

RU3030M2-VB Datasheet

N-Channel 30-V (D-S) MOSFET

V_{DS}		30	V
$R_{DS(on),typ}$	$V_{GS}=10V$	13	$m\Omega$
$R_{DS(on),typ}$	$V_{GS}=4.5V$	19	$m\Omega$
I_D		30	A

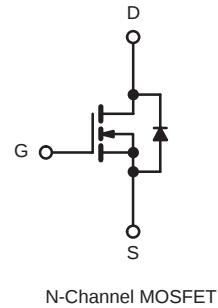
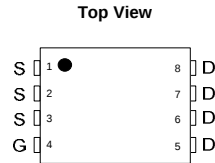
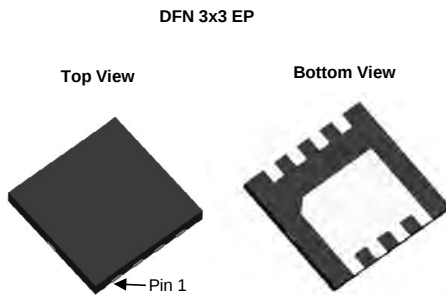
FEATURES

- Halogen-free
- Trench Power MOSFET
- 100 % R_g and UIS Tested



APPLICATIONS

- DC/DC Conversion
- Low-Side Switch
- Notebook PC
- Gaming



ABSOLUTE MAXIMUM RATINGS $T_A = 25\text{ }^{\circ}\text{C}$, unless otherwise noted				
Parameter		Symbol	Limit	Unit
Drain-Source Voltage		V_{DS}	30	V
Gate-Source Voltage		V_{GS}	± 20	V
Continuous Drain Current ($T_J = 150\text{ }^{\circ}\text{C}$)	$T_C = 25\text{ }^{\circ}\text{C}$	I_D	30	A
	$T_C = 70\text{ }^{\circ}\text{C}$		20	
	$T_A = 25\text{ }^{\circ}\text{C}$		21.5 ^{b, c}	
	$T_A = 70\text{ }^{\circ}\text{C}$		17.1 ^{b, c}	
Pulsed Drain Current		I_{DM}	100	
Continuous Source-Drain Diode Current	$T_C = 25\text{ }^{\circ}\text{C}$	I_S	13	A
	$T_A = 25\text{ }^{\circ}\text{C}$		3.1 ^{b, c}	
Single Pulse Avalanche Current	$L = 0.1\text{ mH}$	I_{AS}	10	
Avalanche Energy		E_{AS}	5	mJ
Maximum Power Dissipation	$T_C = 25\text{ }^{\circ}\text{C}$	P_D	60	W
	$T_C = 70\text{ }^{\circ}\text{C}$		30	
	$T_A = 25\text{ }^{\circ}\text{C}$		3.7 ^{b, c}	
	$T_A = 70\text{ }^{\circ}\text{C}$		2.4 ^{b, c}	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	- 55 to 150	$^{\circ}\text{C}$

THERMAL RESISTANCE RATINGS					
Parameter		Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient ^{b, d}	$t \leq 10\text{ s}$	R_{thJA}	27	34	$^{\circ}\text{C/W}$
Maximum Junction-to-Foot (Drain)	Steady State	R_{thJF}	6	7.5	

Notes:

- Based on $T_C = 25\text{ }^{\circ}\text{C}$.
- Surface Mounted on 1" x 1" FR4 board.
- $t = 10\text{ s}$.
- Maximum under Steady State conditions is 85 $^{\circ}\text{C/W}$.

SPECIFICATIONS T _J = 25 °C, unless otherwise noted						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
Drain-Source Breakdown Voltage	V _{DS}	V _{GS} = 0 V, I _D = 1 mA	30			V
V _{DS} Temperature Coefficient	ΔV _{DS} /T _J	I _D = 250 μA		27		mV/°C
V _{GS(th)} Temperature Coefficient	ΔV _{GS(th)} /T _J			- 5.6		
Gate-Source Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	1.0		3.0	V
Gate-Source Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ± 20 V			± 100	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 30 V, V _{GS} = 0 V			1	μA
		V _{DS} = 30 V, V _{GS} = 0 V, T _J = 55 °C			10	
On-State Drain Current ^a	I _{D(on)}	V _{DS} ≥ 5 V, V _{GS} = 10 V	30			A
Drain-Source On-State Resistance ^a	R _{DS(on)}	V _{GS} = 10 V, I _D = 15 A		13		mΩ
		V _{GS} = 4.5 V, I _D = 10 A		19		
Forward Transconductance ^a	g _{fs}	V _{DS} = 15 V, I _D = 15 A		75		S
Dynamic ^b						
Input Capacitance	C _{iss}	V _{DS} = 15 V, V _{GS} = 0 V, f = 1 MHz			900	pF
Output Capacitance	C _{oss}				236	
Reverse Transfer Capacitance	C _{rss}				20	
Total Gate Charge	Q _g	V _{DS} = 15 V, V _{GS} = 10 V, I _D = 10 A			20	nC
		V _{DS} = 15 V, V _{GS} = 4.5 V, I _D = 10 A			9	
Gate-Source Charge	Q _{gs}				2.1	
Gate-Drain Charge	Q _{gd}				0.7	
Gate Resistance	R _g	f = 1 MHz	0.2	1.1	2.2	Ω
Turn-On Delay Time	t _{d(on)}	V _{DD} = 15 V, R _L = 1.5 Ω I _D ≅ 10 A, V _{GEN} = 4.5 V, R _g = 1 Ω		8	16	ns
Rise Time	t _r			16	30	
Turn-Off Delay Time	t _{d(off)}			17	35	
Fall Time	t _f			7	15	
Turn-On Delay Time	t _{d(on)}	V _{DD} = 15 V, R _L = 1.5 Ω I _D ≅ 10 A, V _{GEN} = 10 V, R _g = 1 Ω		14	30	
Rise Time	t _r			50	100	
Turn-Off Delay Time	t _{d(off)}			16	30	
Fall Time	t _f			8	18	
Drain-Source Body Diode Characteristics						
Continuous Source-Drain Diode Current	I _S	T _C = 25 °C			13	A
Pulse Diode Forward Current ^a	I _{SM}				100	
Body Diode Voltage	V _{SD}	I _S = 3 A			1.2	V
Body Diode Reverse Recovery Time	t _{rr}	I _F = 10 A, dI/dt = 100 A/μs, T _J = 25 °C			40	ns
Body Diode Reverse Recovery Charge	Q _{rr}				20	nC
Reverse Recovery Fall Time	t _a			12.5		ns
Reverse Recovery Rise Time	t _b			7.5		

Notes:

a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$

b. Guaranteed by design, not subject to production testing.

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



Output Characteristics



Transfer Characteristics



On-Resistance vs. Drain Current



Capacitance



Gate Charge



On-Resistance vs. Junction Temperature

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



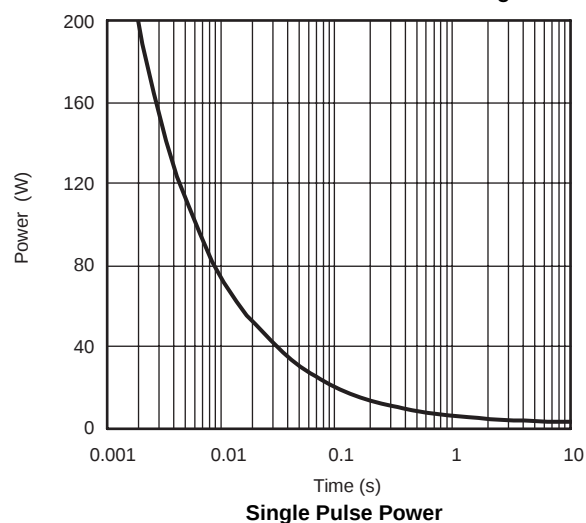
Source-Drain Diode Forward Voltage



On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



Single Pulse Power



Safe Operating Area, Junction-to-Ambient

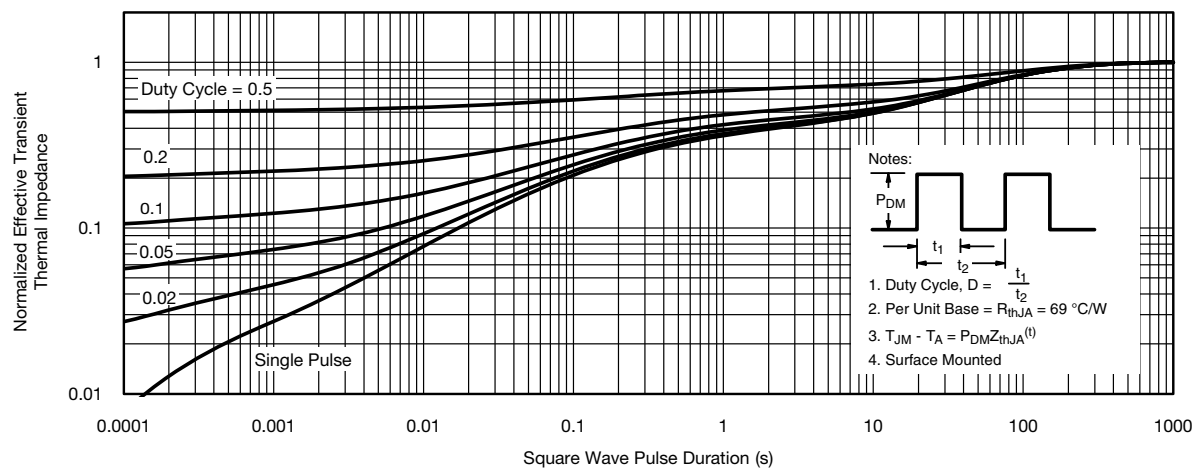
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



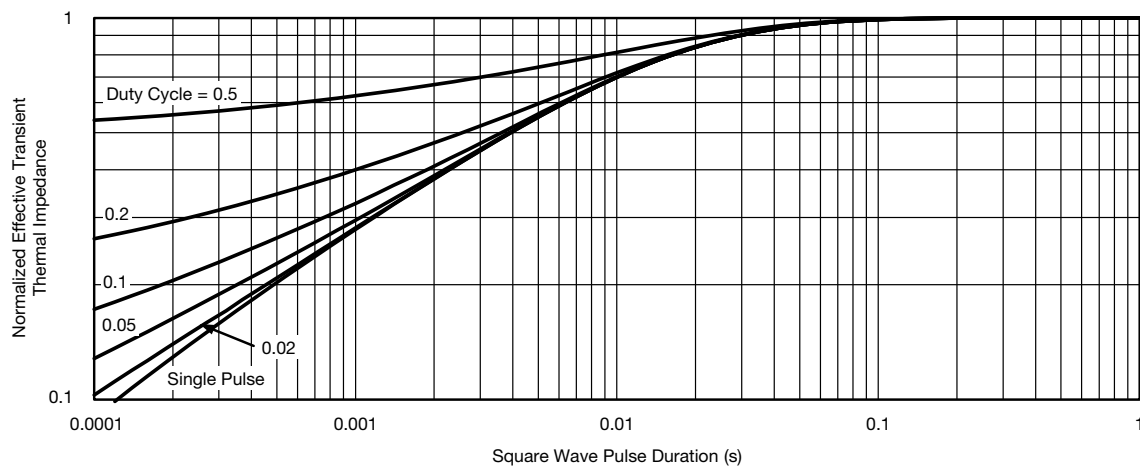
Note

- a. The power dissipation P_D is based on $T_J \text{ max.} = 25\text{ °C}$, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit.

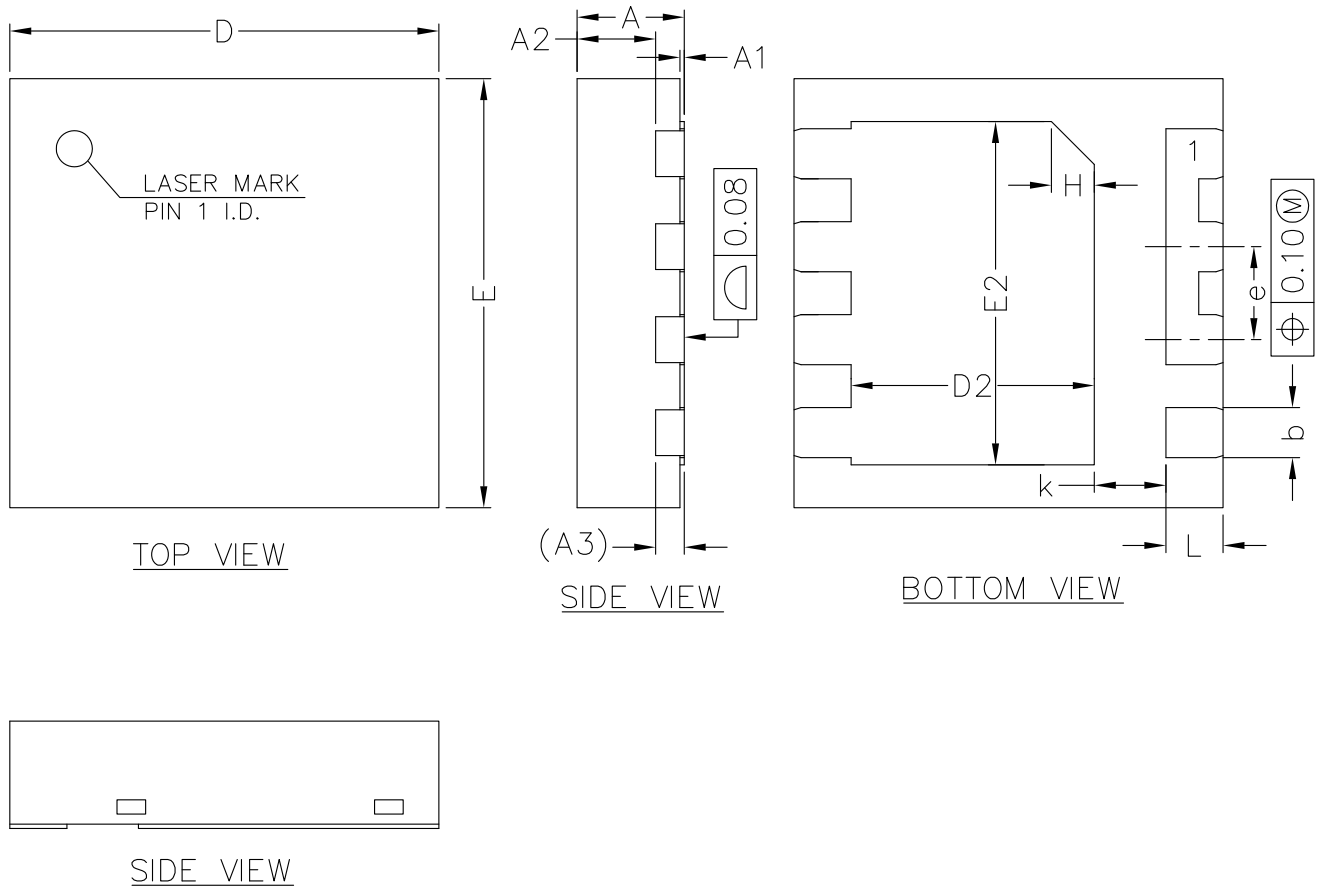
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



Normalized Thermal Transient Impedance, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Case



COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)

SYMBOL	MIN	NOM	MAX
A	0.70	0.75	0.80
A1	0.00	0.02	0.05
A2	0.50	0.55	0.60
A3	0.20REF		
b	0.30	0.35	0.40
D	2.90	3.00	3.10
E	2.90	3.00	3.10
D2	1.60	1.70	1.80
E2	2.30	2.40	2.50
e	0.55	0.65	0.75
K	0.40	0.50	0.60
L	0.35	0.40	0.45

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