

N-Channel Enhancement Mode MOSFET

1. Product Information

1.1 Features

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

1.2 Applications

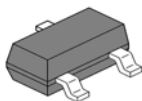
- Portable appliances
 High speed switch
- Battery management
 Low power DC to DC Converter

1.3 Quick reference

- $BV \geq 20\text{ V}$
 $P_{tot} \leq 0.83\text{ W}$
 $I_D \leq 3.6\text{ A}$
- $R_{DS(ON)} \leq 42\text{ m}\Omega @ V_{GS} = 4.5\text{ V}$
 $R_{DS(ON)} \leq 66\text{ m}\Omega @ V_{GS} = 2.5\text{ V}$
 $R_{DS(ON)} \leq 112\text{ m}\Omega @ V_{GS} = 1.8\text{ V}$

2. Pin Description

Pin	Description	Simplified Outline	Symbol
1	Gate(G)	 Top View SOT23	
2	Source(S)		
3	Drain(D)		



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	$T_A = 25\text{ }^\circ\text{C}, V_{GS} = 4.5\text{ V}$		3.6	A
		$T_A = 100\text{ }^\circ\text{C}, V_{GS} = 4.5\text{ V}$		2.3	A
I_{DM}^{***}	Pulsed Drain Current	$T_A = 25\text{ }^\circ\text{C}, V_{GS} = 4.5\text{ V}$		11	A
P_{tot}	Total Power Dissipation	$T_A = 25\text{ }^\circ\text{C}$		0.83	W
T_{stg}	Storage Temperature		-55	150	$^\circ\text{C}$
T_J	Junction Temperature		-55	150	$^\circ\text{C}$
I_S	Diode Forward Current	$T_A = 25\text{ }^\circ\text{C}$		1.2	A
$R_{\theta JA}$	Thermal Resistance- Junction to Ambient			150	$^\circ\text{C/W}$

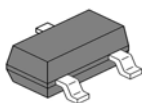
Notes :

* 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
iM2113	113X X: Date Code



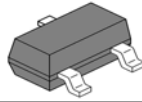
5. Electrical Characteristics (T_A=25 °C Unless Otherwise Noted)

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	0.7	1	V
I _{DSS}	Drain Leakage Current	V _{DS} = 16 V, V _{GS} = 0V			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} = 3.6 A		35	42	mΩ
		V _{GS} = 2.5 V, I _{DS} = 1.2 A		47	66	
		V _{GS} = 1.8 V, I _{DS} = 0.6 A		70	112	
Diode Characteristics						
V _{SD} ^a	Diode Forward Voltage	I _{SD} = 1.2 A, V _{GS} = 0V		0.7	1.3	V
t _{rr}	Reverse Recovery Time	I _{SD} = 3 A, dI _{SD} /dt = 100 A/μs		14.5		ns
Q _{rr}	Reverse Recovery Charge			5		nC
Dynamic Characteristics^b						
R _G	Gate Resistance	V _{GS} = V _{DS} = 0 V, F = 1 MHz		4.8		Ω
C _{iss}	Input Capacitance	V _{GS} = 0 V, V _{DS} = 10 V Frequency = 1 MHz		315		pF
C _{oss}	Output Capacitance			65		
C _{rss}	Reverse Transfer Capacitance			50		
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		4.5	9	ns
t _r	Turn-on Rise Time			15	25	
t _{d(off)}	Turn-off Delay Time			20	40	
t _f	Turn-off Fall Time			5	10	
Gate Charge Characteristics^b						
Q _g	Total Gate Charge	V _{GS} = 4.5 V, V _{DS} = 10 V, I _{DS} = 3 A		4.5	6	nC
Q _{gs}	Gate-Source Charge			0.5		
Q _{gd}	Gate-Drain Charge			1.7		

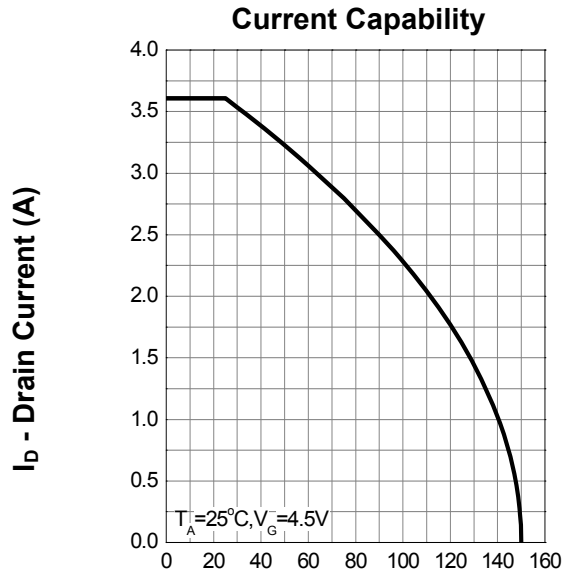
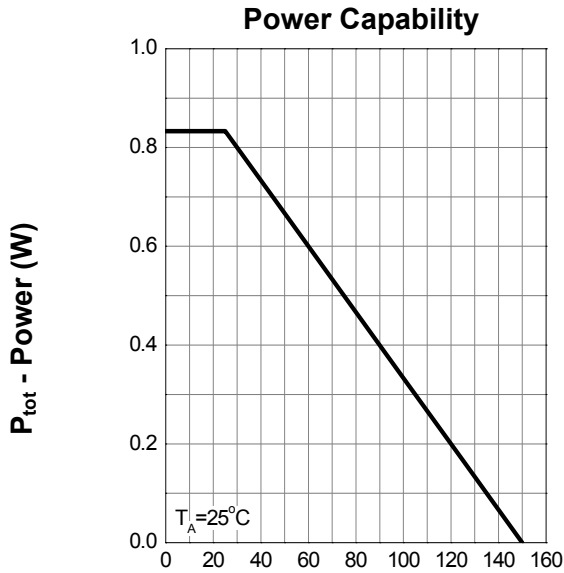
Notes :

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

b : Guaranteed by design, not subject to production testing

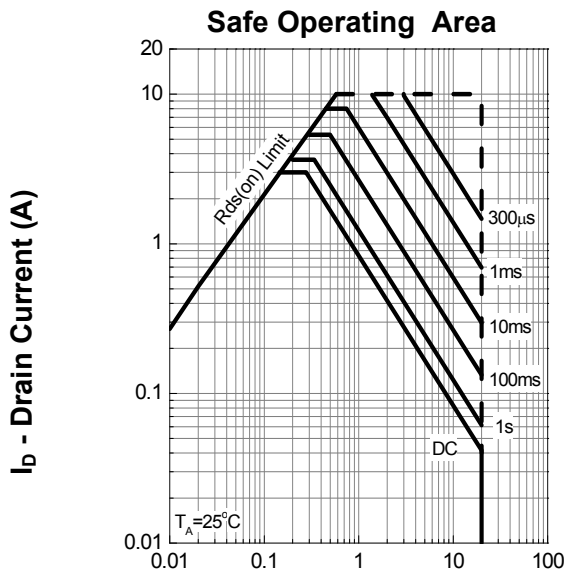


Typical Characteristics

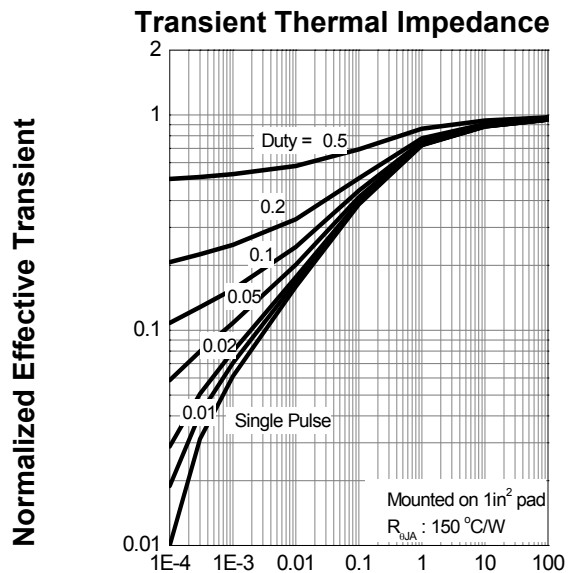


T_{mp} - Mounting Point Temp. ($^{\circ}C$)

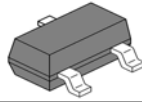
T_{mp} - Mounting Point Temp. ($^{\circ}C$)



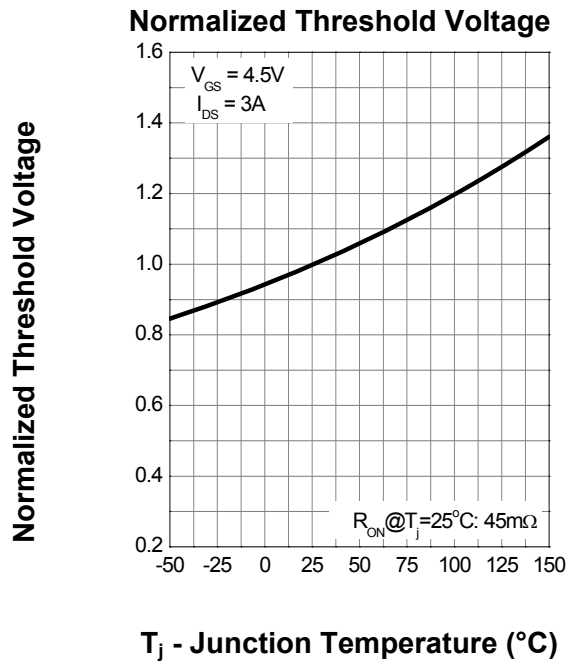
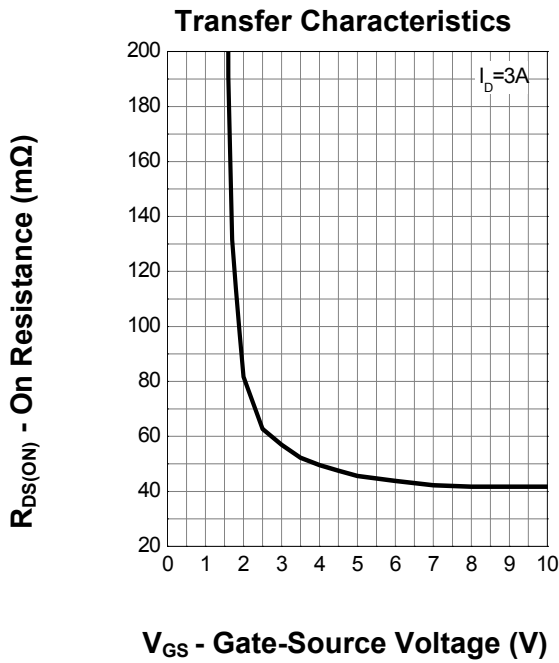
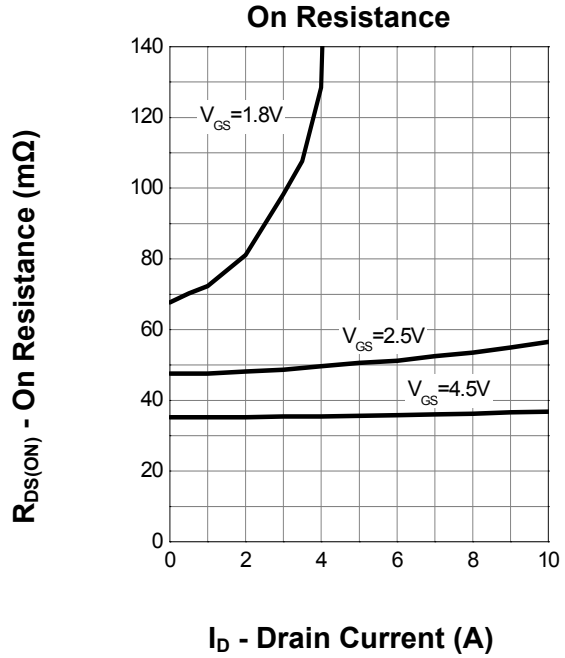
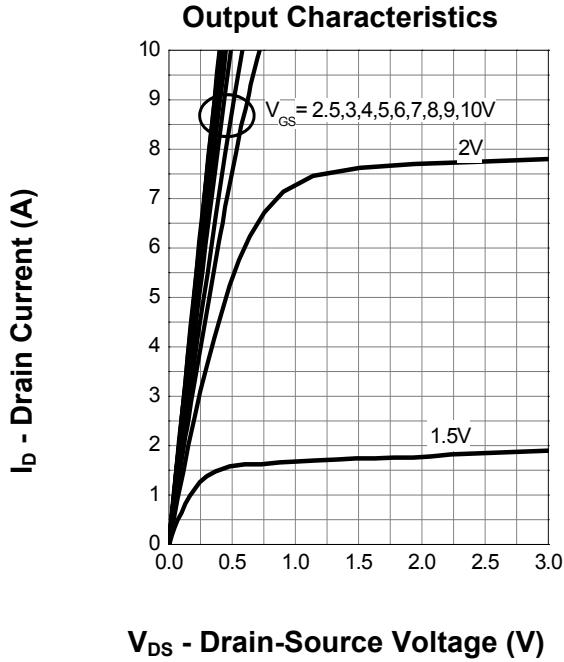
V_{DS} - Drain-Source Voltage (V)

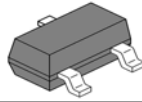


Square Wave Pulse Duration (sec)



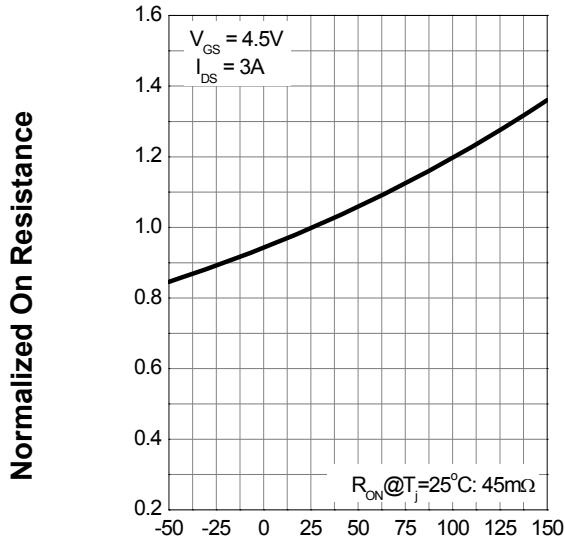
Typical Characteristics



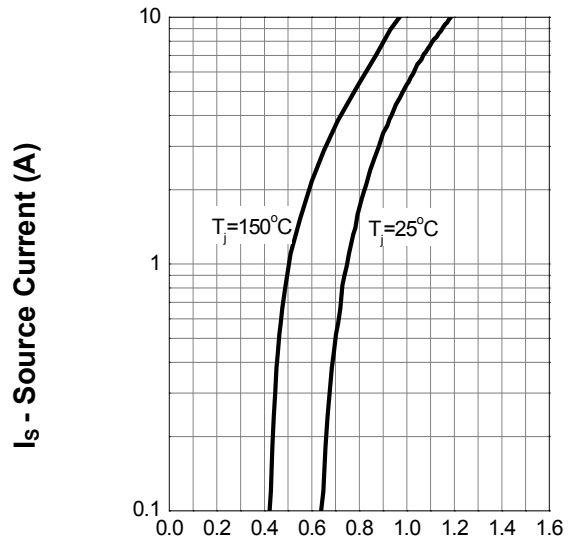


Typical Characteristics

Normalized-Source On Resistance



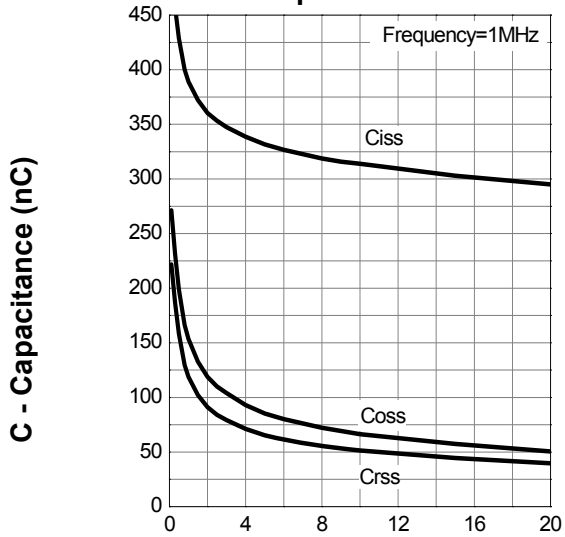
Diode Forward Current



T_j - Junction Temperature (°C)

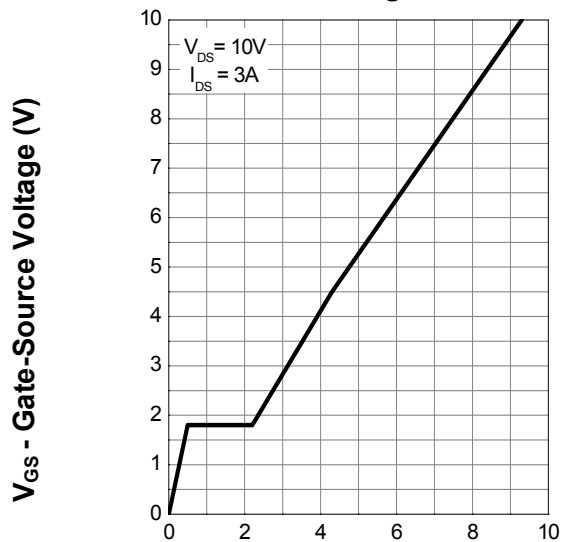
V_{SD} - Source-Drain Voltage (V)

Capacitance



V_{DS} - Drain-Source Voltage (V)

Gate Charge



Q_G - Gate Charge (nC)