Eternal Semiconductor Inc.
EV3415

P-Channel Enhancement-Mode MOSFET (-20V, -4.0A)

PRODUCT SUMMARY

V_{DSS}	I_D	$R_{DS(on)}$ (mΩ) Typ.
-20V	-4.0A	28 @ VGS = -4.5 V,ID=-4A
		33 @ VGS = -2.5V,ID=-4A
		38 @ VGS = -1.5V,ID=-2A

Features

• Super high dense cell trench design for low RDS(on)

• Rugged and reliable

• SOT-23-3L package

• ESD Rating:2000V HBM

• Lead（Pb）-free and halogen-free

EV3415 Pin Assignment & Symbol
3-Lead Plastic SOT-23-3L
Pin 1: Gate Pin 2: Source Pin3: Drain

Absolute Maximum Ratings (T_A=25°C, unless otherwise noted)

Symbol	Parameter	Ratings	Units
V_{DS}	Drain-Source Voltage	-20	V
V_{GS}	Gate-Source Voltage	±8	V
I_D	Drain Current (Continuous)	-4	A
I_{DM}	Drain Current (Pulsed) [a]	-30	A
P_D	Total Power Dissipation @T_A=25°C	1.4	W
I_S	Maximum Diode Forward Current	2	A
T_j, T_{stg}	Operating Junction and Storage Temperature Range	-55 to +150	°C
R_{QJA}	Thermal Resistance Junction to Ambient (PCB mounted) [b]	100	°C/W

a: Repetitive Rating: Pulse width limited by the maximum junction temperature.

b: 1-in^2 2oz Cu PCB board

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Electrical Characteristics (T$_A$=25°C, unless otherwise noted)

Symbol	Characteristic	Test Conditions	Min.	Typ.	Max.	Unit
• **Off Characteristics**						
BV$_{DSS}$	Drain-Source Breakdown Voltage	V$_{GS}$=0V, I$_D$=-250uA	-20	-	-	V
I$_{DSS}$	Zero Gate Voltage Drain Current	V$_{DS}$=-20V, V$_{GS}$=0V	-	-	1	µA
I$_{GSS}$	Gate-Body Leakage Current	V$_{GS}$=±8V, V$_{DS}$=0V	-	-	±10	µA
• **On Characteristics**						
V$_{GS(th)}$	Gate Threshold Voltage	V$_{DS}$=V$_{GS}$, I$_D$=-250uA	-0.45	-0.55	-1	V
R$_{DS(on)}$	Drain-Source On-State Resistance	V$_{GS}$=-4.5V, I$_D$=-4A	-	28	34	mΩ
		V$_{GS}$=-2.5V, I$_D$=-4A	-	33	40	
		V$_{GS}$=-1.8V, I$_D$=-2A	-	38	46	
• **Dynamic Characteristics**						
C$_{iss}$	Input Capacitance		-	950	-	
C$_{oss}$	Output Capacitance	V$_{DS}$=-10V, V$_{GS}$=0V, f=1MHz	-	165	-	PF
C$_{rss}$	Reverse Transfer Capacitance		-	120	-	
• **Switching Characteristics**						
Q$_g$	Total Gate Charge		-	12	-	
Q$_{gs}$	Gate-Source Charge	V$_{DS}$=-10V, I$_D$=-1A, V$_{GS}$=-4.5V	-	10	-	nC
Q$_{gd}$	Gate-Drain Charge		-	19	-	
t$_{d(on)}$	Turn-on Delay Time		-	12	-	
t$_r$	Turn-on Rise Time	V$_{DD}$=-10V, R$_L$=15Ω, I$_D$=1A,	-	10	-	nS
t$_{d(off)}$	Turn-off Delay Time	VGEN=-4.5V, RG=10Ω	-	19	-	
t$_f$	Turn-off Fall Time		-	25	-	
• **Drain-Source Diode Characteristics**						
V$_{SD}$	Drain-Source Diode Forward Voltage	V$_{GS}$=0V, I$_S$=-1A	-	-	-1	V

Note: Pulse Test: Pulse Width≤300us, Duty Cycle≤2%
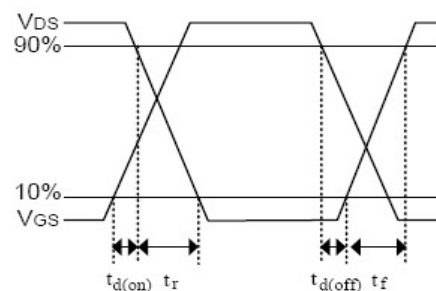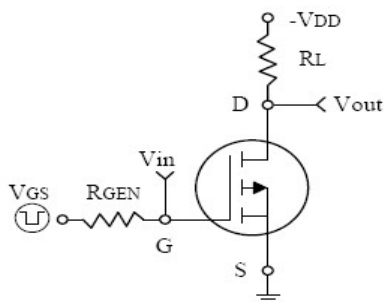
Switching Test Circuit and Swithcing Waveforms

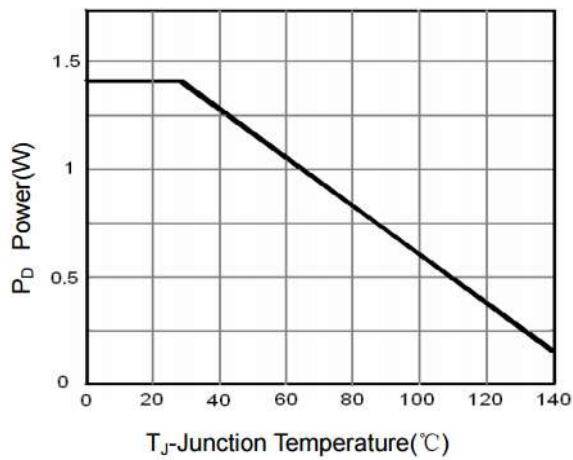## Typical Characteristics Curves (Ta=25°C, unless otherwise note)

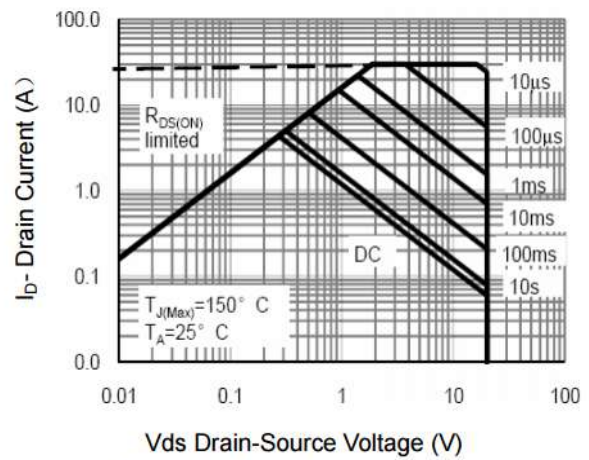**Figure 1 Power Dissipation**

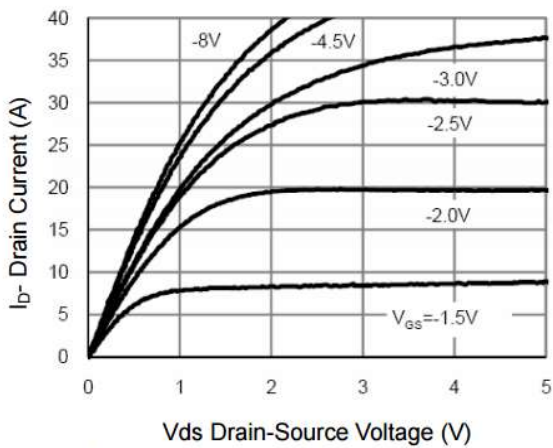**Figure 2 Safe Operation Area**
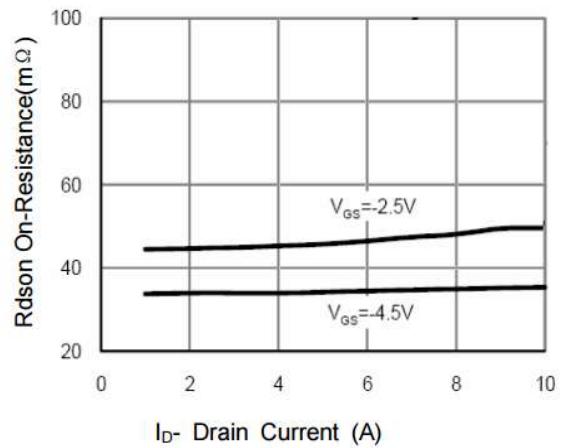

Figure 3 Output Characteristics

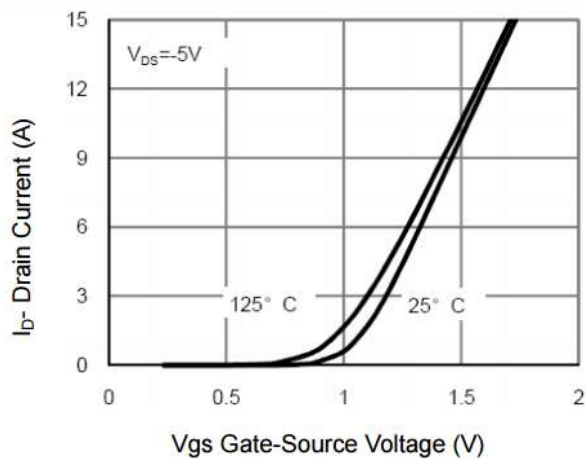**Figure 4 Drain-Source On-Resistance**
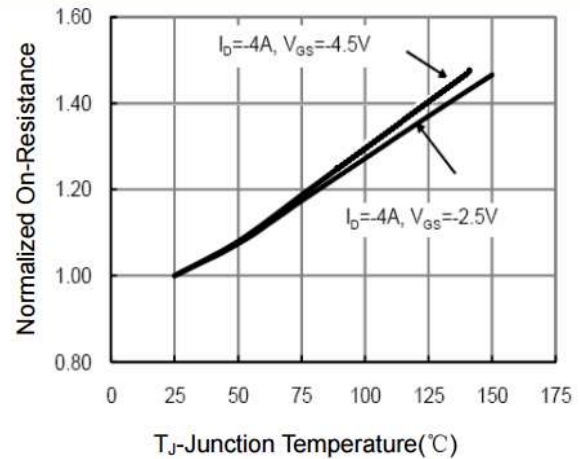

Figure 5 Transfer Characteristics

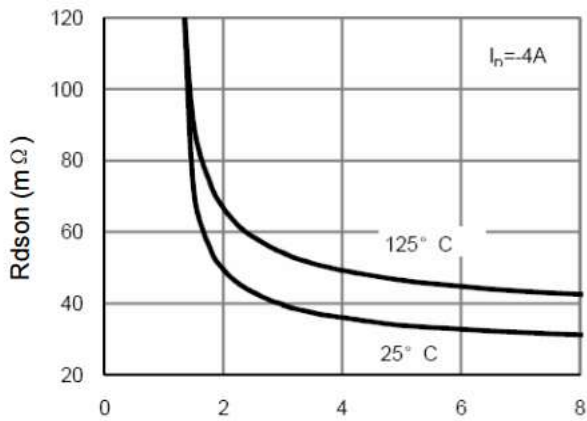

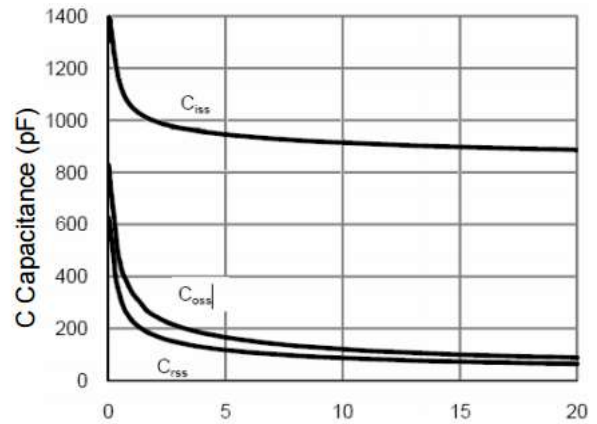**Figure 6 Drain-Source On-Resistance**
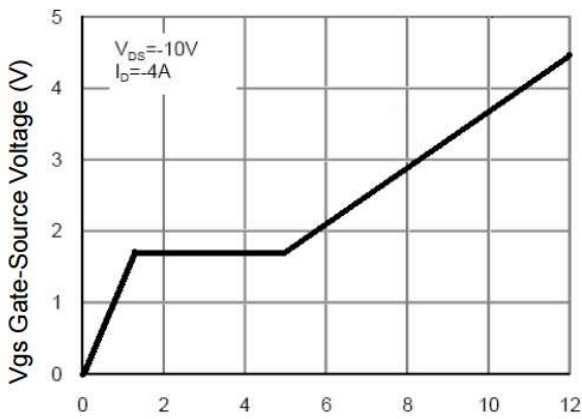
Figure 7 Rdson vs Vgs

Figure 8 Capacitance vs Vds
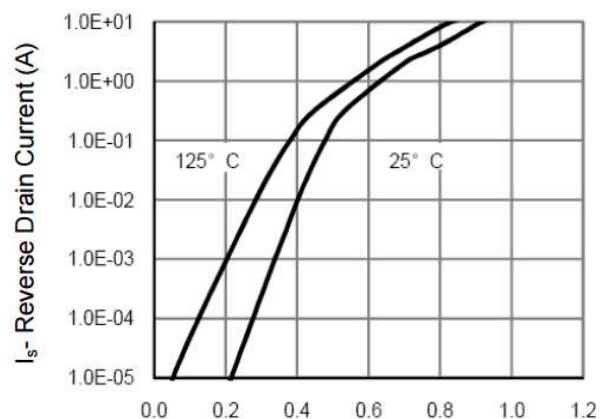

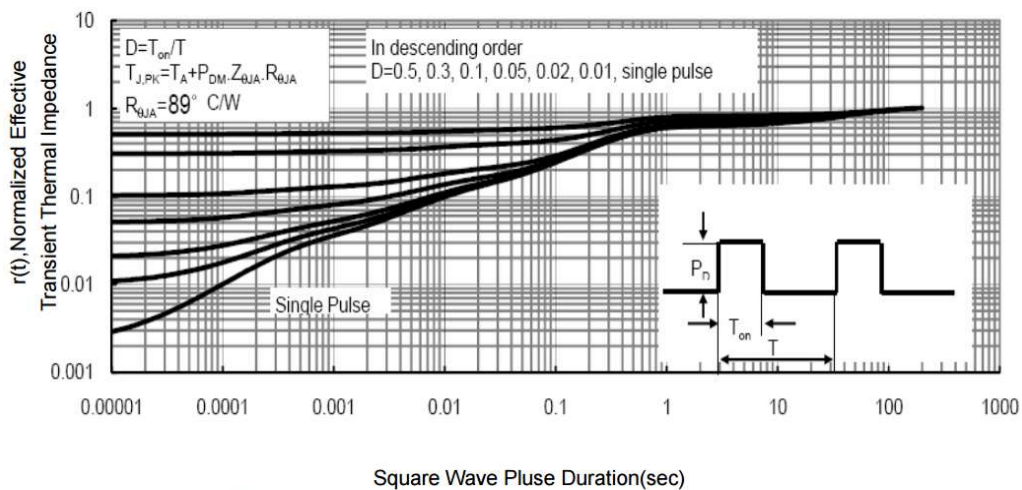Figure 9 Gate Charge

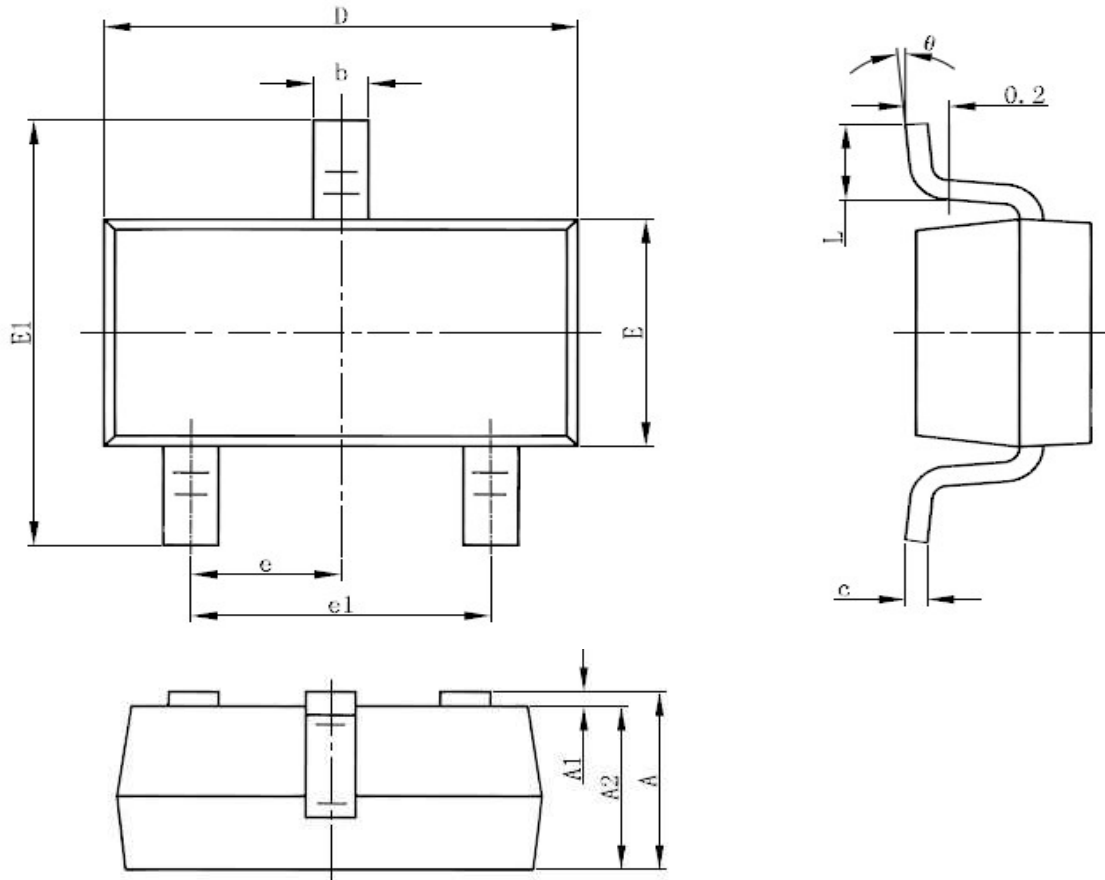

Figure 10 Source- Drain Diode Forward

Square Wave Pluse Duration(sec)

Figure 11 Normalized Maximum Transient Thermal Impedance

SOT23-3L PACKAGE OUTLINE DIMENSIONS

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.850	1.250	0.033	0.049
A1	0.000	0.100	0.000	0.004
A2	0.7	1.150	0.028	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°