

Dual P-Channel Enhancement Mode MOSFET

1. Product Information

1.1 Features

- Advanced trench cell design
- Extremely low threshold voltage

1.2 Applications

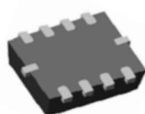
- Portable appliances
- High speed switch

1.3 Quick reference

- $BV \leq -20\text{ V}$
- $R_{DS(ON)} \leq 90\text{ m}\Omega @ V_{GS} = -4.5\text{ V}$
- $P_{tot} \leq 1.1\text{ W}$
- $R_{DS(ON)} \leq 135\text{ m}\Omega @ V_{GS} = -2.5\text{ V}$
- $I_D \leq -2.9\text{ A}$
- $R_{DS(ON)} \leq 230\text{ m}\Omega @ V_{GS} = -1.8\text{ V}$

2. Pin Description

Pin	Description	Simplified Outline	Symbol
1	Source(S1)	 Top View DFN3x2	
2	Gate(G1)		
3	Source(S2)		
4	Gate(G2)		
5,6	Drain(D2)		
7,8	Drain(D1)		



3. Limiting Values

Symbol	Parameter	Conditions	Min	Max	Unit
V_{DS}	Drain-Source Voltage	$T_A = 25\text{ }^\circ\text{C}$	-	- 20	V
V_{GS}	Gate-Source Voltage	$T_A = 25\text{ }^\circ\text{C}$	-	± 12	V
I_D^*	Drain Current	$T_A = 25\text{ }^\circ\text{C}, V_{GS} = -4.5\text{ V}$	-	- 2.9	A
		$T_A = 100\text{ }^\circ\text{C}, V_{GS} = -4.5\text{ V}$	-	- 1.8	A
I_{DM}^{***}	Pulsed Drain Current	$T_A = 25\text{ }^\circ\text{C}, V_{GS} = -4.5\text{ V}$	-	- 9	A
P_{tot}	Total Power Dissipation	$T_A = 25\text{ }^\circ\text{C}$	-	1.1	W
T_{stg}	Storage Temperature		- 55	150	$^\circ\text{C}$
T_J	Junction Temperature		- 55	150	$^\circ\text{C}$
I_S	Diode Forward Current	$T_A = 25\text{ }^\circ\text{C}$	-	- 1	A
$R_{\theta JA}^*$	Thermal Resistance- Junction to Ambient		-	110	$^\circ\text{C} / \text{W}$

Notes :



* Surface Mounted on 1 in² pad area, $t \leq 10\text{ sec}$

** Pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$

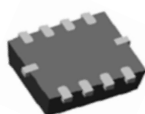
4. Marking Information

Product Name	Marking
iM1310	310X X: Date Code

5. Ordering Code

iM1310   Assembly Material	Assembly Material G: Halogen and Lead Free Device
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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)



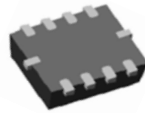
6. Electrical Characteristics (T_A = 25 °C Unless Otherwise Noted)

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	- 0.75	- 1	V
I _{DSS}	Drain Leakage Current	V _{DS} = - 16 V, V _{GS} = 0 V	-	-	- 1	μA
		T _J = 85 °C	-	-	- 30	μA
I _{GSS}	Gate Leakage Current	V _{GS} = ± 10 V, V _{DS} = 0 V	-	-	± 10	μA
R _{DS(ON)} ^a	On-State Resistance	V _{GS} = - 4.5 V, I _{DS} = - 2.9 A	-	70	90	mΩ
		V _{GS} = - 2.5 V, I _{DS} = - 2 A	-	110	135	
		V _{GS} = - 1.8 V, I _{DS} = - 0.5 A	-	150	230	
Diode Characteristics						
V _{SD} ^a	Diode Forward Voltage	I _{SD} = - 1 A, V _{GS} = 0 V	-	- 0.7	- 1.3	V
t _{rr}	Reverse Recovery Time	I _{SD} = - 2.9 A, dI _{SD} /dt = 100 A/μs	-	15	-	ns
Q _{rr}	Reverse Recovery Charge		-	7	-	nC
Dynamic Characteristics^b						
R _G	Gate Resistance	V _{GS} = V _{DS} = 0 V, F = 1 MHz	-	10	-	Ω
C _{ISS}	Input Capacitance	V _{GS} = 0 V, V _{DS} = - 10 V Frequency = 1 MHz	-	430	-	pF
C _{OSS}	Output Capacitance		-	90	-	
C _{RSS}	Reverse Transfer Capacitance		-	60	-	
t _{d(on)}	Turn-on Delay Time	V _{DS} = - 10 V, V _{GEN} = - 4.5 V, R _G = 6 Ω, R _L = 10 Ω, I _{DS} = - 1 A	-	6	12.5	ns
t _r	Turn-on Rise Time		-	13	28	
t _{d(off)}	Turn-off Delay Time		-	28	56	
t _f	Turn-off Fall Time		-	21	40	
Gate Charge Characteristics^b						
Q _g	Total Gate Charge	V _{GS} = - 4.5 V, V _{DS} = - 10 V, I _{DS} = - 2.9 A	-	4.7	7	nC
Q _{gs}	Gate-Source Charge		-	0.65	-	
Q _{gd}	Gate-Drain Charge		-	1.5	-	

Notes :

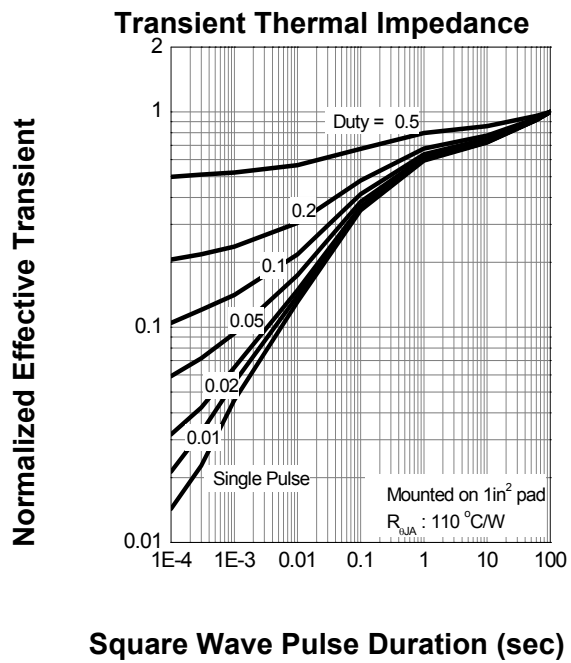
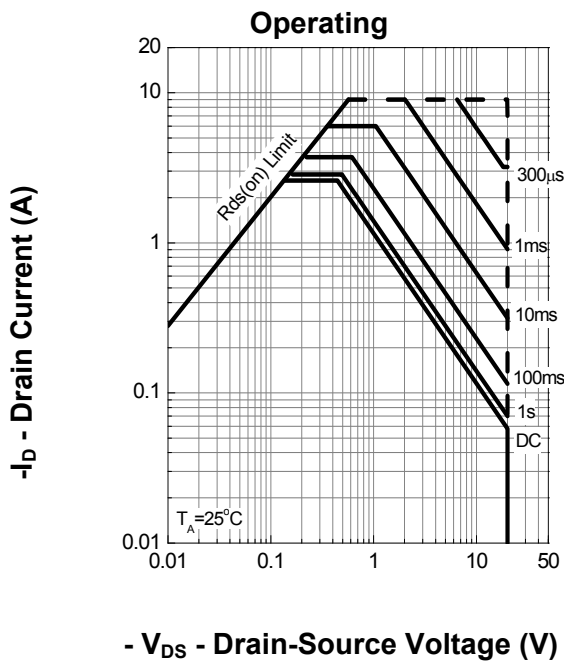
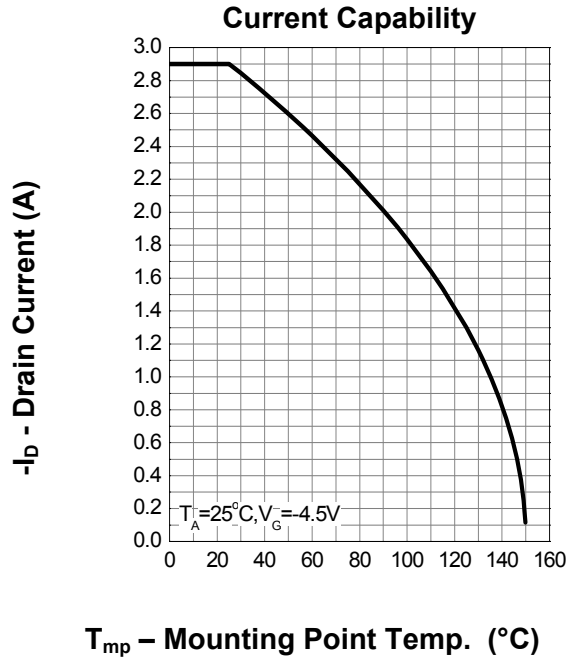
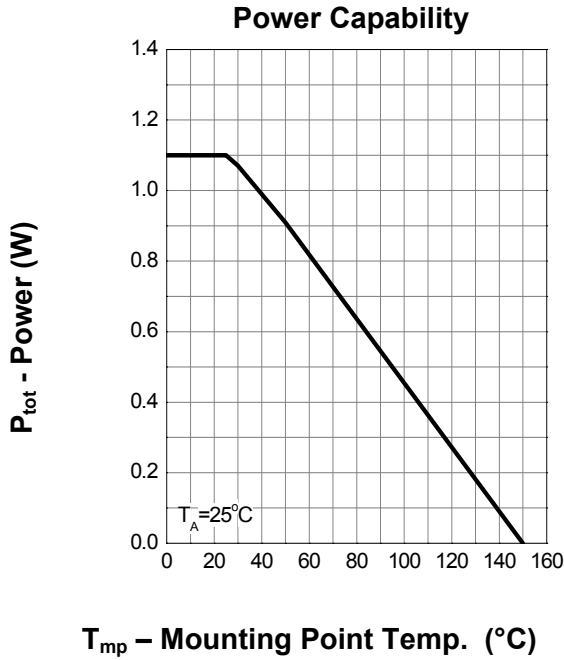
a : Pulse test ; pulse width ≤ 300 μs, duty cycle ≤ 2 %

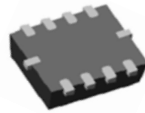
b : Guaranteed by design, not subject to production testing



7. Typical Characteristics

PMOSFET

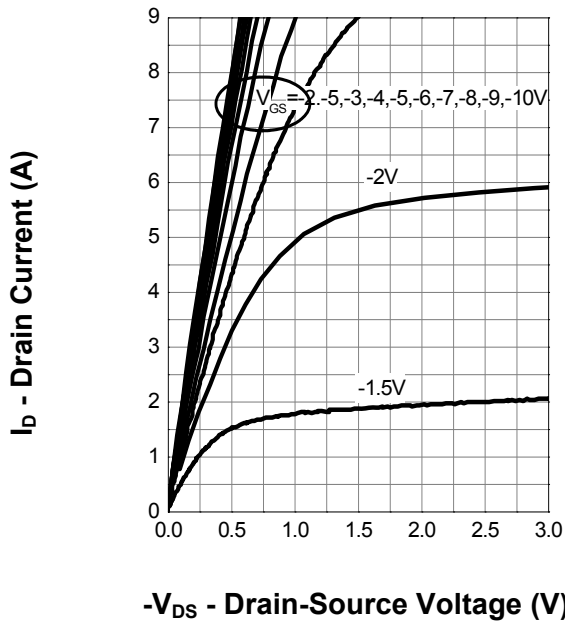




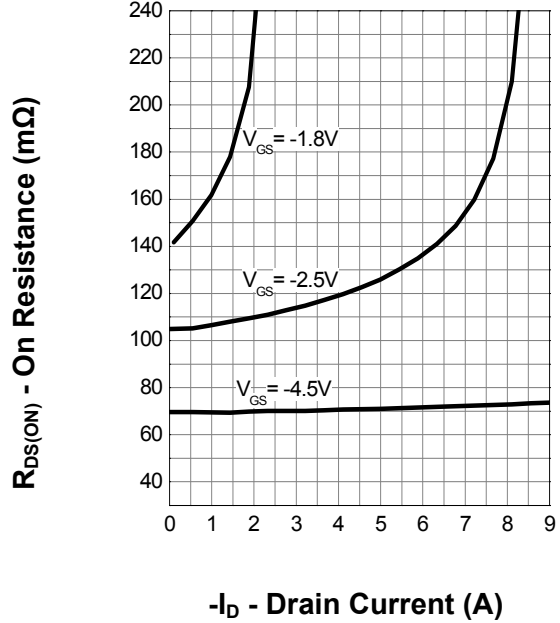
7. Typical Characteristics (cont.)

PMOSFET

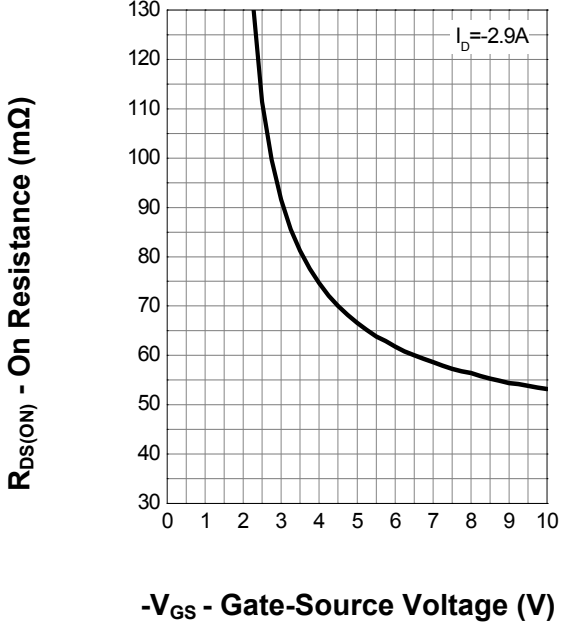
Output Characteristics



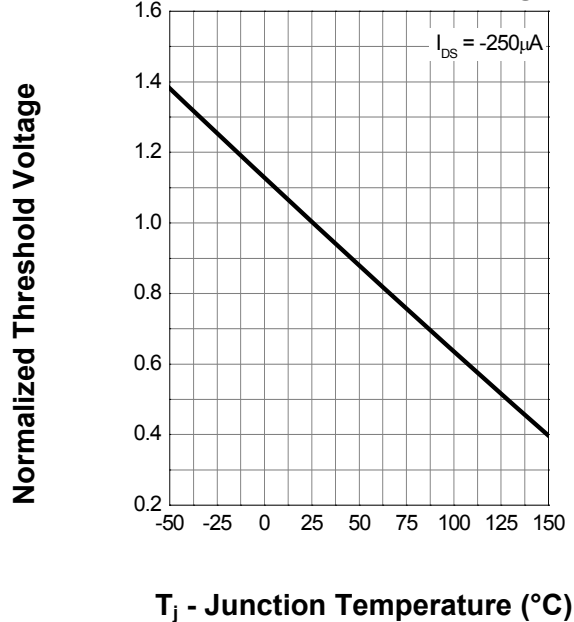
On Resistance

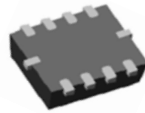


Transfer Characteristics



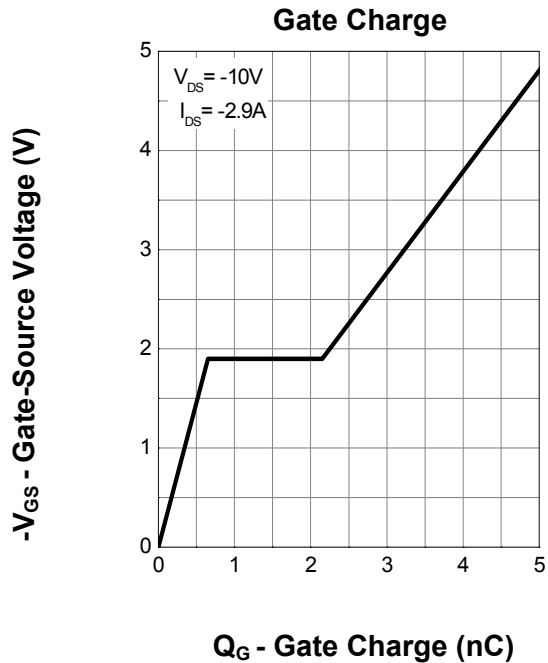
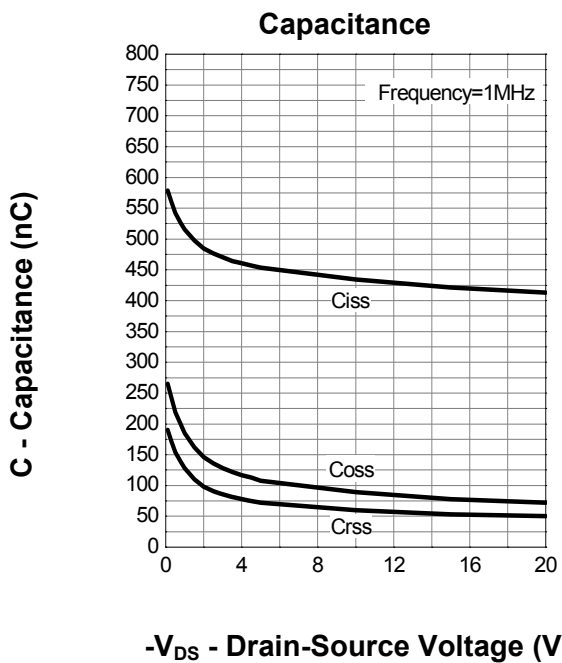
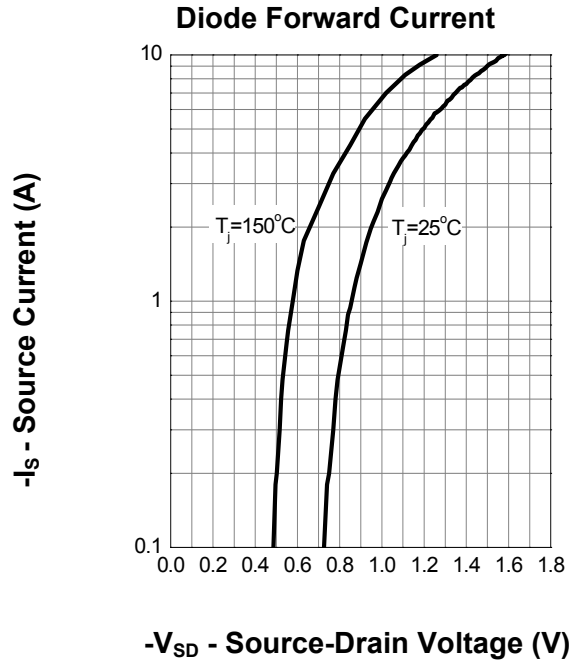
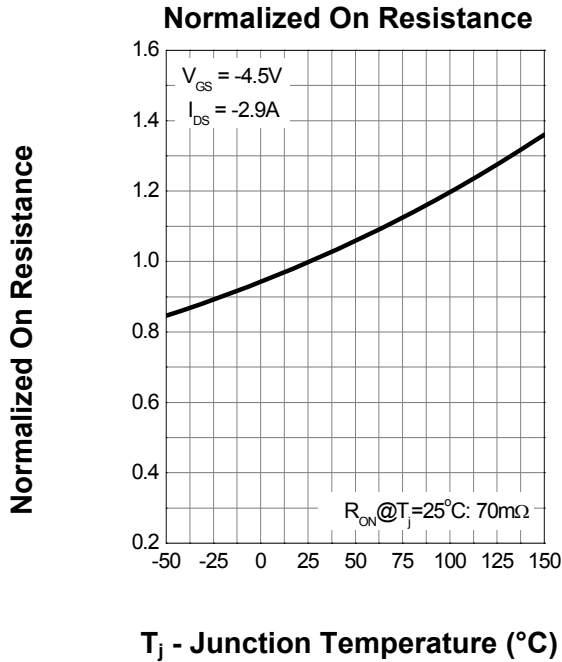
Normalized Threshold Voltage

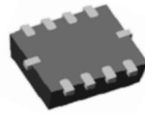




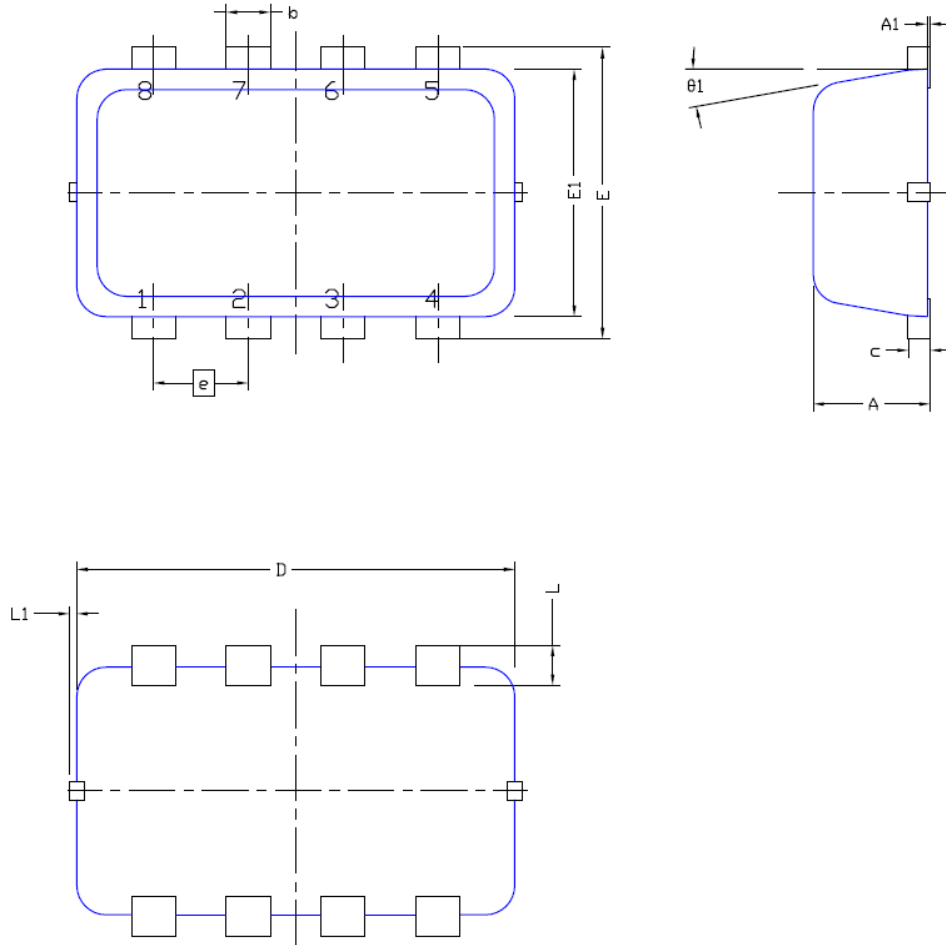
7. Typical Characteristics (cont.)

PMOSFET





8. Package Dimensions
DFN3X2-8L



Symbol	Dimensions In Millimeters	
	MIN.	MAX.
A	0.70	0.90
A1	0.00	0.05
b	0.24	0.35
c	0.08	0.25
D	3.00 BSC	
E	2.00 BSC	
E1	1.70 BSC	
e	0.65 BSC	
L	0.20	0.40
L1	0.00	0.10
θ1	0°	12°