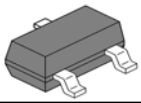
iM3415



P-Channel Enhancement Mode MOSFET

1. Product Information

1.1 Features

- ☑ Surface-mounted package
- ☑ Advanced trench cell design
- ☑ Extremely low threshold voltage
- ☑ ESD protected

1.2 Applications

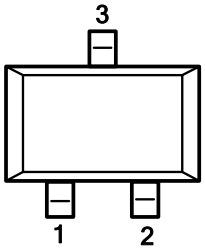
- ☑ Portable appliances
- ☑ High speed switch
- ☑ Battery management
- ☑ Low power DC to DC Converter

1.3 Quick reference

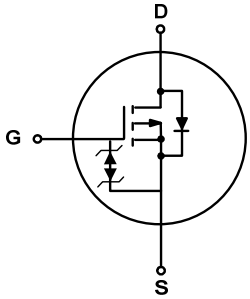
- ☑ BV ≦ - 20 V
- ☑ P_{tot} ≦0.83 W
- ☑ I_D ≦ - 4 A
- ☑ $R_{DS(ON)}$ ≦ 37 mΩ @ V_{GS} = - 4.5 V
  $R_{DS(ON)}$ ≦ 52 mΩ @ V_{GS} = - 2.5 V
  $R_{DS(ON)}$ ≦ 72 mΩ @ V_{GS} = - 1.8 V

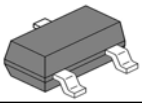
2. Pin Description

Pin	Description	Simplified Outline	Symbol
1	Gate(G)		
2	Source(S)		
3	Drain(D)		



Top View
SOT23-3L





3. Limiting Values

Symbol	Parameter	Conditions	Min	Max	Unit
V_{DS}	Drain-Source Voltage	T_A = 25 ℃	-	- 20	V
V_{GS}	Gate-Source Voltage	T_A = 25 ℃	-	± 8	V
I_D*	Drain Current	T_A = 25 ℃, V_{GS} = - 4.5 V	-	- 4	A
I_{DM}*,**	Pulsed Drain Current	T_A = 25 ℃, V_{GS} = - 4.5 V	-	- 16	A
P_{tot}	Total Power Dissipation	T_A = 25 ℃	-	0.83	W
		T_A = 100 ℃	-	0.3	
T_{stg}	Storage Temperature		- 55	150	℃
T_J	Junction Temperature		-	150	℃
I_S	Diode Forward Current	T_A = 25 ℃	-	- 1	A
$R_{\theta JA}$	Thermal Resistance- Junction to Ambient		-	150	℃ / W

Notes：

* Surface Mounted on 1 in^2 pad area, t ≤ 10 sec

** Pulse width ≤ 300 μs, duty cycle ≤ 2 %

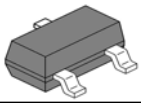
4. Marking Information

Product Name	Marking
iM3415	3415X X: Date Code

5. Ordering Code

iM3415□ └── Assembly Material	Assembly Material G: Halogen and Lead Free Device

Note: inergy defines " Green " as lead-free (RoHS compliant) and halogen free (Br or Cl does not exceed 900 ppm by weight in homogeneous material and total of Br and Cl does not exceed 1500 ppm by weight; Follow IEC 61249-2-21 and IPC / JEDEC J-STD-020C)



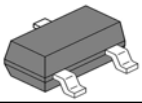
6. Electrical Characteristics (T_A = 25 °C Unless Otherwise Noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS} = 0 V, I_{DS} = - 250 µA	- 20	-	-	V
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_{DS} = - 250 µA	- 0.5	-	- 1	V
I_{DSS}	Drain Leakage Current	V_{DS} = - 16 V, V_{GS} = 0V	-	-	- 1	µA
		T_J = 85 ℃	-	-	- 30	µA
I_{GSS}	Gate Leakage Current	V_{GS} = ± 8 V, V_{DS} = 0 V	-	-	± 10	uA
$R_{DS(ON)}$[a]	On-State Resistance	V_{GS} = - 4.5 V, I_{DS} = - 4 A	-	30	37	mΩ
		V_{GS} = - 2.5 V, I_{DS} = - 3 A	-	42	52	
		V_{GS} = - 1.8 V, I_{DS} = - 2 A	-	57	72	
Diode Characteristics						
V_{SD}[a]	Diode Forward Voltage	I_{SD} = - 1 A, V_{GS} = 0V	-0.5	-	- 1.3	V
Dynamic Characteristics[b]						
C_{iss}	Input Capacitance	V_{GS} = 0 V, V_{DS} = - 10 V Frequency = 1 MHz	-	1081	-	pF
C_{oss}	Output Capacitance		-	164	-	
C_{rss}	Reverse Transfer Capacitance		-	152	-	
t_d(on)	Turn-on Delay Time	V_{DS} = - 10 V, V_{GEN} = - 4.5 V, R_G = 3.3 Ω, R_L = 2.5 Ω, I_{DS} = - 4 A	-	108	-	nS
t_r	Turn-on Rise Time		-	250	-	
t_d(off)	Turn-off Delay Time		-	3026	-	
t_f	Turn-off Fall Time		-	1920	-	
Gate Charge Characteristics[b]						
Q_g	Total Gate Charge	V_{GS} = - 4.5 V, V_{DS} = - 10 V, I_{DS} = - 4 A	-	13	-	nC
Q_{gs}	Gate-Source Charge		-	1.8	-	
Q_{gd}	Gate-Drain Charge		-	3	-	

Notes :

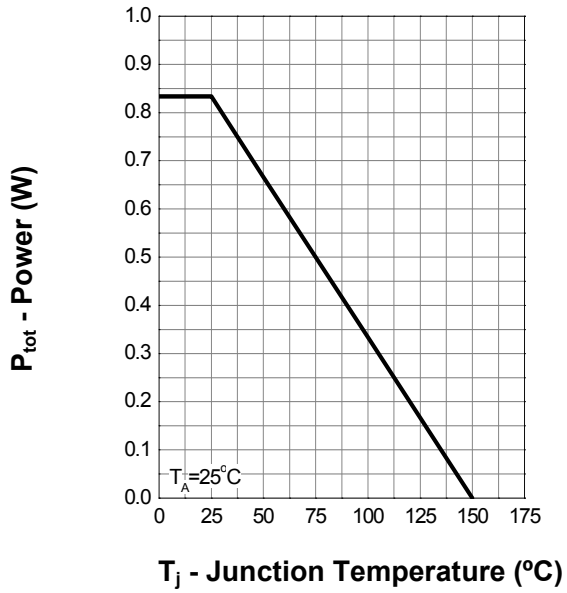
a : Pulse test ; pulse width ≤ 300 µs, duty cycle ≤ 2 %

b : Guaranteed by design, not subject to production testing

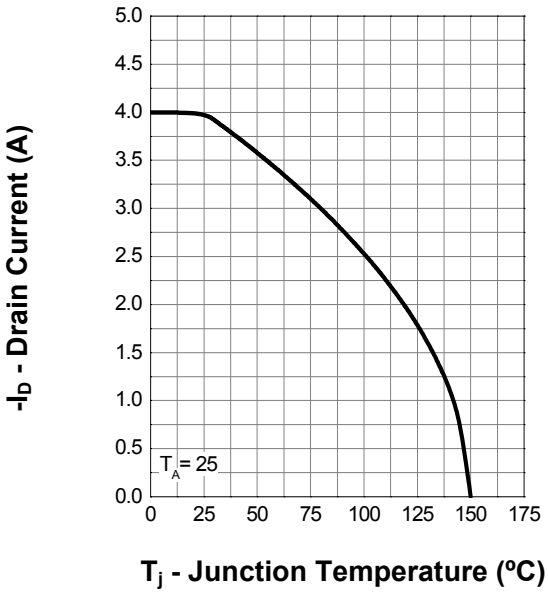


7. Typical Characteristics

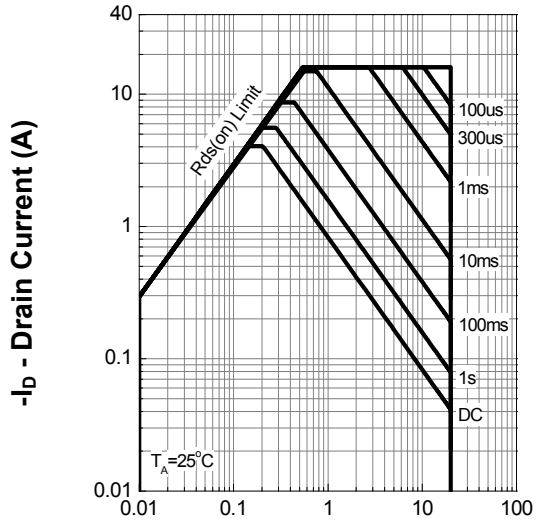
Power Dissipation



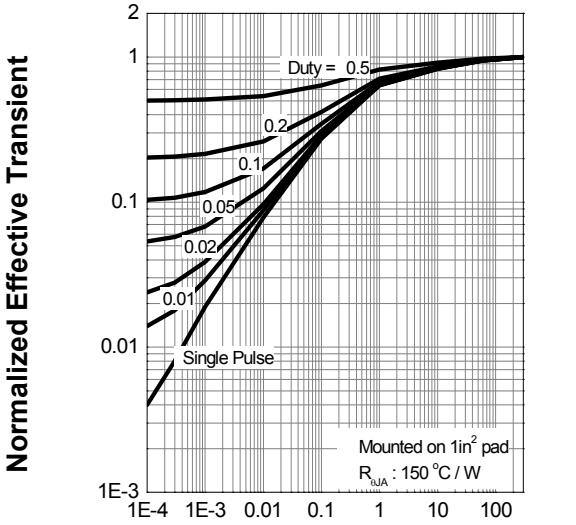
Current Capability



Safe Operation Area

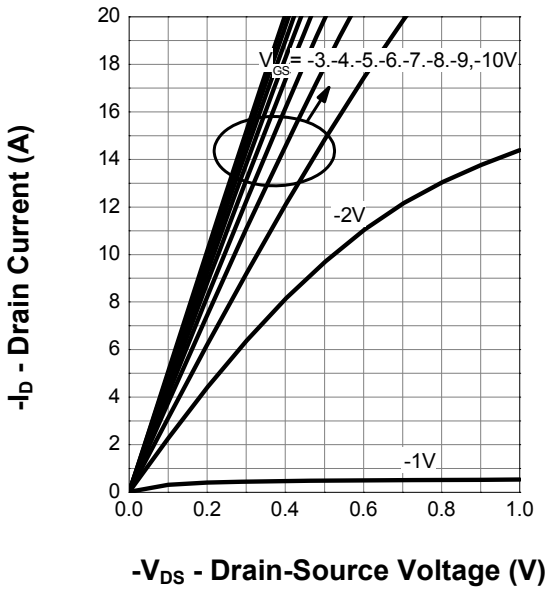


Thermal Transient Impedance

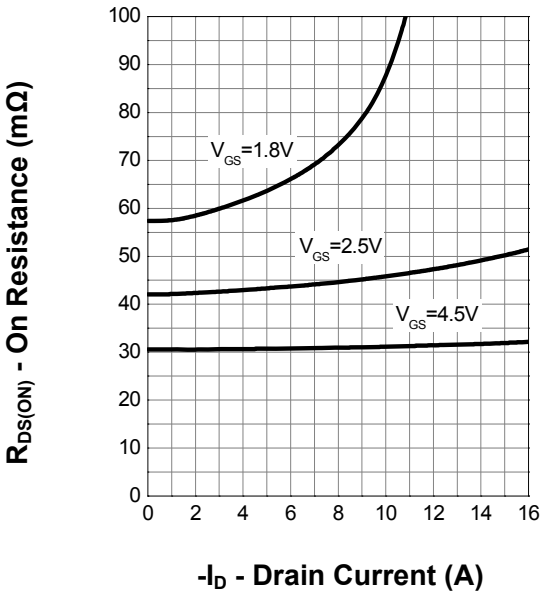


7. Typical Characteristics (cont.)

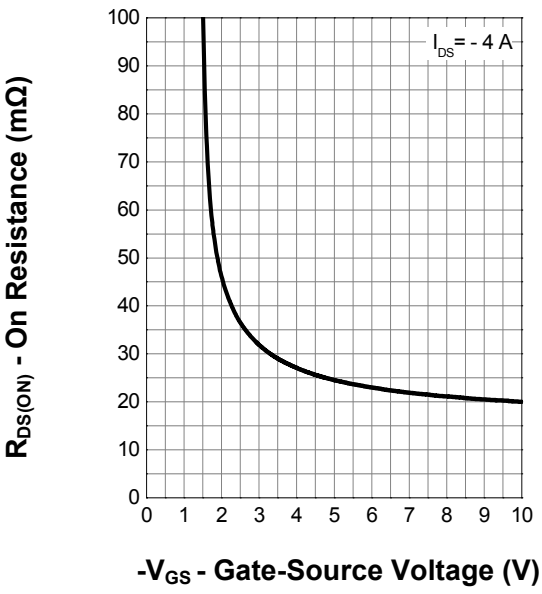
Output Characteristics



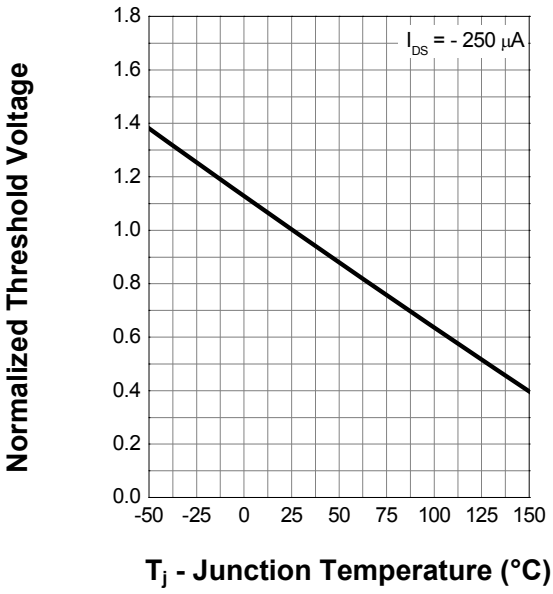
Drain-Source On Resistance



Transfer Characteristics

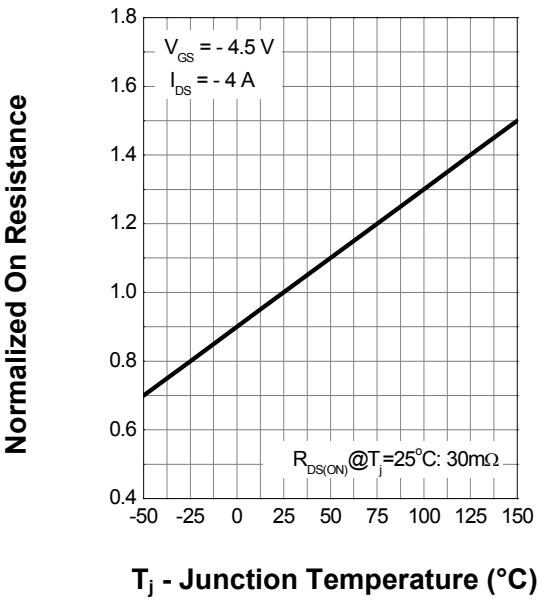


Normalized Threshold Voltage

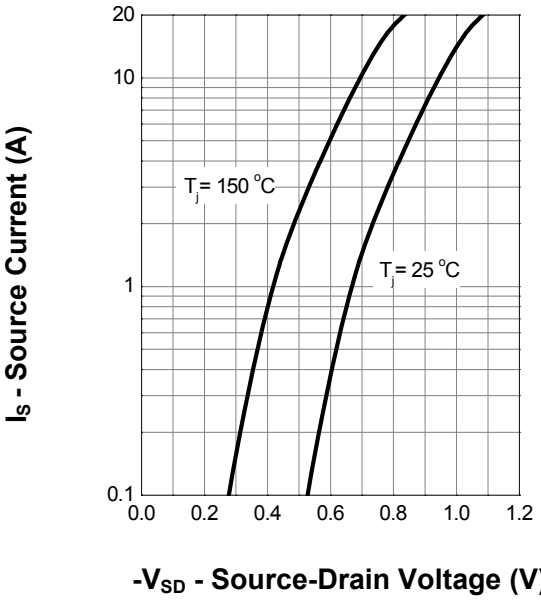


7. Typical Characteristics (cont.)

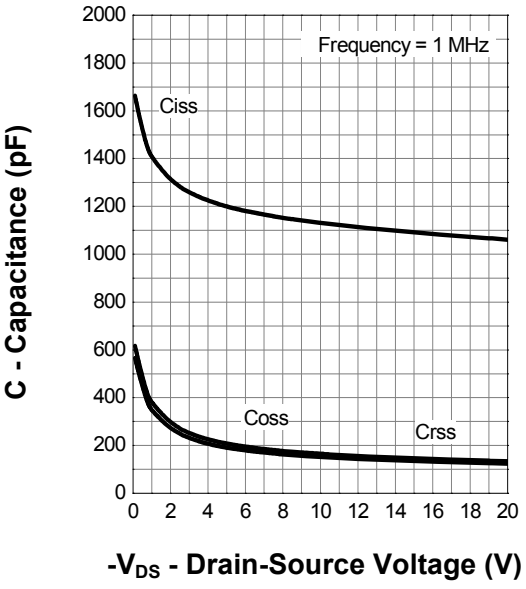
Normalized On Resistance



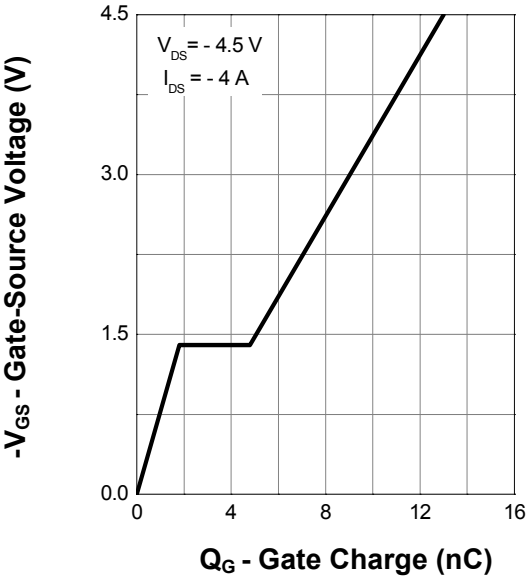
Current Diode Forward



Capacitance

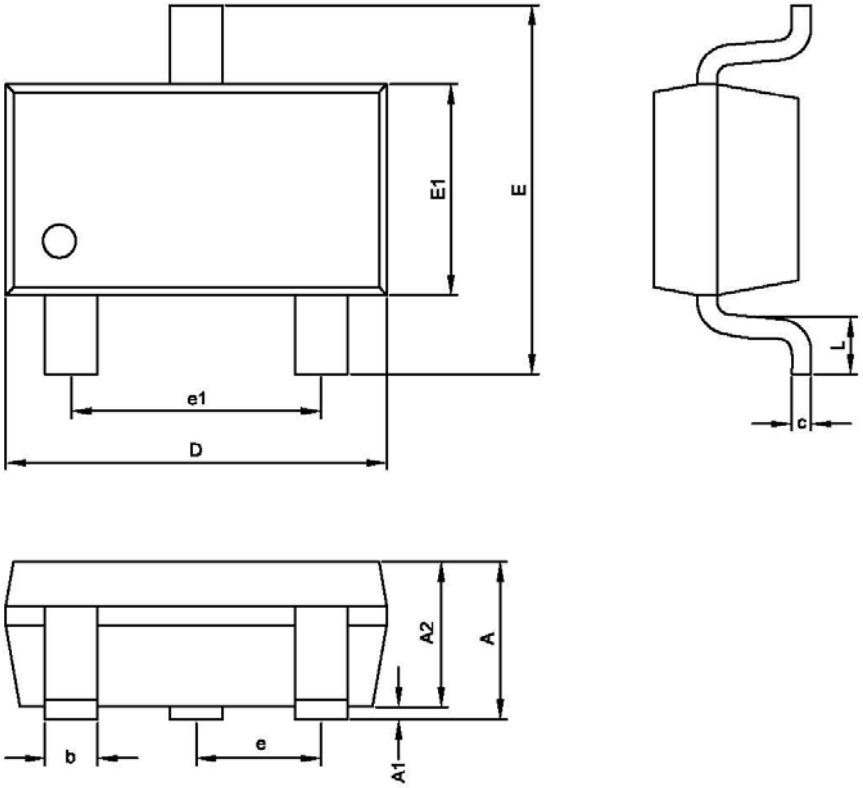


Gate Charge



Package Dimensions

SOT23-3L



Symbol	Dimensions In MM			Dimensions In INCH		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A	1.00	1.10	1.45	0.039	0.043	0.057
A1	0.00	- - -	0.15	0.000	- - -	0.006
A2	1.00	1.10	1.30	0.039	0.043	0.051
D	2.70	2.90	3.10	0.106	0.114	0.122
E	2.60	2.80	3.00	0.102	0.110	0.118
E1	1.50	1.60	1.70	0.059	0.063	0.067
c	0.08	0.15	0.25	0.003	0.006	0.010
b	0.30	0.40	0.50	0.012	0.016	0.020
e	0.95 BSC			0.037 BSC		
e1	1.90 BSC			0.075 BSC		
L	0.30	0.45	0.60	0.012	0.018	0.024