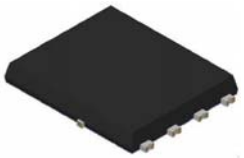
iM1635



Dual N-Channel Enhancement Mode MOSFET

1. Product Information

1.1 Features

- ☑ Surface-mounted package
- ☑ Advanced trench cell design

1.2 Applications

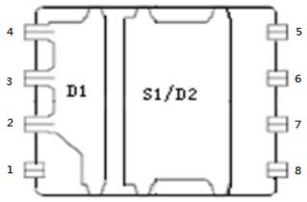
- ☑ MB and NB
- ☑ Half – bridge Drivers
- ☑ Motor drivers

1.3 Quick reference

Channel-1	Channel-2
☑ BV ≧ 30 V	☑ BV ≧ 30 V
☑ P_{tot} ≦ 44 W	☑ P_{tot} ≦ 78 W
☑ I_D ≦ 72 A	☑ I_D ≦ 96 A
☑ $R_{DS(ON)}$ ≦ 4.6 mΩ @ V_{GS} = 10 V	☑ $R_{DS(ON)}$ ≦ 2.3 mΩ @ V_{GS} = 10 V
☑ $R_{DS(ON)}$ ≦ 7.8 mΩ @ V_{GS} = 4.5 V	☑ $R_{DS(ON)}$ ≦ 3.6 mΩ @ V_{GS} = 4.5 V

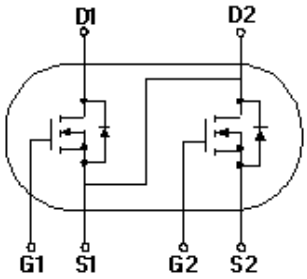
2. Pin Description

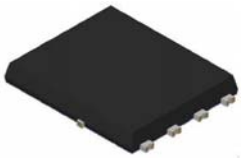
Pin	Description	Simplified Outline	Symbol
1	G1		
2,3,4	D1		
8	G2		
5,6,7	S2		



Bottom View

PDFN5x6B-8L





3. Limiting Values

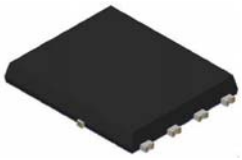
Symbol	Parameter	Conditions	Min	Max	Unit
Channel-1					
V_{DS}	Drain-Source Voltage	T_C = 25 ℃	-	30	V
V_{GS}	Gate-Source Voltage	T_C = 25 ℃	-	± 20	V
I_D*,***	Drain Current (DC)	T_C = 25 ℃, V_{GS} = 10 V	-	72	A
		T_C = 100 ℃, V_{GS} = 10 V	-	48	A
I_{DM}*,**	Drain Current (Pulsed)	T_C = 25 ℃, V_{GS} = 10 V	-	220	A
E_{AS}*	Single Pulsed Avalanche Energy	V_{DD}= 30 V , L= 1.0 mH	-	98	mJ
P_{tot}	Total Power Dissipation	T_C = 25 ℃	-	44	W
T_{stg}	Storage Temperature		- 55	150	℃
T_J	Junction Temperature		-	150	℃
I_S	Diode Forward Current	T_C = 25 ℃	-	72	A
$R_{\theta JA}$*	Thermal Resistance- Junction to Ambient		-	60	℃ / W
$R_{\theta JC}$*	Thermal Resistance- Junction to Case		-	2.8	℃ / W
Channel-2					
V_{DS}	Drain-Source Voltage	T_C = 25 ℃	-	30	V
V_{GS}	Gate-Source Voltage	T_C = 25 ℃	-	± 20	V
I_D*,***	Drain Current (DC)	T_C = 25 ℃, V_{GS} = 10 V	-	96	A
		T_C = 100 ℃, V_{GS} = 10 V	-	92	A
I_{DM}*,**	Drain Current (Pulsed)	T_C = 25 ℃, V_{GS} = 10 V	-	480	A
E_{AS}*	Single Pulsed Avalanche Energy	V_{DD}= 30 V , L= 1.0 mH	-	312	mJ
P_{tot}	Total Power Dissipation	T_C = 25 ℃	-	78	W
T_{stg}	Storage Temperature		- 55	150	℃
T_J	Junction Temperature		-	150	℃
I_S	Diode Forward Current	T_C = 25 ℃	-	96	A
$R_{\theta JA}$*	Thermal Resistance- Junction to Ambient		-	55	℃ / W
$R_{\theta JC}$*	Thermal Resistance- Junction to Case		-	1.6	℃ / W

Notes：

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

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

*** Limited by bonding wire

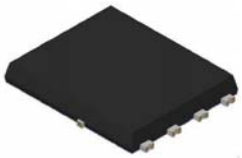


4. Marking Information

Product Name	Marking
iM1635	iM1635 XXXXX X : Date Code

5. Ordering Code

iM1635



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

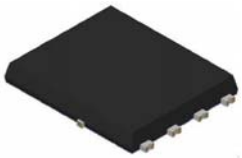
Channel-1:

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS} = 0 V, I_D = 250 μA	30	-	-	V
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_{DS} = 250 μA	1	-	2	V
I_{DSS}	Zero Gate Voltage Source Current	V_{DS} = 24 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	-	3.7	4.6	mΩ
		V_{GS} = 4.5 V, I_D = 10 A	-	6	7.8	
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	-	17	-	nS
Q_{rr}	Reverse Recovery Charge		-	3.8	-	nC
Dynamic Characteristics[b]						
C_{iss}	Input Capacitance	V_{GS} = 0 V, V_{DS} = 15 V Frequency = 1 MHz	-	954	-	pF
C_{oss}	Output Capacitance		-	457	-	
C_{rss}	Reverse Transfer Capacitance		-	61	-	
t_d(on)	Turn-on Delay Time	V_{DS} = 15 V, V_{GEN} = 10 V, R_G = 3.9 Ω, R_L = 0.75 Ω, I_D = 20 A	-	6.4	-	nS
t_r	Turn-on Rise Time		-	89	-	
t_d(off)	Turn-off Delay Time		-	18	-	
t_f	Turn-off Fall Time		-	28	-	
Gate Charge Characteristics[b]						
Q_g	Total Gate Charge	V_{GS} = 10 V, V_{DS} = 15 V, I_{DS} = 20 A	-	18	-	nC
Q_{gs}	Gate-Source Charge		-	4.4	-	
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



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

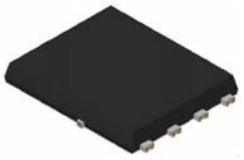
Channel-2:

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS} = 0 V, I_D = 250 μA	30	-	-	V
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_{DS} = - 250 μA	1	-	2	V
I_{DSS}	Zero Gate Voltage Source Current	V_{DS} = 24 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	-	1.9	2.3	mΩ
		V_{GS} = 4.5 V, I_D = 10 A	-	2.8	3.6	
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	-	29	-	nS
Q_{rr}	Reverse Recovery Charge		-	14	-	nC
Dynamic Characteristics[b]						
C_{iss}	Input Capacitance	V_{GS} = 0 V, V_{DS} = 15 V Frequency = 1 MHz	-	2292	-	pF
C_{oss}	Output Capacitance		-	1036	-	
C_{rss}	Reverse Transfer Capacitance		-	126	-	
t_d(on)	Turn-on Delay Time	V_{DS} = 15 V, V_{GEN} = 10 V, R_G = 3.9 Ω, R_L = 0.75 Ω, I_D = 20 A	-	8.3	-	nS
t_r	Turn-on Rise Time		-	65	-	
t_d(off)	Turn-off Delay Time		-	40	-	
t_f	Turn-off Fall Time		-	30	-	
Gate Charge Characteristics[b]						
Q_g	Total Gate Charge	V_{GS} = 10 V, V_{DS} = 15 V, I_{DS} = 20 A	-	42	-	nC
Q_{gs}	Gate-Source Charge		-	8.7	-	
Q_{gd}	Gate-Drain Charge		-	6.4	-	

Notes：

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

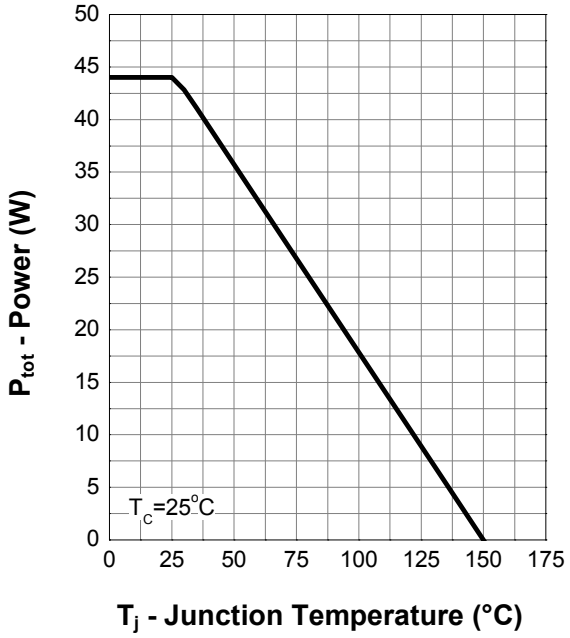
b : Guaranteed by design, not subject to production testing



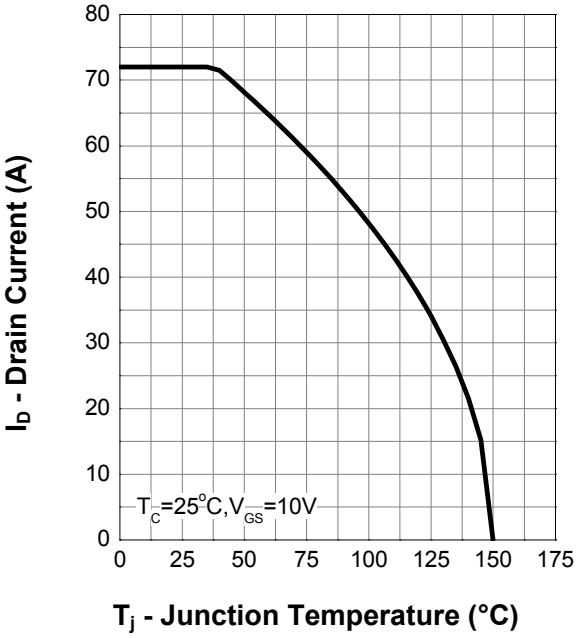
7. Typical Characteristics (Cont.)

Channel-1:

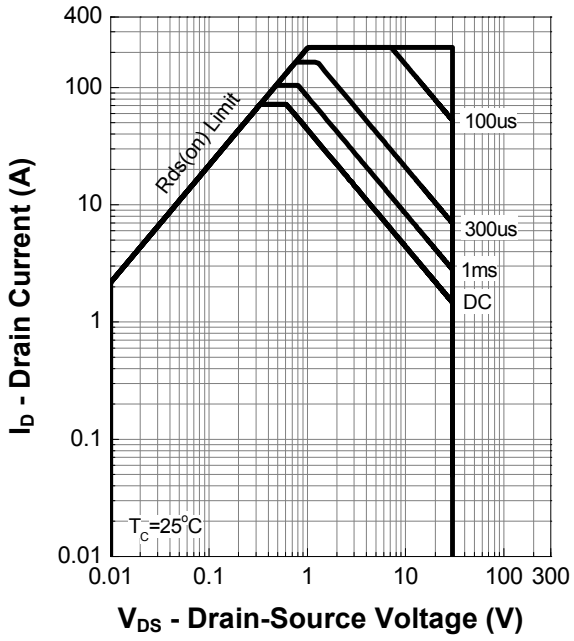
Power Capability



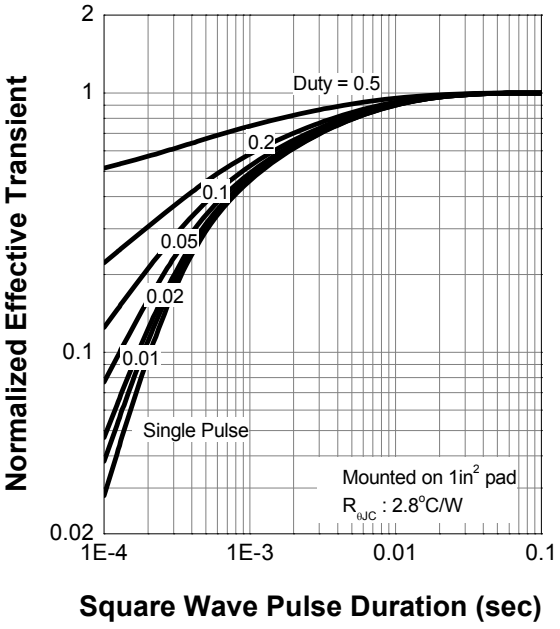
Current Capability

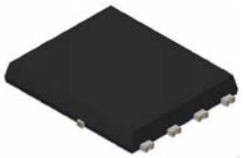


Safe Operation Area



Transient Thermal Impedance

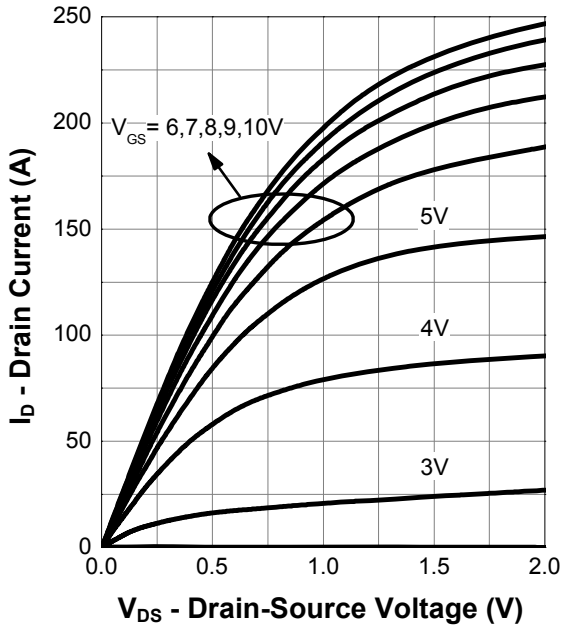




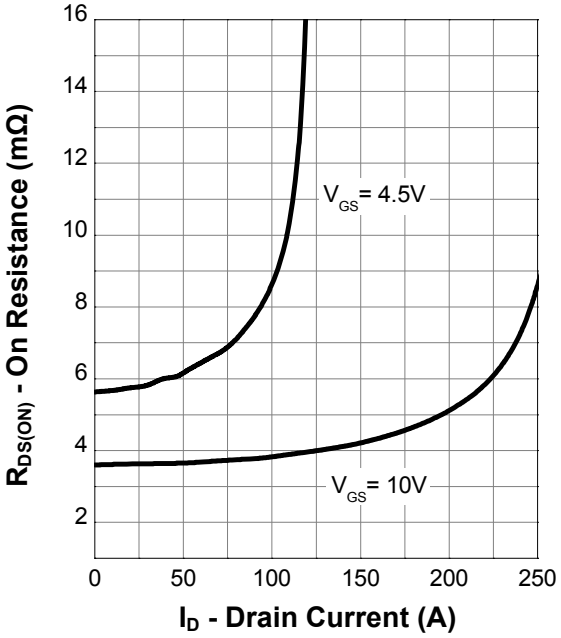
7. Typical Characteristics (Cont.)

Channel-1:

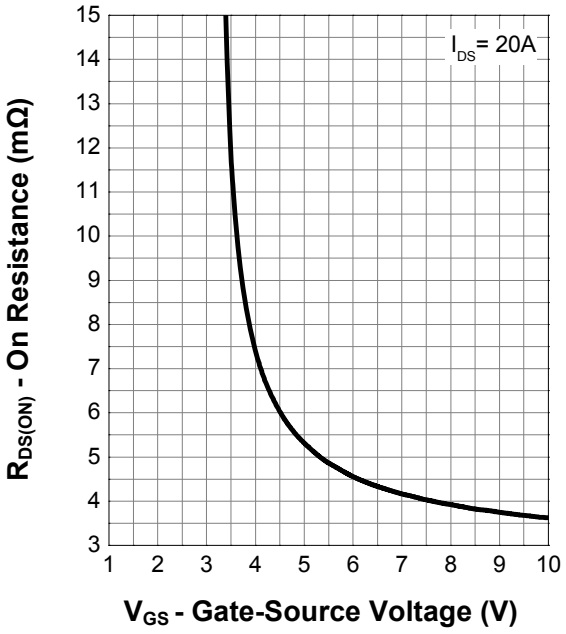
Output Characteristics



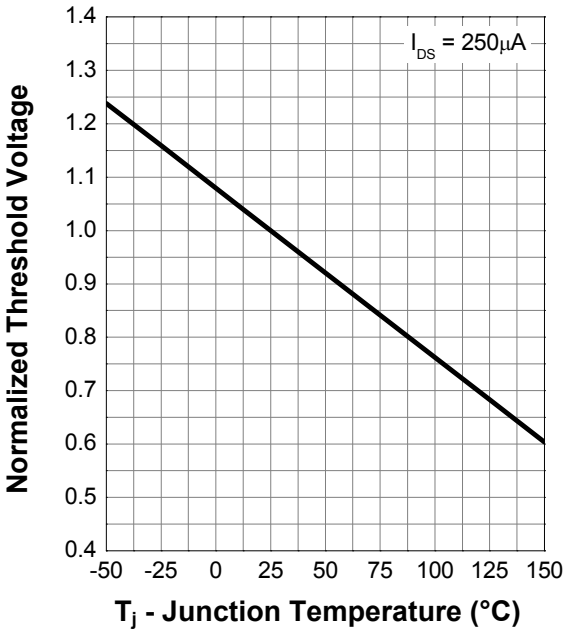
On Resistance

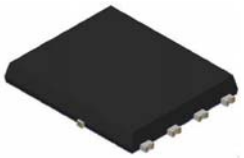


Transfer Characteristics



Normalized Threshold Voltage

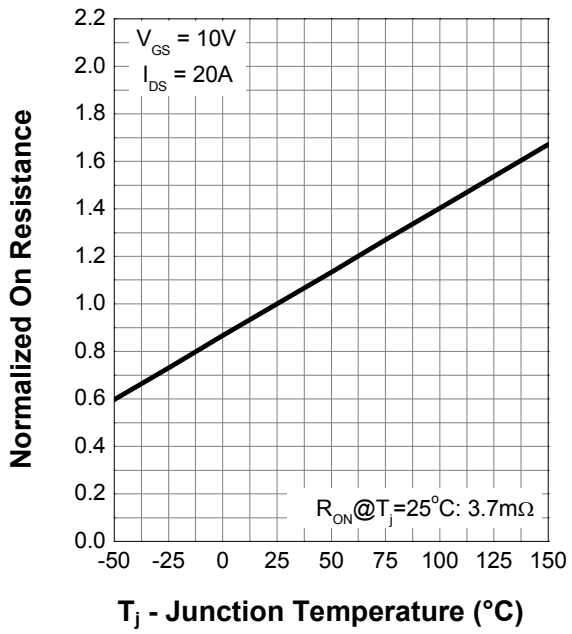




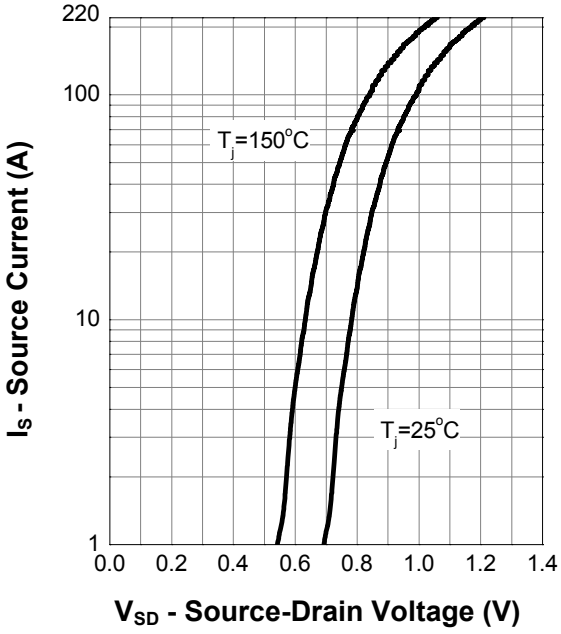
7. Typical Characteristics (Cont.)

Channel-1:

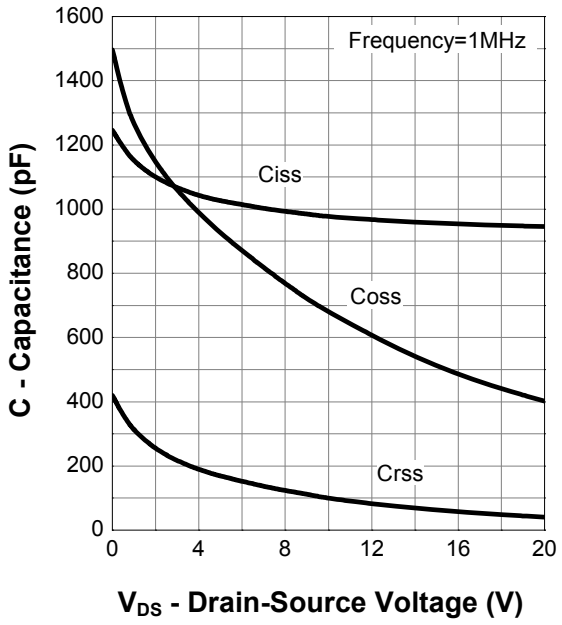
Normalized On Resistance



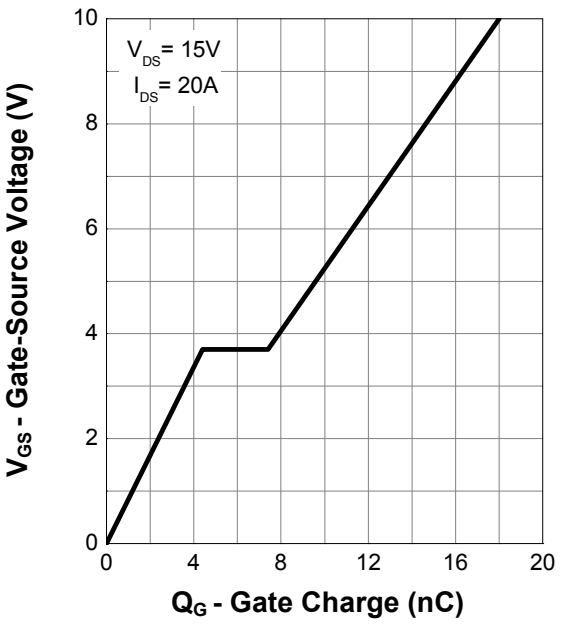
Diode Forward Current

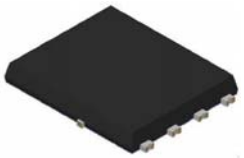


Capacitance



Gate Charge

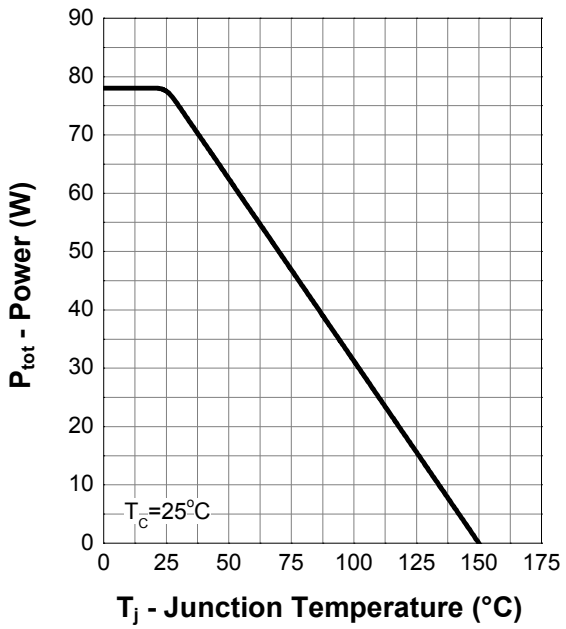




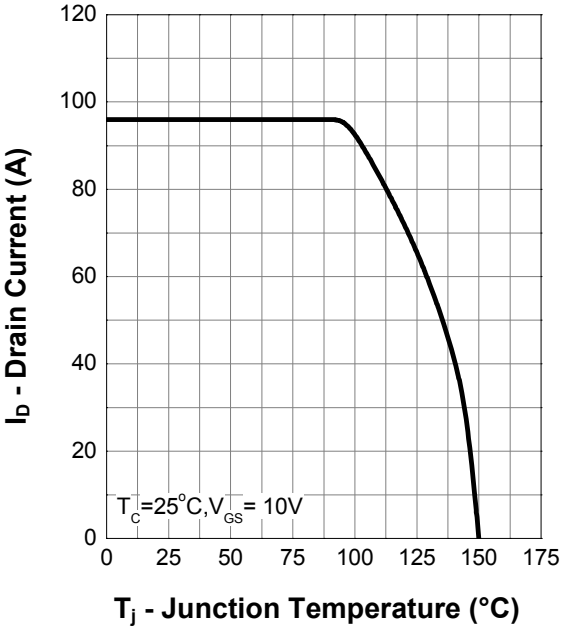
7. Typical Characteristics (Cont.)

Channel-2:

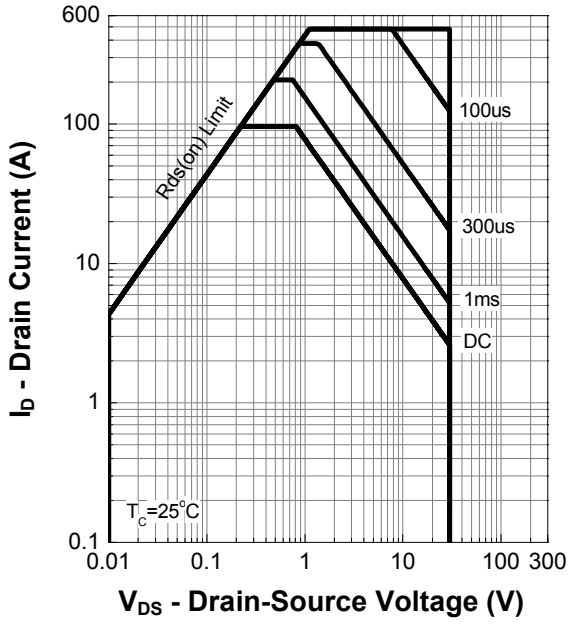
Power Capability



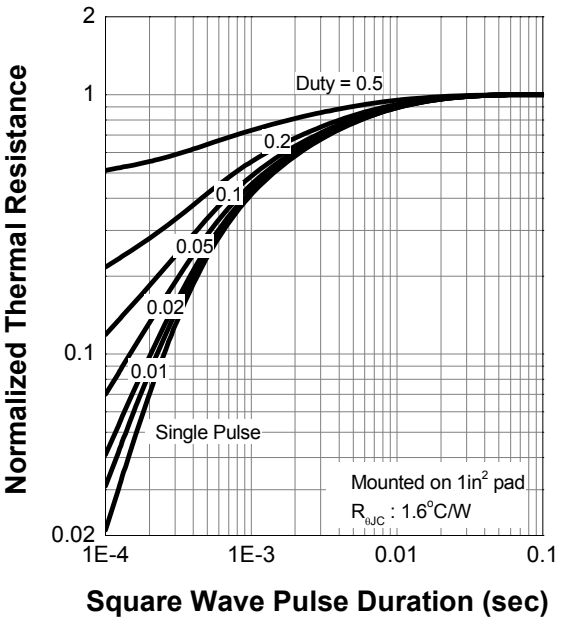
Current Capability

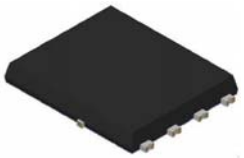


Safe Operation Area



Transient Thermal Impedance

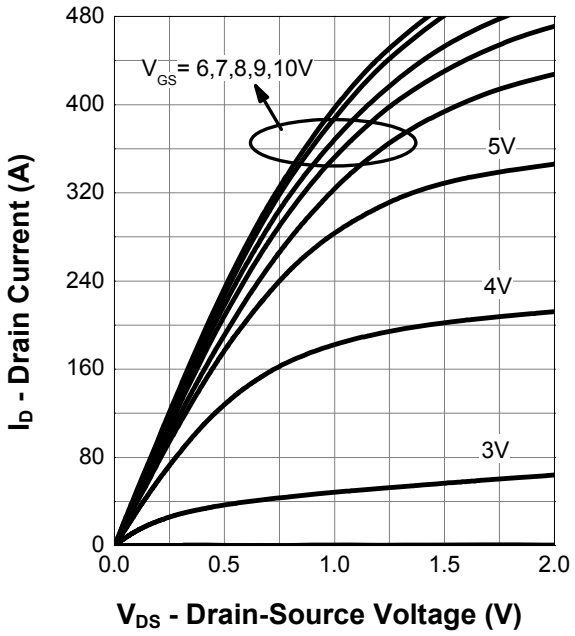




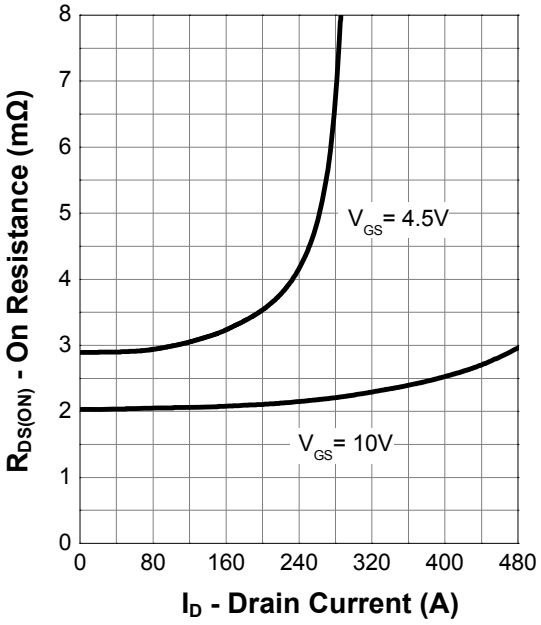
7. Typical Characteristics (Cont.)

Channel-2:

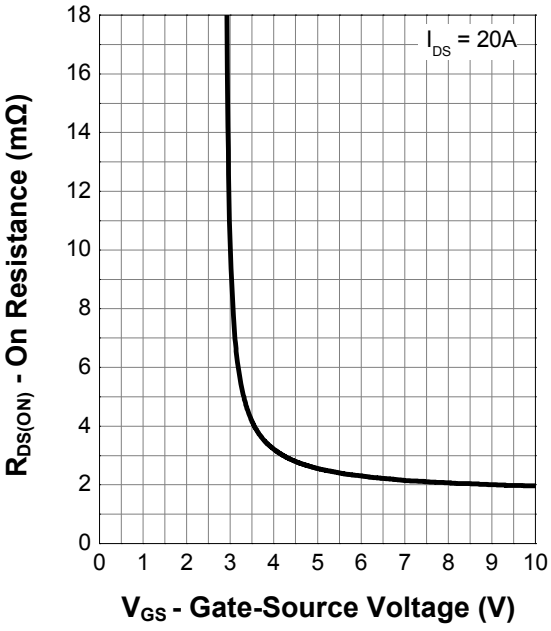
Output Characteristics



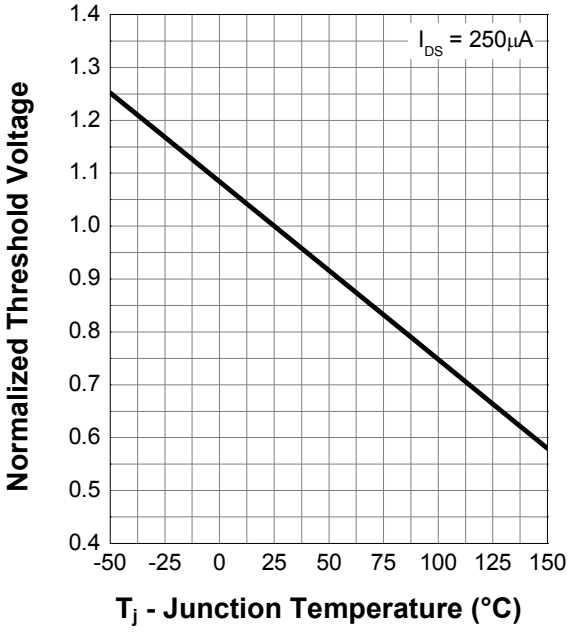
Drain-Source On Resistance

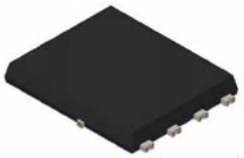


Transfer Characteristics



Normalized Threshold Voltage

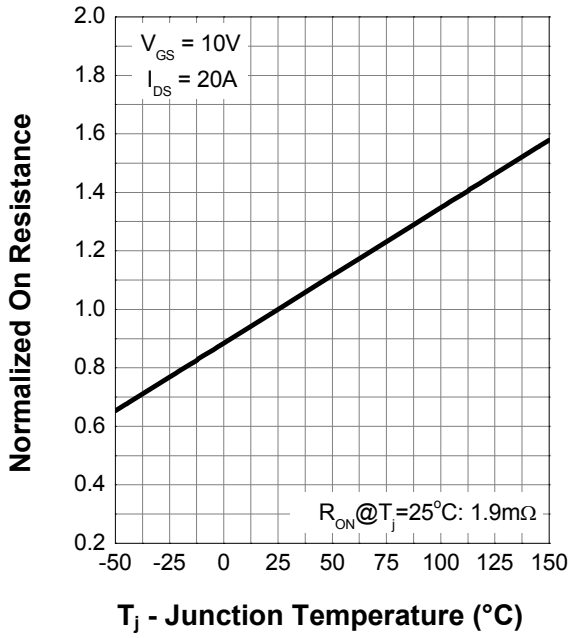




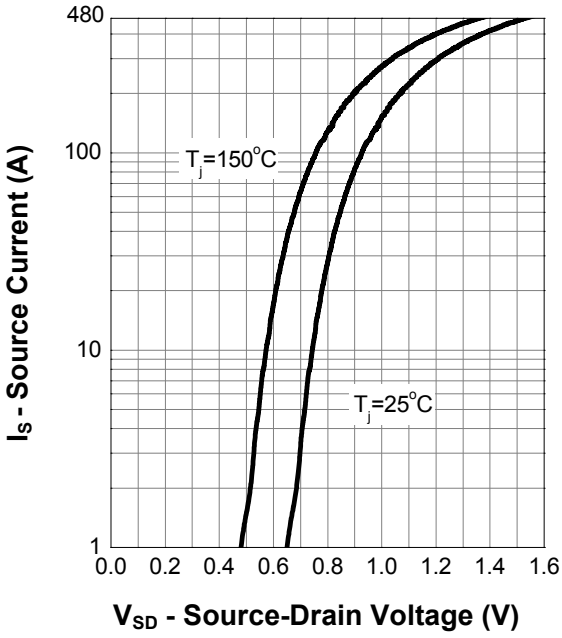
7. Typical Characteristics (Cont.)

Channel-2:

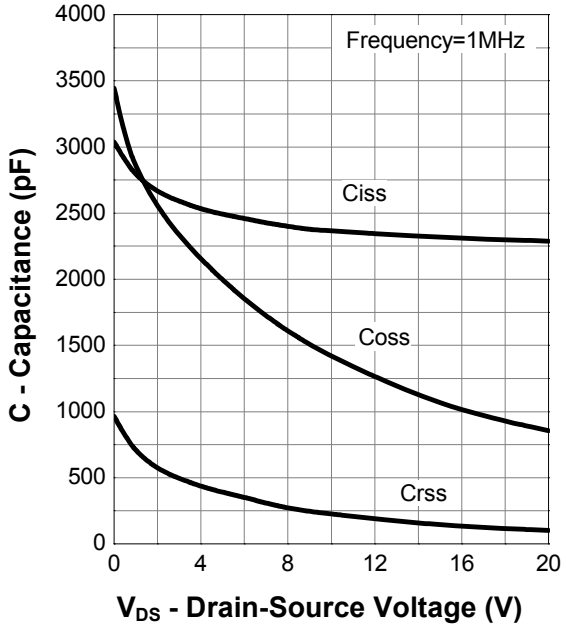
Normalized On Resistance



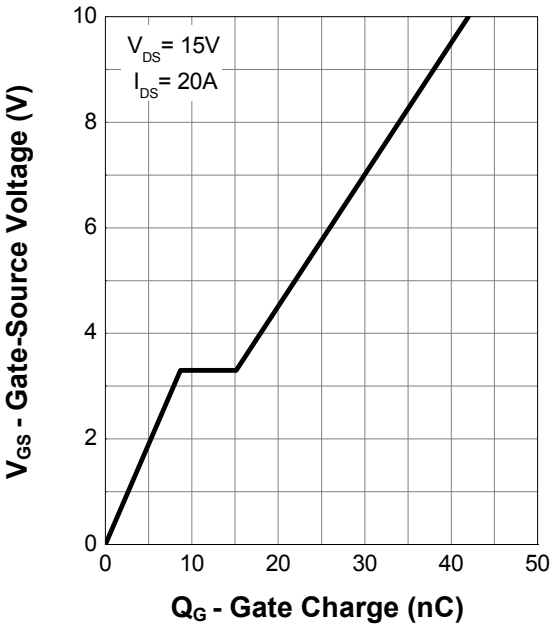
Diode Forward Current

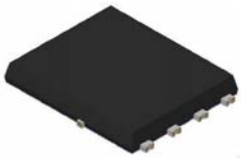


Capacitance



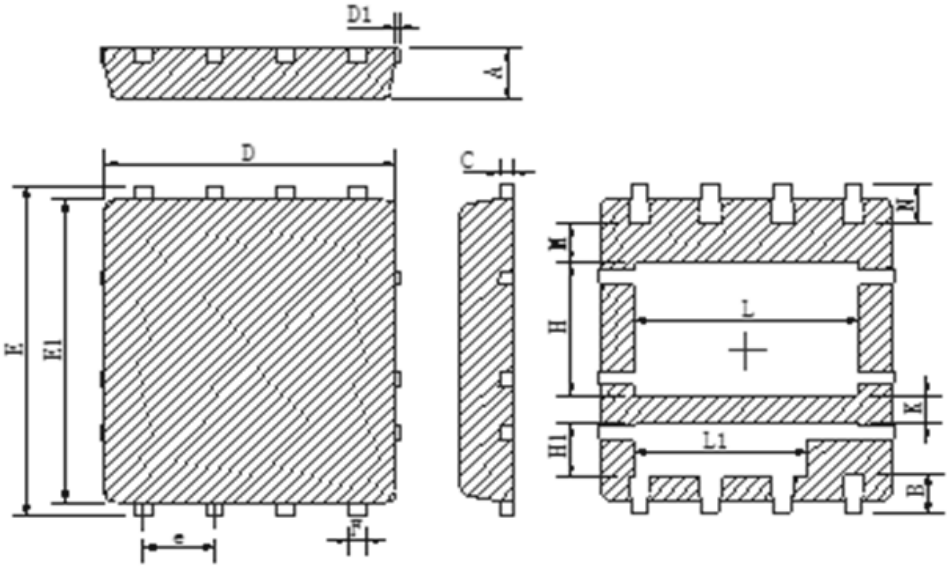
Gate Charge





8. Package Dimensions

PDFN 5x6B- 8L (Dual) Package



Symbol	Dimensions In Millimeters	
	MIN.	MAX.
A	0.9	1.0
B	0.6	0.8
C	0.2	0.3
D	5.1	5.3
D1	-	0.12
E	5.95	6.15
E1	5.4	5.7
e	1.22	1.32
F	0.25	0.35
H	2.35	2.55
H1	0.88	1.08
L	3.8	4.2
L1	3.0	3.2
M	0.6	0.8
N	0.63	0.83
K	0.4	0.6