iM6211



N-Channel Enhancement Mode MOSFET

1. Product Information

1.1 Features

- ☑ Advanced trench cell design
- ☑ Low Thermal Resistance

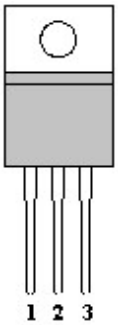
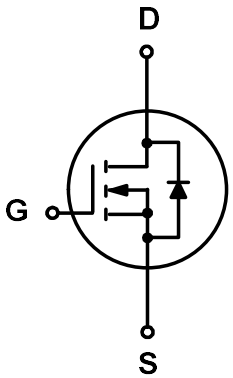
1.2 Applications

- ☑ Motor drivers
- ☑ DC - DC Converter

1.3 Quick reference

- ☑ BV ≧ 40 V
- ☑ P_{tot} ≦ 147 W
- ☑ I_D ≦ 120 A
- ☑ $R_{DS(ON)}$ ≦ 2.9 mΩ @ V_{GS} = 10 V
- ☑ $R_{DS(ON)}$ ≦ 3.7 mΩ @ V_{GS} = 4.5 V

Pin Description

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

Top View
TO-220-3L



2. Limiting Values

Symbol	Parameter	Conditions	Min	Max	Unit
V_{DS}	Drain-Source Voltage	T_C = 25 ℃	-	40	V
V_{GS}	Gate-Source Voltage	T_C = 25 ℃	-	± 20	V
I_D*,***	Drain Current (DC)	T_C = 25 ℃, V_{GS} = 10 V	-	120	A
		T_C = 100 ℃, V_{GS} = 10 V	-	109	A
I_{DM}*,**	Drain Current (Pulsed)	T_C = 25 ℃, V_{GS} = 10 V	-	480	A
P_{tot}*	Total Power Dissipation	T_C = 25 ℃	-	147	W
T_{stg}	Storage Temperature		- 55	150	℃
T_J	Junction Temperature		-	150	℃
I_S	Diode Forward Current	T_C = 25 ℃	-	120	A
E_{AS}*	Single Pulsed Avalanche Energy	V_{DD}= 40 V , L= 1.0 mH	-	1140	mJ
$R_{\theta JA}$*	Thermal Resistance- Junction to Ambient		-	42	℃ / W
$R_{\theta JC}$	Thermal Resistance- Junction to Case		-	0.85	

Notes :

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

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

*** Limited by bonding wire

3. Marking Information

Product Name	Marking
iM6211	iM6211 XXXXXX X : Date Code

4. Ordering Code

iM6211



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_D = 250 µA	40	-	-	V
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_{DS} = 250 µA	1.0	-	2.2	V
I_{DSS}	Zero Gate Voltage Source Current	V_{DS} = 32 V, V_{GS} = 0 V	-	-	1	µA
I_{GSS}	Gate Leakage Current	V_{GS} = ± 20 V, V_{DS} = 0 V	-	-	± 100	nA
$R_{DS(ON)}$[a]	Drain-Source On-State Resistance	V_{GS} = 10 V, I_D = 20 A	-	2.3	2.9	mΩ
	Drain-Source On-State Resistance	V_{GS} = 4.5 V, I_D = 20 A	-	2.8	3.7	mΩ
Diode Characteristics						
V_{SD}[a]	Diode Forward Voltage	I_{SD} = 20 A, V_{GS} = 0 V	-	-	1.3	V
t_{rr}	Reverse Recovery Time	I_{SD} = 20 A, dI_{SD}/dt = 100 A/µs	-	15	-	nS
Q_{rr}	Reverse Recovery Charge		-	27	-	nC
Dynamic Characteristics[b]						
C_{iss}	Input Capacitance	V_{GS} = 0 V, V_{DS} = 20 V Frequency = 1 MHz	-	14160	-	pF
C_{oss}	Output Capacitance		-	991	-	
C_{rss}	Reverse Transfer Capacitance		-	352	-	
t_d(on)	Turn-on Delay Time	V_{DS} = 20 V, V_{GEN} = 10 V, R_G = 3.9 Ω, R_L = 1 Ω, I_D = 20 A	-	25	-	nS
t_r	Turn-on Rise Time		-	63	-	
t_d(off)	Turn-off Delay Time		-	185	-	
t_f	Turn-off Fall Time		-	102	-	
Gate Charge Characteristics[b]						
Q_g	Total Gate Charge	V_{GS} = 10 V, V_{DS} = 20 V, I_{DS} = 20 A	-	232	-	nC
Q_{gs}	Gate-Source Charge		-	54	-	
Q_{gd}	Gate-Drain Charge		-	29	-	

Notes：

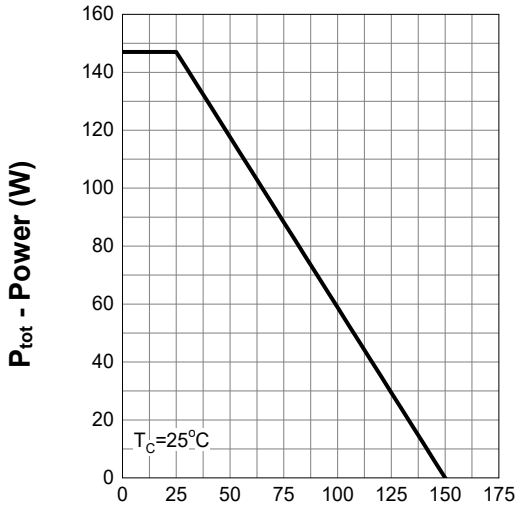
a : Pulse test ; pulse width ≤ 300 µs, duty cycle ≤ 2 %

b : Guaranteed by design, not subject to production testing

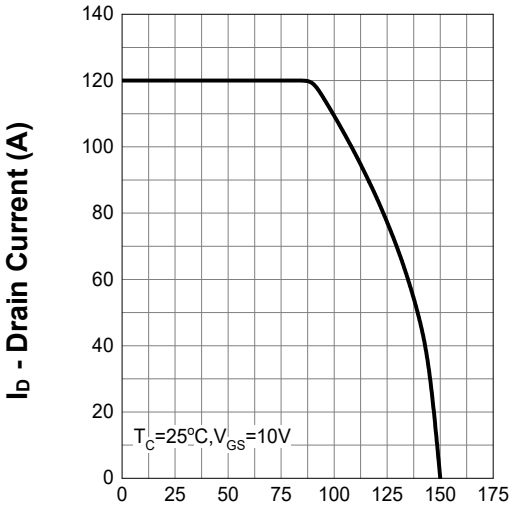


6. Typical Characteristics

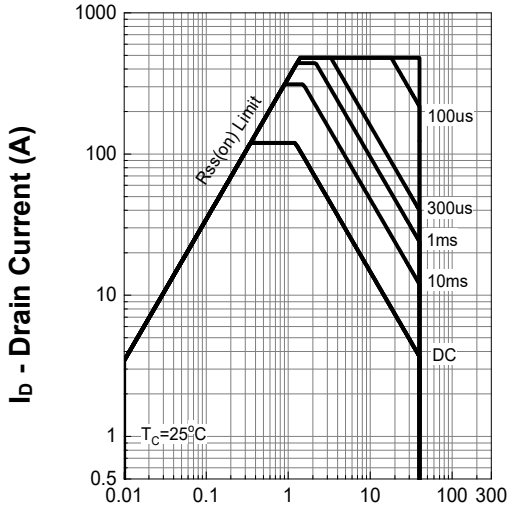
Power Capability



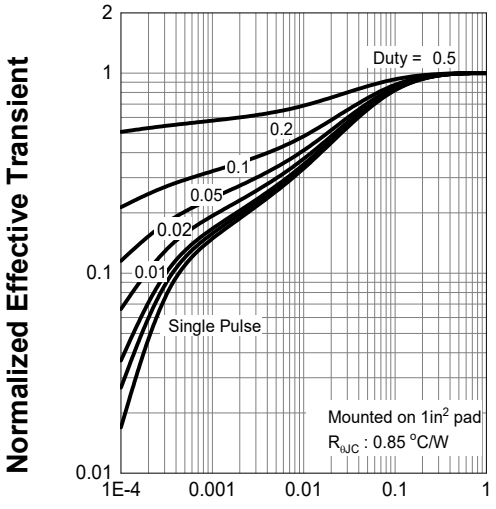
Current Capability



Safe Operation Area



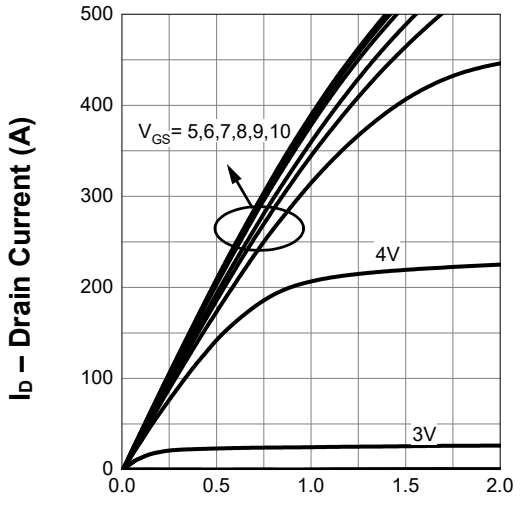
Thermal Transient Impedance



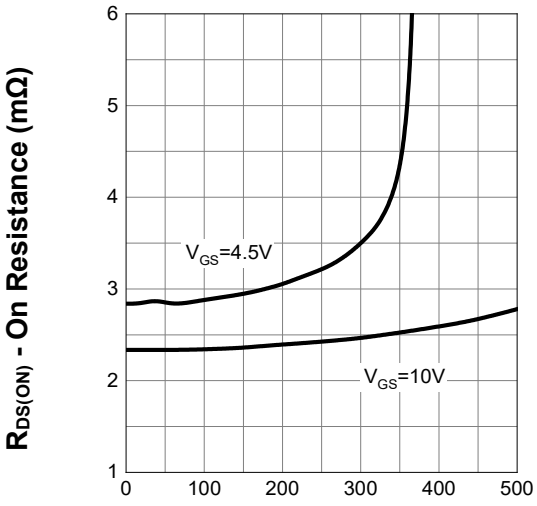


6. Typical Characteristics (cont.)

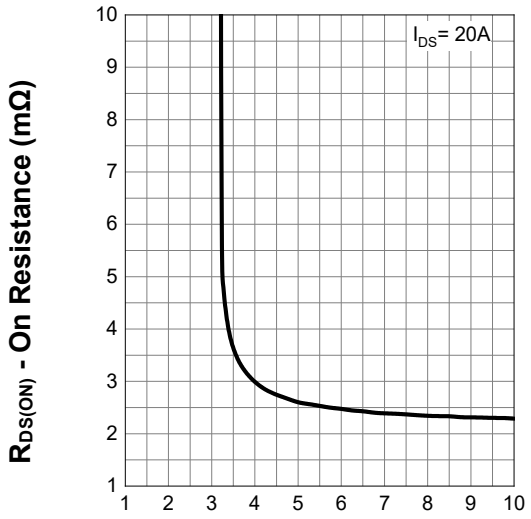
Output Characteristics



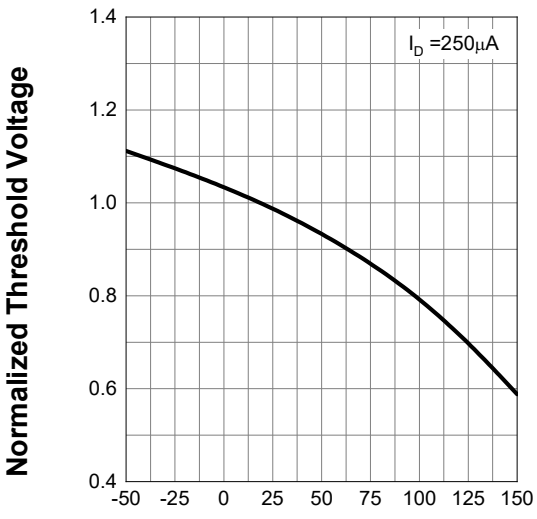
Drain-Source On Resistance



Transfer Characteristics

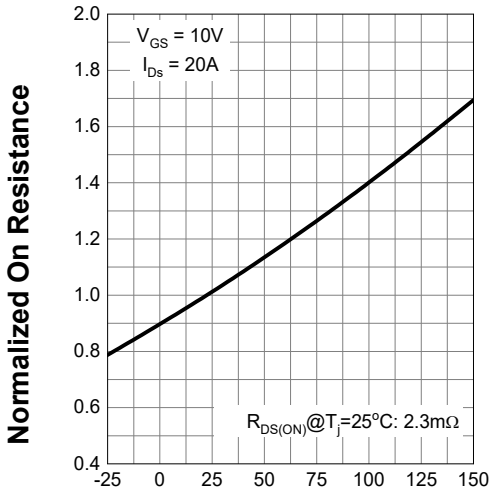


Gate Threshold Voltage

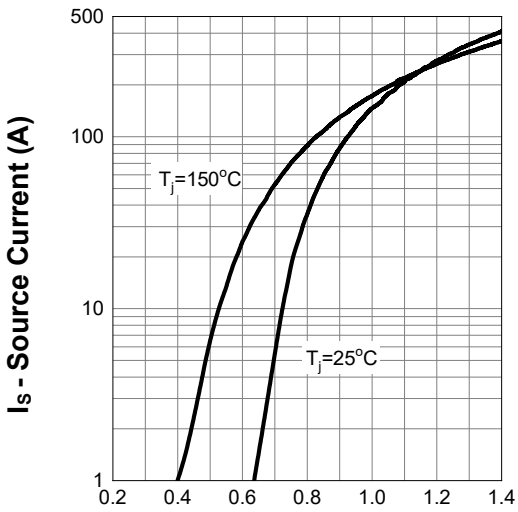


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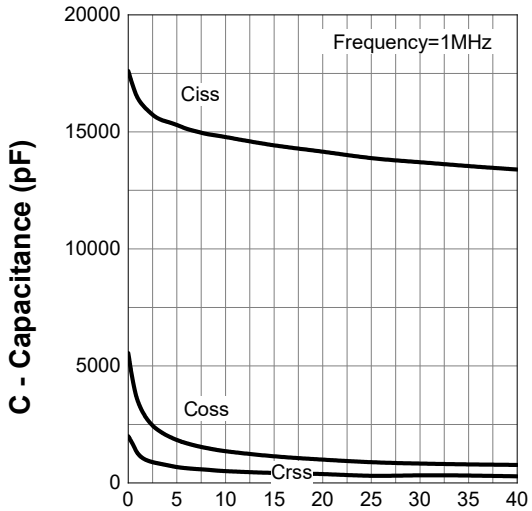
Drain-Source On Resistance



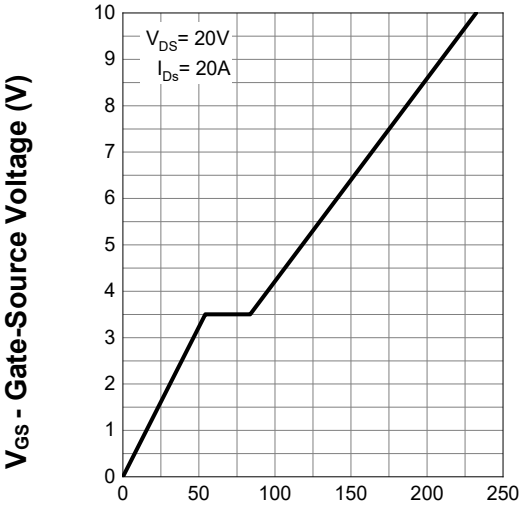
Body Diode Characteristics



Capacitance



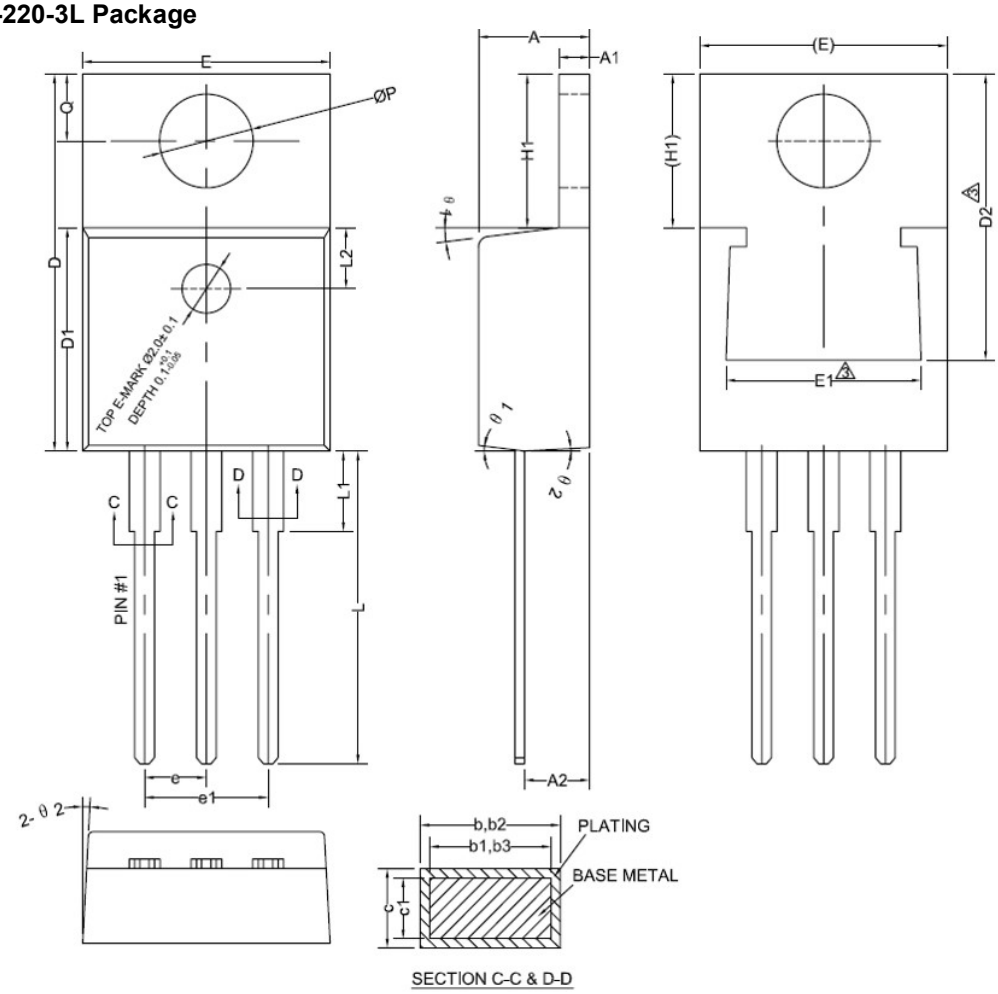
Gate Charge





7. Package Dimensions

TO-220-3L Package



Symbol	Dimensions In Millimeters	
	MIN.	MAX.
A	4.40	4.70
A1	1.22	1.32
A2	2.59	2.79
b	0.77	0.90
b1	0.76	0.86
b2	1.23	1.36
b3	1.22	1.32
c	0.34	0.47
c1	0.33	0.43
D	15.15	15.75
D1	9.05	9.25



D2	11.40	12.88
E	9.96	10.36
E1	6.86	8.89
e	2.44	2.64
e1	4.98	5.18
H1	6.10	6.50
L	12.70	13.12
L1	-	3.90
L2	2.50REF	
ØP	3.80	3.88
Q	2.60	2.90
θ1	5°	9°
θ2	1°	5°