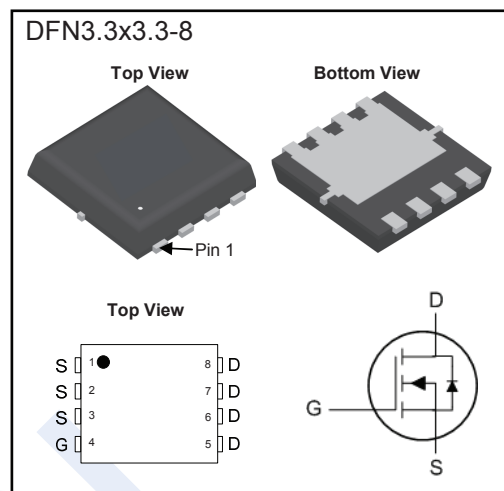


N-Channel MOSFET

KI30N03DFN

■ Features

- $V_{DS} (V) = 30 V$
- $I_{D_{MAX}} = 28 A$
- $R_{DS(ON)}$ (at $V_{GS} = 10 V$) $< 18 m\Omega$

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

Parameter				Symbol	Rating	Unit
Drain-Source Voltage				V _{DS}	30	V
Gate-Source Voltage				V _{GS}	±20	
Continuous Drain Current, V _{GS} @ 10V (Note 1)	T _C =25℃		I _D	28	A	
	T _C =100℃			18		
	T _A =25℃	10s		11.7		
		Steady State		7.4		
	T _A =70℃	10s		9.4		
		Steady State		6		
Pulsed Drain Current (Note 2)				I _{DM}	56	
Avalanche Current				I _{AS}	21	
Single Pulse Avalanche Energy (Note 3)				E _{AS}	72	mJ
Power Dissipation (Note 4)	T _C =25℃		P _D	20.8	W	
	T _A =25℃	10s		4.2		
		Steady State		1.67		
Thermal Resistance.Junction- to-Ambient (Note 1)			Steady State	R _{thJA}	75	℃/W
				t ≤ 10s	30	
Thermal Resistance.Junction- to-Case (Note 1)				R _{thJC}	6	
Junction Temperature				T _J	150	℃
Storage Temperature Range				T _{stg}	-55 to 150	

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■ Electrical Characteristics ($T_J = 25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	BV_{DSS}	$I_D = 250\ \mu\text{A}$, $V_{GS} = 0\text{V}$	30			V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 24\text{V}$, $V_{GS} = 0\text{V}$			1	μA
		$V_{DS} = 24\text{V}$, $V_{GS} = 0\text{V}$, $T_J = 55^\circ\text{C}$			5	
Gate to Source Leakage Current	I_{GSS}	$V_{DS} = 0\text{V}$, $V_{GS} = \pm 20\text{V}$			± 100	nA
Gate to Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = 250\ \mu\text{A}$	1.2		2.5	V
Static Drain-Source On-Resistance (Note 2)	$R_{DS(on)}$	$V_{GS} = 10\text{V}$, $I_D = 15\text{A}$			18	m Ω
		$V_{GS} = 4.5\text{V}$, $I_D = 10\text{A}$			30	
Forward Transconductance	g_{FS}	$V_{DS} = 5\text{V}$, $I_D = 30\text{A}$		19.4		S
Input Capacitance	C_{iss}	$V_{GS} = 0\text{V}$, $V_{DS} = 15\text{V}$, $f = 1\text{MHz}$		572	801	pF
Output Capacitance	C_{oss}			80	112	
Reverse Transfer Capacitance	C_{rss}			65	91	
Gate Resistance	R_g	$V_{GS} = 0\text{V}$, $V_{DS} = 0\text{V}$, $f = 1\text{MHz}$		2.5	5	Ω
Single Pulse Avalanche Energy (Note 5)	E_{AS}	$V_{DD} = 25\text{V}$, $L = 0.1\text{mH}$, $I_{AS} = 10\text{A}$	16			mJ
Total Gate Charge	$Q_g(4.5\text{V})$	$V_{GS} = 4.5\text{V}$, $V_{DS} = 15\text{V}$, $I_D = 15\text{A}$		6.2	8.7	nC
Gate Source Charge	Q_{gs}			2.4	3.4	
Gate Drain Charge	Q_{gd}			2.5	3.5	
Turn-On DelayTime	$t_{d(on)}$	$V_{GS} = 10\text{V}$, $V_{DD} = 15\text{V}$, $R_G = 3.3\ \Omega$, $I_D = 15\text{A}$		3	6	ns
Turn-On Rise Time	t_r			7.6	14	
Turn-Off DelayTime	$t_{d(off)}$			20.8	42	
Turn-Off Fall Time	t_f			4	8	
Body Diode Reverse Recovery Time	t_{rr}	$I_F = 30\text{A}$, $dI/dt = 100\text{A}/\mu\text{s}$		17		nC
Body Diode Reverse Recovery Charge	Q_{rr}			3		
Maximum Body-Diode Continuous Current (Note 1,6)	I_S	$V_G = V_D = 0\text{V}$, Force Current			28	A
Pulsed Source Current (Note 2,6)	I_{SM}				56	
Diode Forward Voltage (Note 2)	V_{SD}	$V_{GS} = 0\text{V}$, $I_S = 1\text{A}$			1.2	V

Notes:

1. The data tested by surface mounted on a 1 inch² FR-4 board with 20Z copper.
2. The data tested by pulsed, pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$
3. The EAS data shows Max. rating. The test condition is $V_{DD} = 25\text{V}$, $V_{GS} = 10\text{V}$, $L = 0.1\text{mH}$, $I_{AS} = 21\text{A}$
4. The power dissipation is limited by 150°C junction temperature
5. The Min. value is 100% EAS tested guarantee.
6. The data is theoretically the same as I_D and I_{DM} , in real applications, should be limited by total power dissipation.

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■ Typical Characteristics

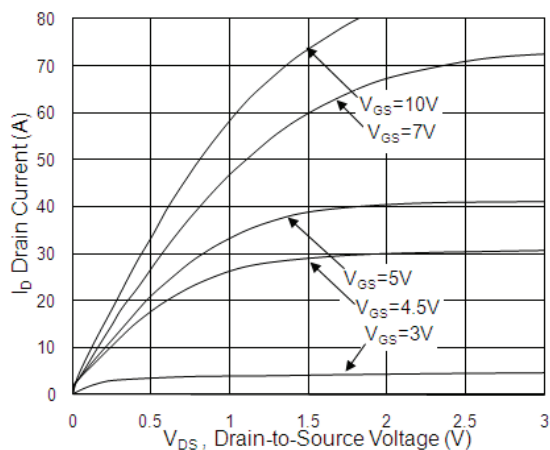


Fig.1 Typical Output Characteristics

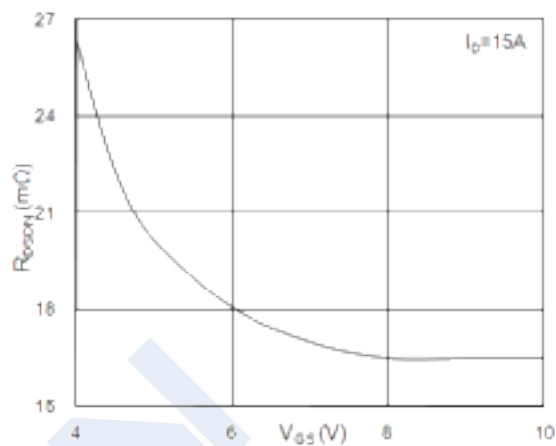


Fig.2 On-Resistance vs. Gate-Source

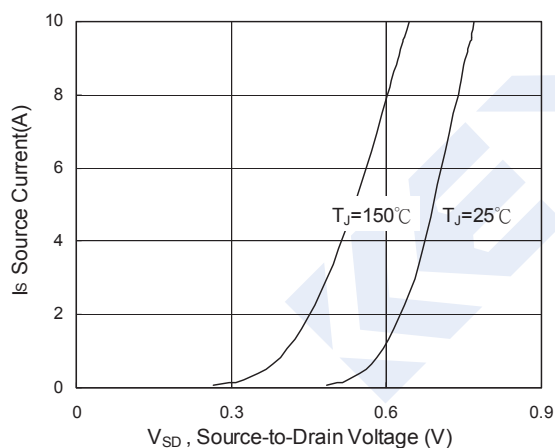


Fig.3 Forward Characteristics Of Reverse

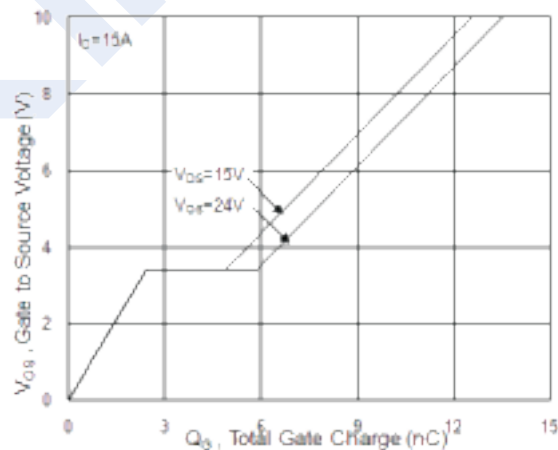
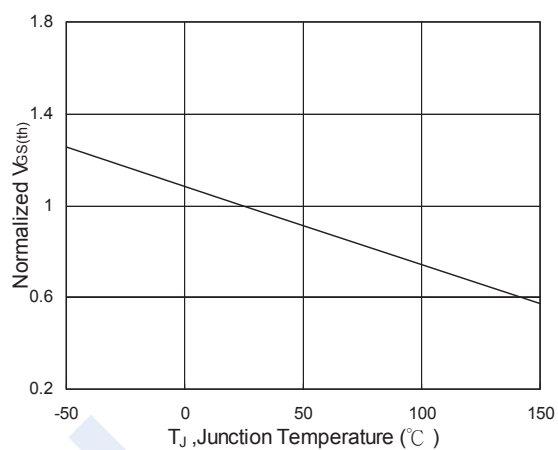
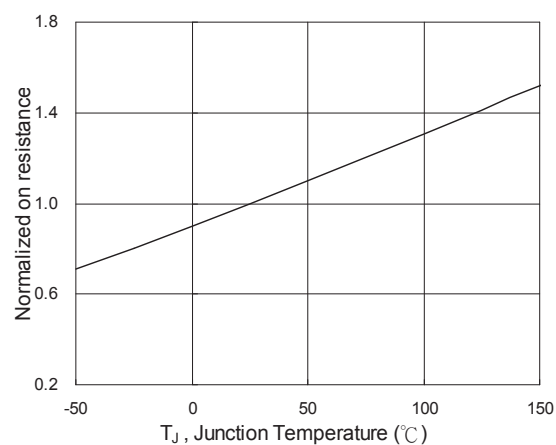


Fig.4 Gate-Charge Characteristics

Fig.5 Normalized $V_{GS(th)}$ vs. T_J Fig.6 Normalized $R_{DS(on)}$ vs. T_J

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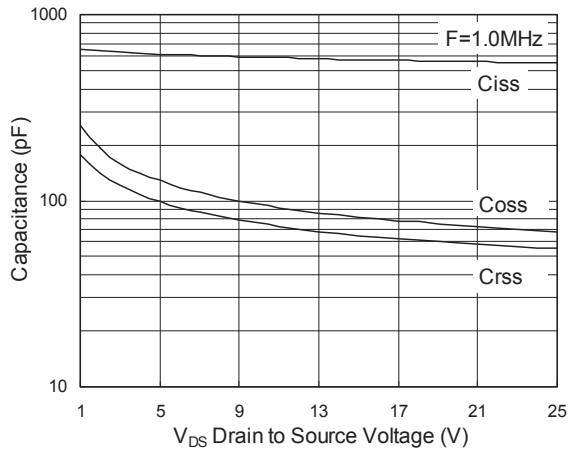


Fig.7 Capacitance

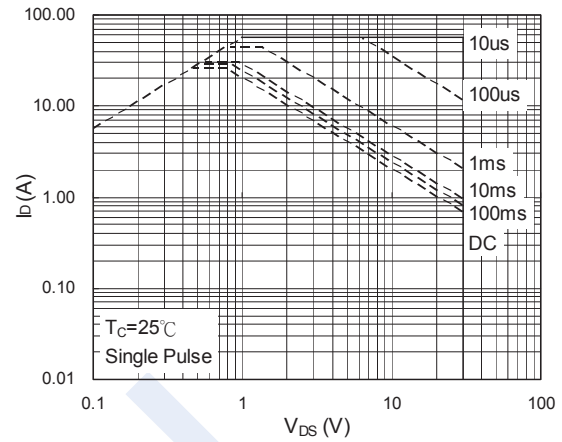


Fig.8 Safe Operating Area

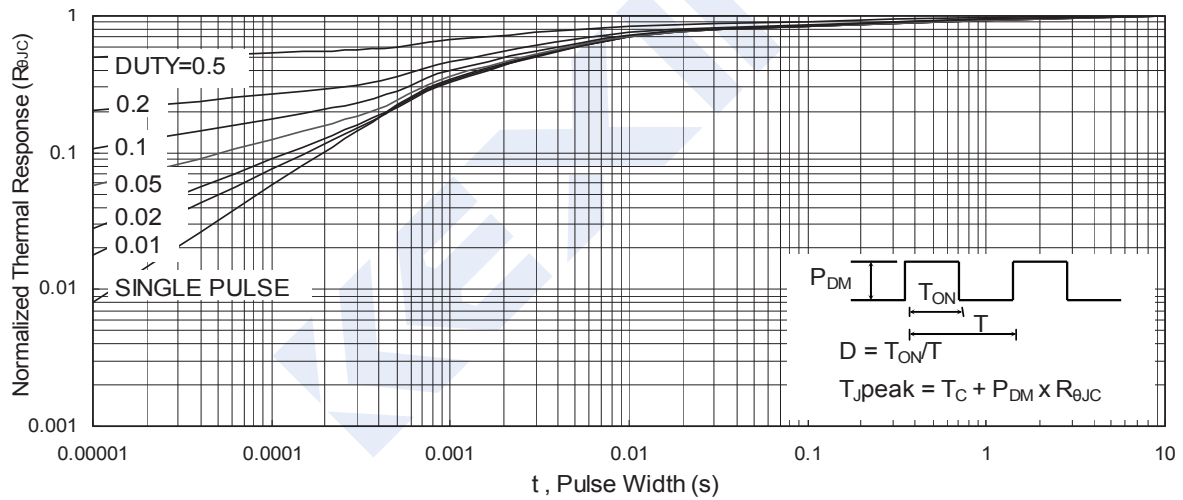


Fig.9 Normalized Maximum Transient Thermal Impedance

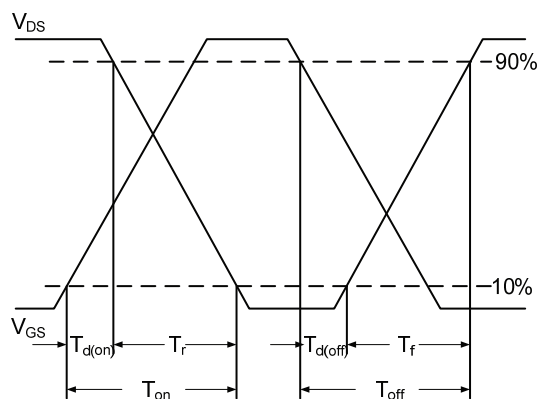


Fig.10 Switching Time Waveform

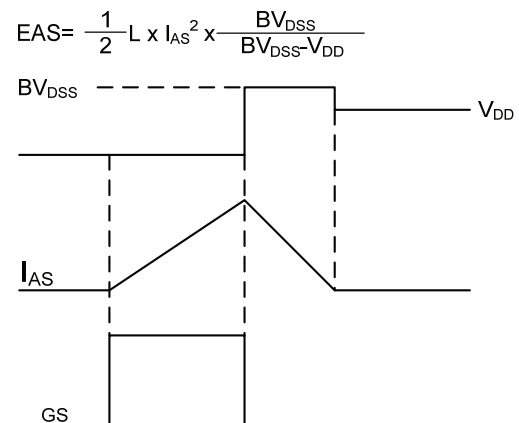
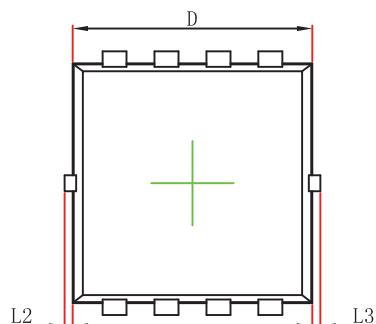


Fig.11 Unclamped Inductive Switching Waveform

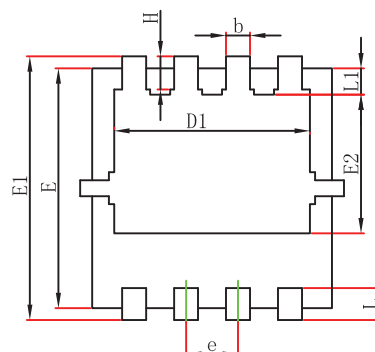
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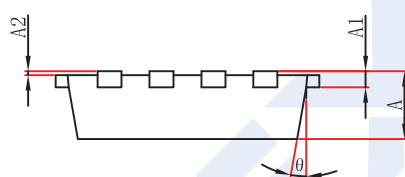
■ DFN3.3x3.3-8 Package Outline Dimensions



Top View



Bottom View



Side View

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.650	0.850	0.026	0.033
A1	0.152 REF.		0.006 REF.	
A2	0~0.05		0~0.002	
D	2.900	3.100	0.114	0.122
D1	2.300	2.600	0.091	0.102
E	2.900	3.100	0.114	0.122
E1	3.150	3.450	0.124	0.136
E2	1.535	1.935	0.060	0.076
b	0.200	0.400	0.008	0.016
e	0.550	0.750	0.022	0.030
L	0.300	0.500	0.012	0.020
L1	0.180	0.480	0.007	0.019
L2	0~0.100		0~0.004	
L3	0~0.100		0~0.004	
H	0.315	0.515	0.012	0.020
θ	9°	13°	9°	13°