V
$I_S$	Maximum Body-Diode Continuous Current				40	A
<b>Dynamic Characteristics</b>						
$C_{iss}$	Input Capacitance	$V_{DS} = 15V, V_{GS} = 0V$ $f = 1.0\text{MHz}$		745		$\text{pF}$
$C_{oss}$	Output Capacitance			192		$\text{pF}$
$C_{rss}$	Reverse Transfer Capacitance			76		$\text{pF}$
<b>Switching Characteristics</b>						
$Q_g$	Total Gate Charge	$V_{DS} = 15V, I_D = 12A$ $V_{GS} = 10V$		15		nC
$Q_{gs}$	Gate-Source Charge			1.3		nC
$Q_{gd}$	Gate-Drain Charge			2.6		nC
$t_{D(ON)}$	Turn-On Delay Time	$V_{DD} = 15V, I_D = 1A$ $V_{GS} = 10V$ $R_{GEN} = 6\text{ohm}$		9.5		ns
$t_r$	Turn-On Rise Time			12.5		ns
$t_{D(OFF)}$	Turn-Off Delay Time			24		ns
$t_f$	Turn-Off Fall Time			6		ns

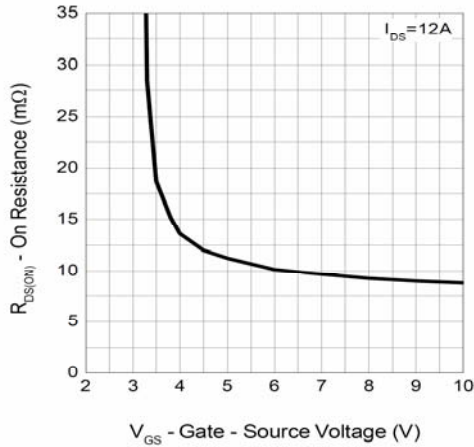
- Repetitive rating, Pulse width limited by junction temperature  $T_{J(MAX)}=150^\circ\text{C}$ . Ratings are based on low frequency and duty cycles to keep initial  $T_J=25^\circ\text{C}$
- The power dissipation  $P_D$  is based on  $T_{J(MAX)}=150^\circ\text{C}$ , using  $\leq 10\text{s}$  junction-to-ambient thermal resistance.
- The value of  $R_{\theta JA}$  is measured with the device mounted on  $1\text{in}^2$  FR-4 board with 2oz. Copper, in a still air environment with  $T_A = 25^\circ\text{C}$ . The value in any given application depends on the user's specific board design.
- The  $R_{\theta JA}$  is the sum of the thermal impedance from junction to lead  $R_{\theta JL}$  and lead to ambient.

## Typical Characteristics

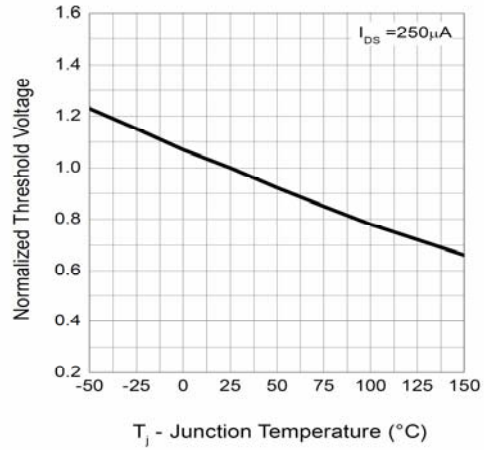


## Typical Characteristics

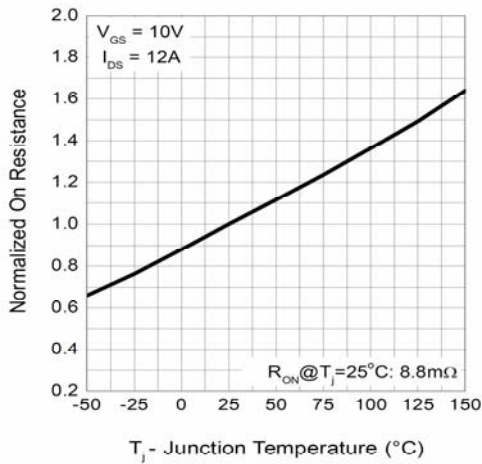
**Gate-Source On Resistance**



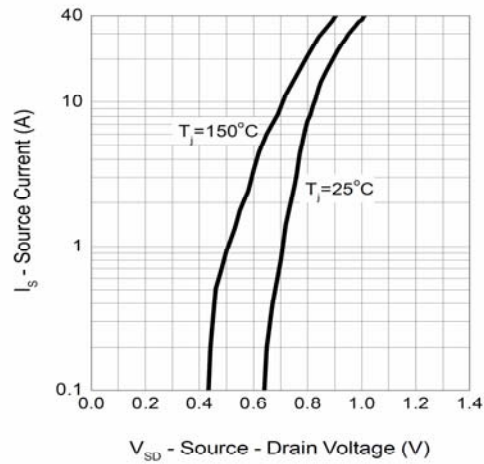
**Gate Threshold Voltage**



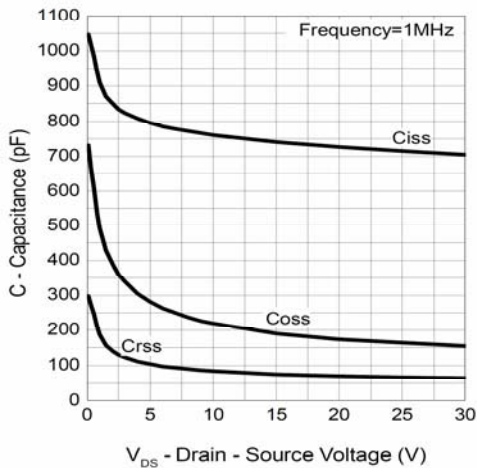
**Drain-Source On Resistance**



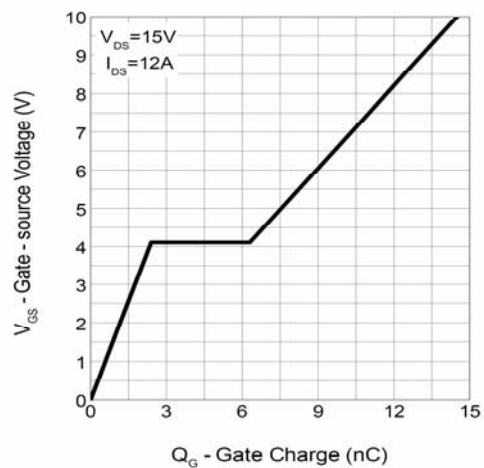
**Source-Drain Diode Forward**



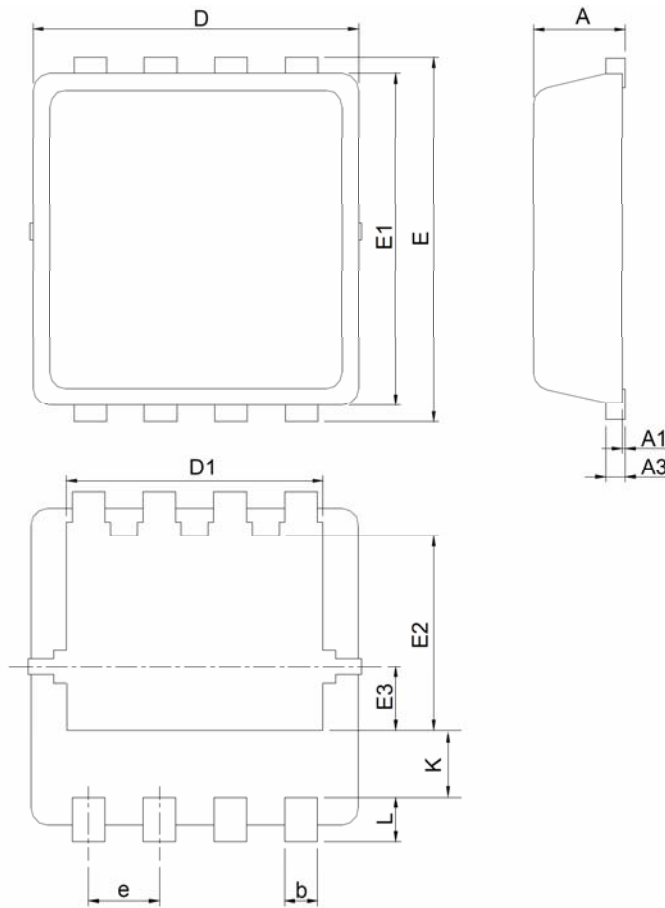
**Capacitance**



**Gate Charge**



## DFN3x3EP-8L Package



SYMBOL	DFN3x3-8			
	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	0.80	1.00	0.031	0.039
A1	0.00	0.05	0.000	0.002
A3	0.10	0.25	0.004	0.010
b	0.24	0.35	0.009	0.014
D	2.90	3.10	0.114	0.122
D1	2.25	2.45	0.089	0.096
E	3.10	3.30	0.122	0.130
E1	2.90	3.10	0.114	0.122
E2	1.65	1.85	0.065	0.073
E3	0.56	0.58	0.022	0.023
e	0.65 BSC		0.026 BSC	
K	0.475	0.775	0.019	0.031
L	0.30	0.50	0.012	0.020

### RECOMMENDED LAND PATTERN

