

N-Channel Enhancement Mode MOSFET

1. Product Information

1.1 Features

- ☒ Advanced trench cell design
- ☒ Low Thermal Resistance

1.2 Applications

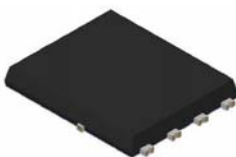
- ☒ Motor drivers
- ☒ DC - DC Converter

1.3 Quick reference

- ☒ $BV \geq 80\text{ V}$
- ☒ $P_{\text{tot}} \leq 35\text{ W}$
- ☒ $I_D \leq 78\text{ A}$
- ☒ $R_{\text{DS(ON)}} \leq 3.75\text{ m}\Omega @ V_{\text{GS}} = 10\text{ V}$
- ☒ $R_{\text{DS(ON)}} \leq 5.0\text{ m}\Omega @ V_{\text{GS}} = 6\text{ V}$

2. Pin Description

Pin	Description	Simplified Outline	Symbol
1,2,3	Source	Top View PDFN5x6-8L	
4	Gate		
5,6,7,8	Drain		



3. Limiting Values

Symbol	Parameter	Conditions	Min	Max	Unit
V_{DS}	Drain-Source Voltage	$T_C = 25\text{ }^{\circ}\text{C}$	80	-	V
V_{GS}	Gate-Source Voltage	$T_C = 25\text{ }^{\circ}\text{C}$	-	± 20	V
I_D^*	Drain Current	$T_C = 25\text{ }^{\circ}\text{C}, V_{GS} = 10\text{ V}$	-	78	A
		$T_C = 100\text{ }^{\circ}\text{C}, V_{GS} = 10\text{ V}$	-	49	A
I_{DM}^{***}	Pulsed Source Current	$T_C = 25\text{ }^{\circ}\text{C}, V_{GS} = 10\text{ V}$	-	312	A
P_{tot}^*	Total Power Dissipation	$T_C = 25\text{ }^{\circ}\text{C}$	-	35	W
T_{stg}	Storage Temperature		- 55	150	$^{\circ}\text{C}$
T_J	Junction Temperature		-	150	$^{\circ}\text{C}$
I_S	Diode Forward Current	$T_C = 25\text{ }^{\circ}\text{C}$	-	78	A
E_{AS}^*	Single Pulsed Avalanche Energy	$V_{DD} = 50\text{ V}, L = 1.0\text{ mH}$	-	112	mJ
$R_{\theta JA}^*$	Thermal Resistance- Junction to Ambient		-	62.5	$^{\circ}\text{C} / \text{W}$
$R_{\theta JC}^*$	Thermal Resistance- Junction to Case		-	3.5	

Notes :

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

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

*** limited by bonding wire

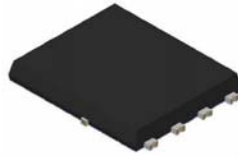
4. Marking Information

Product Name	Marking
iM1889	iM1889 XXXXXX X : Date Code

5. Ordering Code

iM1889 ☐ → 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)



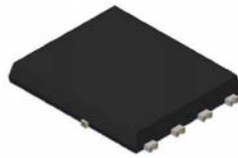
6. Electrical Characteristics (T_A = 25 °C Unless Otherwise Noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} = 0 V, I _D = 250 μA	80	-	-	V
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _{DS} = 250 μA	2.5	-	3.5	V
I _{DSS}	Zero Gate Voltage Source Current	V _{DS} = 64 V, V _{GS} = 0 V	-	-	1	μA
		T _J = 85 °C	-	-	30	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	-	3	3.75	mΩ
		V _{GS} = 6 V, I _D = 10 A	-	4	5	
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	-	71	-	nS
Q _{rr}	Reverse Recovery Charge		-	113	-	nC
Dynamic Characteristics ^b						
C _{iSS}	Input Capacitance	V _{GS} = 0 V, V _{DS} = 40 V Frequency = 1 MHz	-	5631	-	pF
C _{oSS}	Output Capacitance		-	758	-	
C _{rSS}	Reverse Transfer Capacitance		-	37	-	
t _{d(on)}	Turn-on Delay Time	V _{DS} = 40 V, V _{GEN} = 10 V, R _G = 4.5 Ω, R _L = 2 Ω, I _{DS} = 20 A	-	20	-	nS
t _r	Turn-on Rise Time		-	40	-	
t _{d(off)}	Turn-off Delay Time		-	67	-	
t _f	Turn-off Fall Time		-	34	-	
Gate Charge Characteristics ^b						
Q _g	Total Gate Charge	V _{DS} = 40 V, V _{GS} = 10 V, I _{DS} = 20 A	-	110	-	nC
Q _{gs}	Gate-Source Charge		-	28	-	
Q _{gd}	Gate-Drain Charge		-	30	-	

Notes :

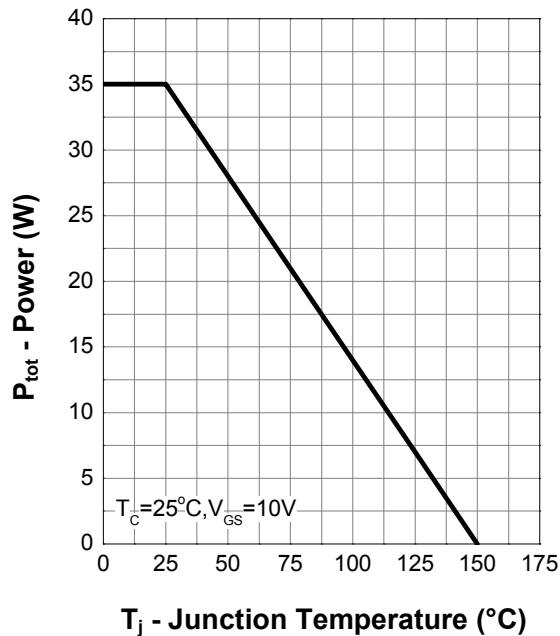
a : Pulse test ; pulse width ≤ 300 μs, duty cycle ≤ 2 %

b : Guaranteed by design, not subject to production testing

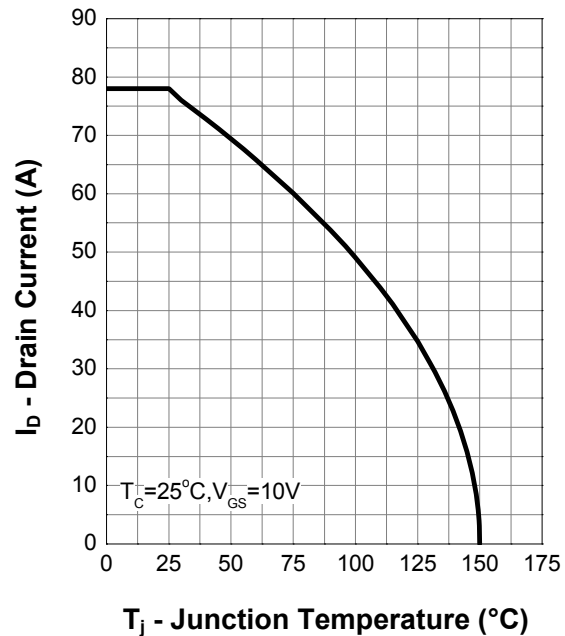


7. Typical Characteristics (Cont.)

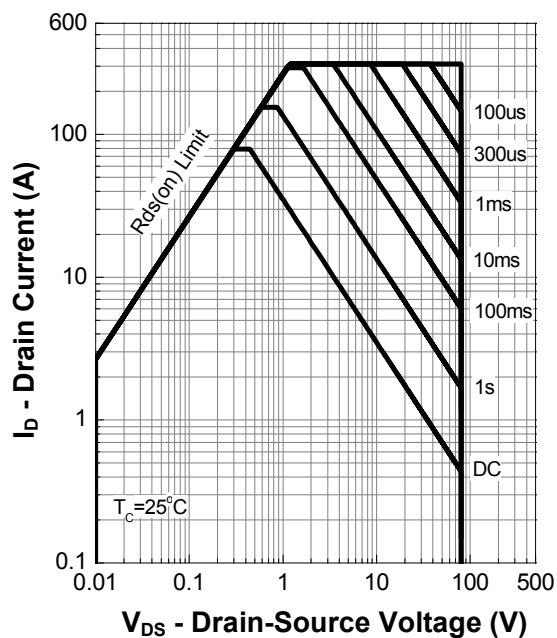
Power Capability



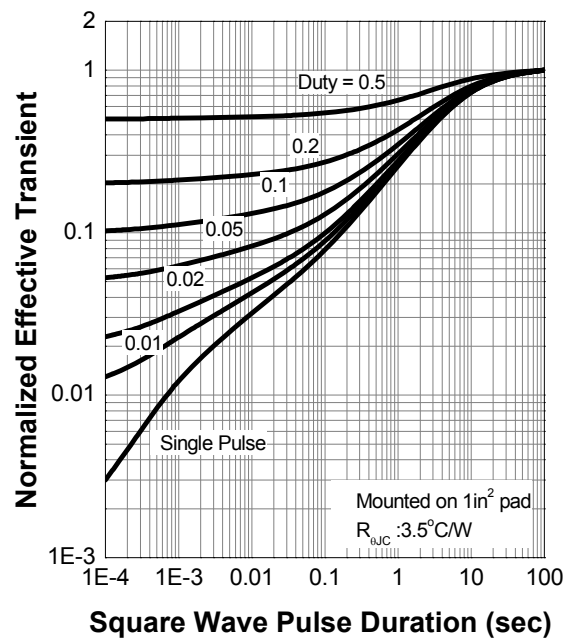
Current Capability

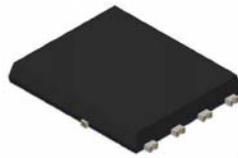


Safe Operation Area



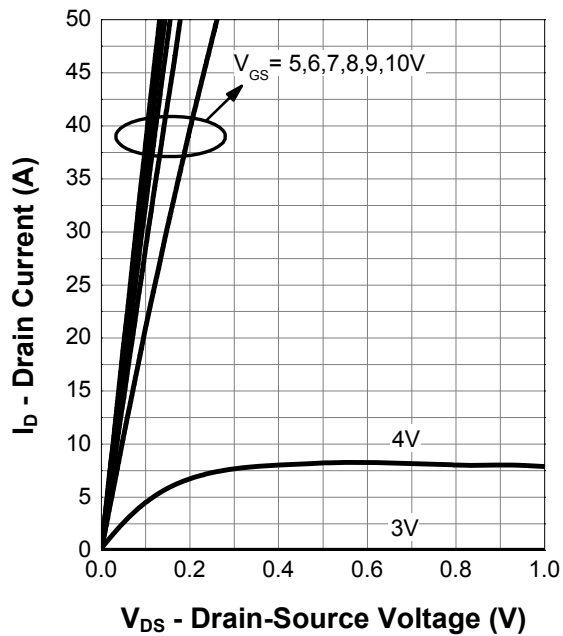
Transient Thermal Impedance



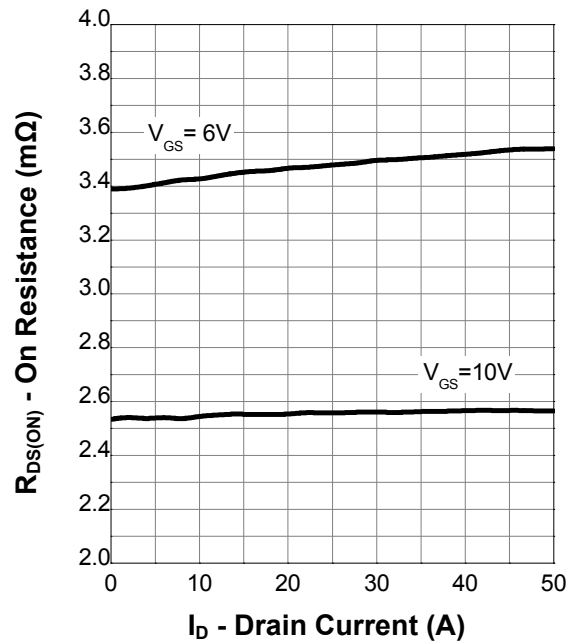


7. Typical Characteristics (Cont.)

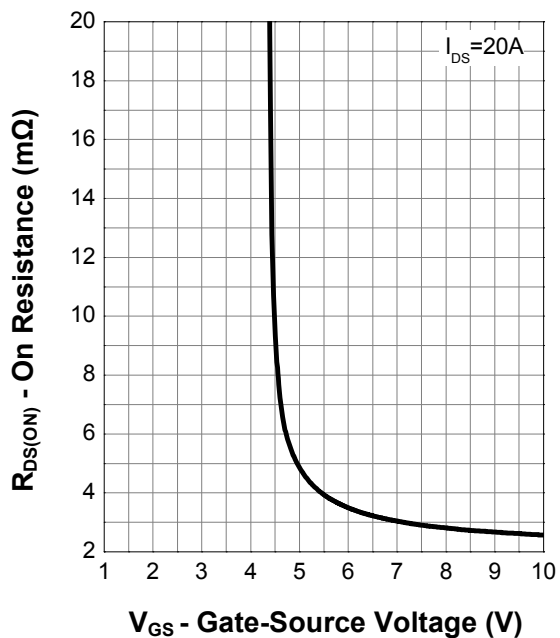
Output Characteristics



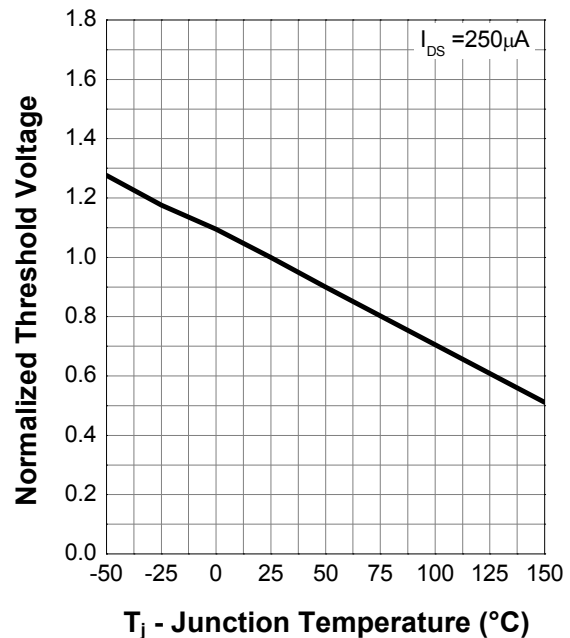
On Resistance

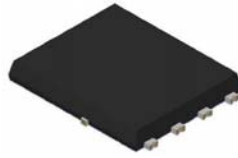


Transfer Characteristics

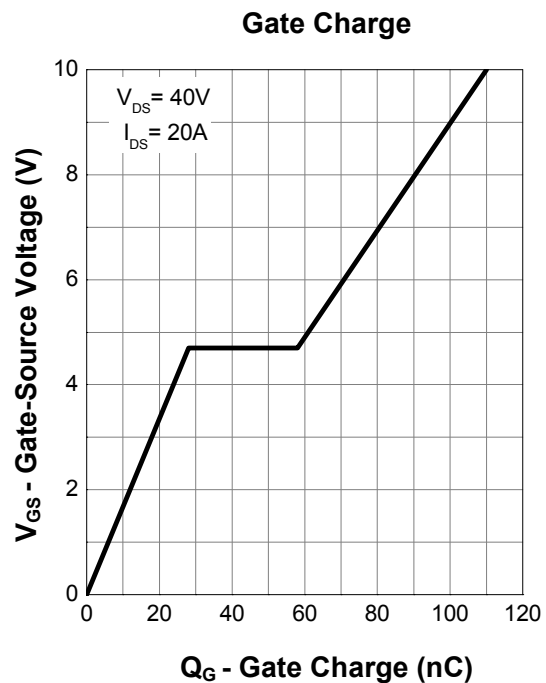
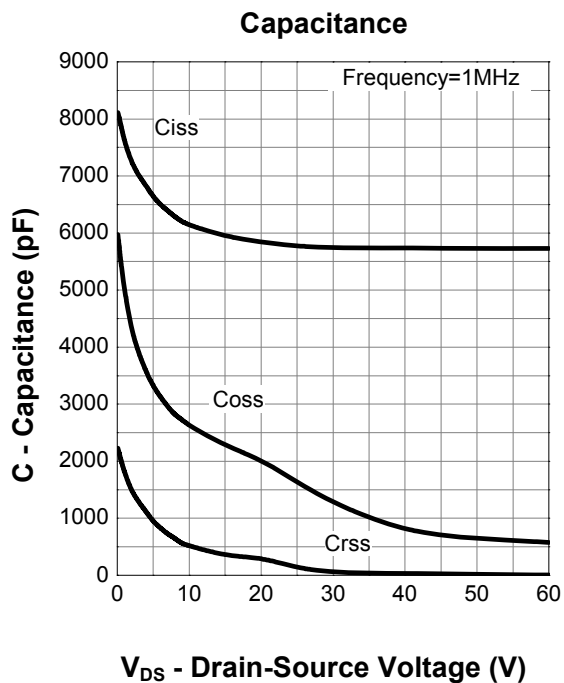
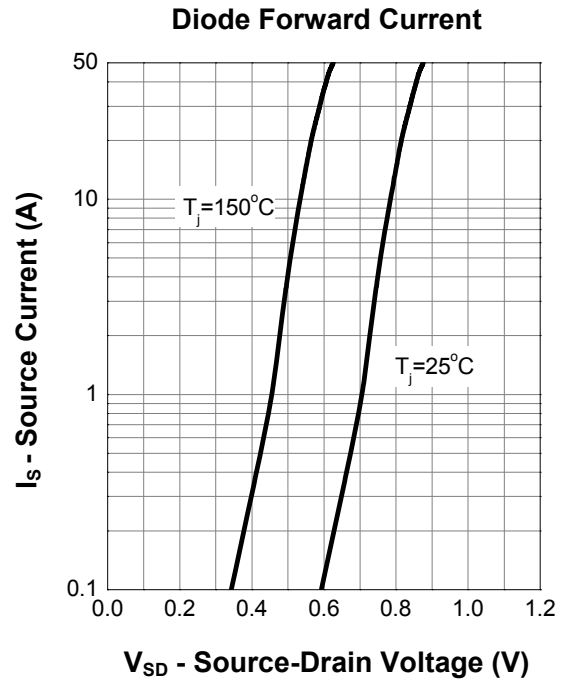
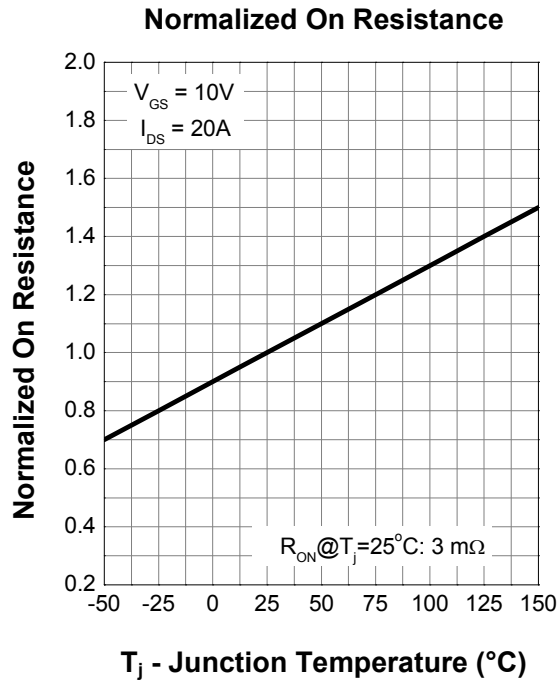


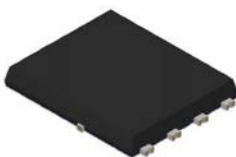
Normalized Threshold Voltage





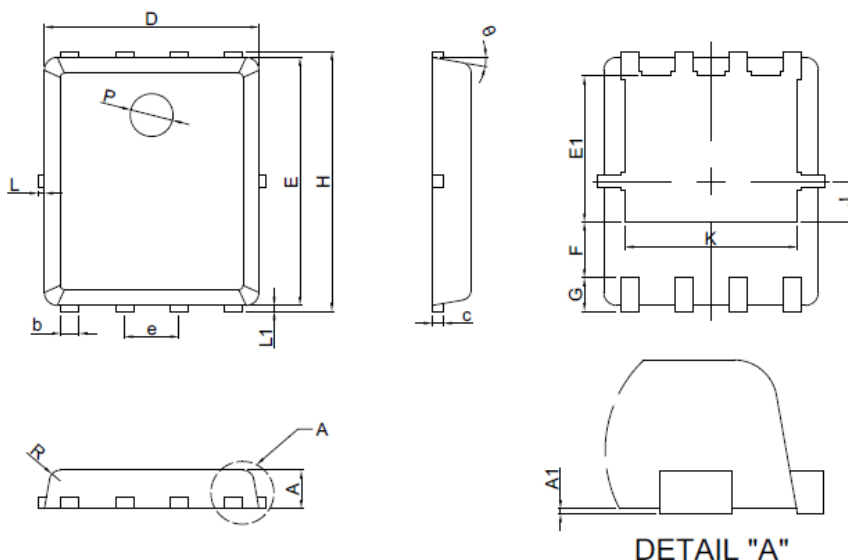
7. Typical Characteristics (Cont.)





8. Package Dimensions

PDFN5x6 - 8L Package



Symbol	Dimensions In Millimeters	
	MIN.	MAX.
A	0.80	1.00
A1	0.00	0.05
b	0.35	0.49
c	0.254REF	
D	4.90	5.10
F	1.40REF	
E	5.70	5.90
e	1.27BSC	
H	5.95	6.20
L1	0.10	0.18
G	0.60REF	
K	4.00REF	
L	-	0.15
J	0.95BSC	
P	1.00REF	
E1	3.40REF	
θ	6°	14°
R	0.25REF	