

P-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

$BV \geq -40\text{ V}$

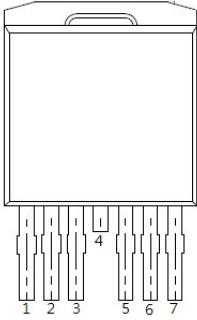
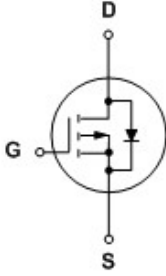
$P_{tot} \cong 375$

$I_D \cong -180\text{ A}$

$R_{DS(ON)} \leq 2.2\text{ m}\Omega @ V_{GS} = -10\text{ V}$

$R_{DS(ON)} \leq 4.2\text{ m}\Omega @ V_{GS} = -4.5\text{ V}$

2. Pin Description

Pin	Description	Simplified Outline	Symbol
1	Gate(G)	 <p>Top View TO-263-7L</p>	
2,3	Source (S)		
4	Drain(D)		
5,6,7	Source (S)		

3. Limiting Values

Symbol	Parameter	Conditions	Min	Max	Unit
V _{DS}	Drain-Source Voltage	T _C = 25 °C	-	- 40	V
V _{GS}	Gate-Source Voltage	T _C = 25 °C	-	± 20	V
I _D *	Drain Current (DC)	T _C = 25 °C, V _{GS} = - 10 V	-	- 180	A
		T _C = 100 °C, V _{GS} = - 10 V	-	- 120	A
I _{DM} **	Drain Current (Pulsed)	T _C = 25 °C, V _{GS} = - 10 V	-	- 600	A
P _{tot} *	Total Power Dissipation	T _C = 25 °C	-	375	W
T _{stg}	Storage Temperature		- 55	150	°C
T _J	Junction Temperature		-	150	°C
I _S	Diode Forward Current	T _C = 25 °C	-	- 180	A
E _{AS} *	Single Pulsed Avalanche Energy	V _{DD} = - 30 V , L = 1 mH	-	1568	mJ
R _{θJA} *	Thermal Resistance- Junction to Ambient		-	40	°C / W
R _{θJC} *	Thermal Resistance- Junction to Case		-	0.4	

Notes :

- * Surface Mounted on 1 in² pad area, t ≤ 10 sec
- ** Pulse width ≤ 300 μs, duty cycle ≤ 2 %
- *** limited by bonding wire

4. Ordering Code

Product Name	Package	Reel Size	Tape width	Quantity	Note
IPB180P04P4L-02	TO263-7L(D2-PAK)			1000	

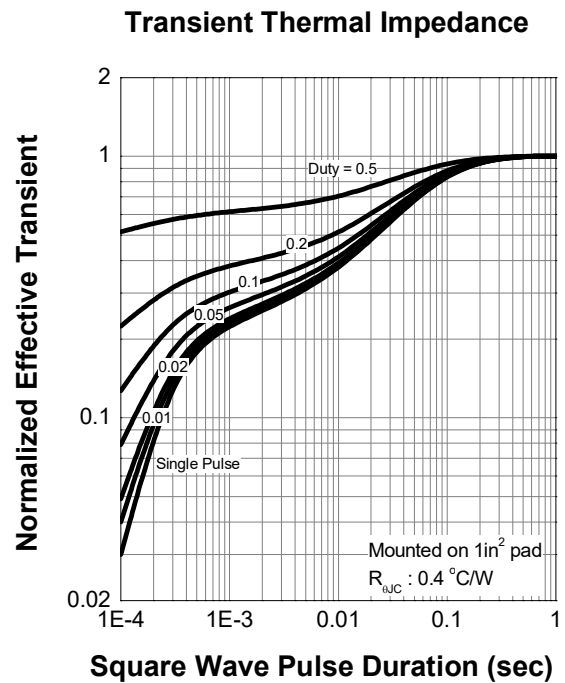
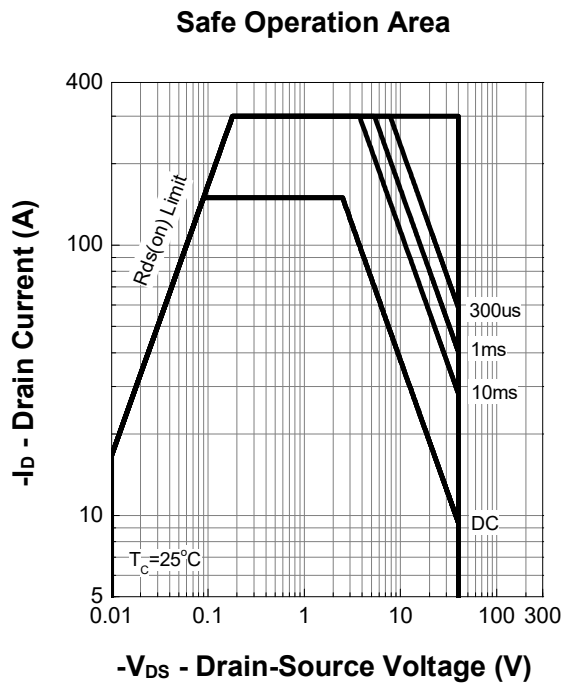
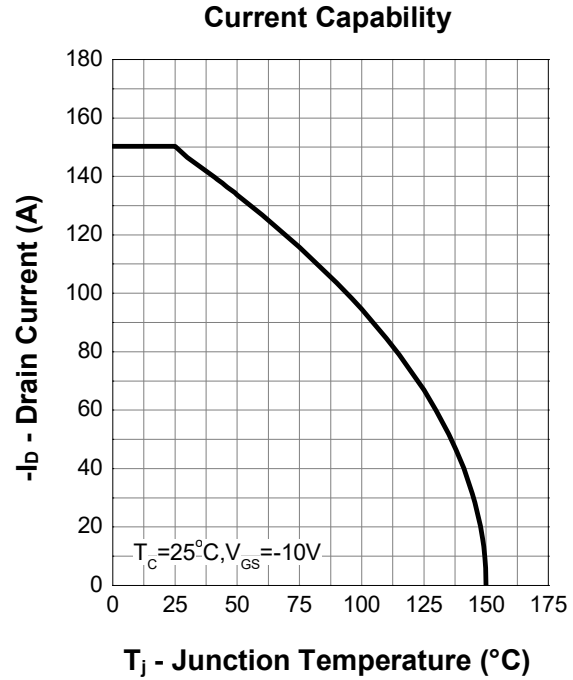
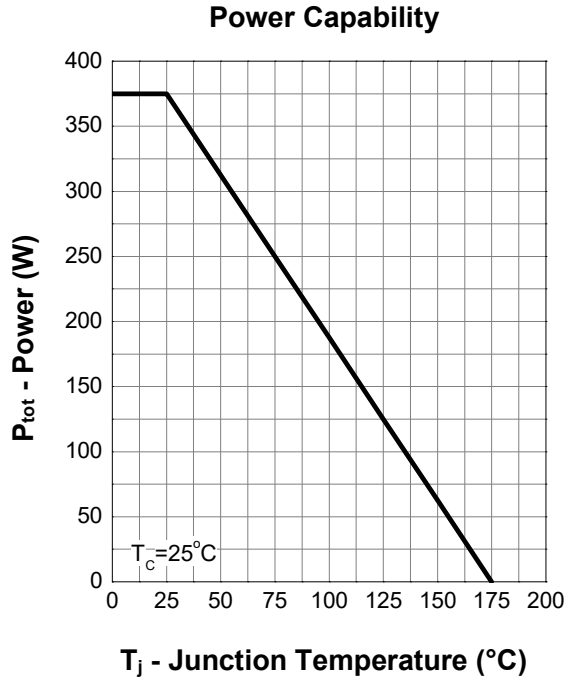
5. Electrical Characteristics (T_A = 25 °C Unless Otherwise Noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static Characteristics						
B _V 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	-	- 3	V
I _{DSS}	Zero Gate Voltage Source Current	V _{DS} = - 36 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 = - 50 A	-	1.8	2.2	mΩ
		V _{GS} = - 4.5 V, I _D = - 30 A	-	3.8	4.2	
Diode Characteristics						
V _{SD} ^a	Diode Forward Voltage	I _{SD} = - 50 A, V _{GS} = 0 V	-	-	- 1.3	V
t _{rr}	Reverse Recovery Time	I _{SD} = - 30 A, dI _{SD} /dt = 100 A/μs	-	37	-	nS
Q _{rr}	Reverse Recovery Charge		-	30	-	nC
Dynamic Characteristics^b						
C _{iss}	Input Capacitance	V _{GS} = 0 V, V _{DS} = - 15 V Frequency = 1 MHz	-	12977	-	pF
C _{oss}	Output Capacitance		-	1526	-	
C _{rss}	Reverse Transfer Capacitance		-	517	-	
t _{d(on)}	Turn-on Delay Time	V _{DS} = - 15 V, V _{GEN} = - 10 V, R _G = 3.9 Ω, R _L = 0.3 Ω, I _{DS} = - 50 A	-	21	-	nS
t _r	Turn-on Rise Time		-	195	-	
t _{d(off)}	Turn-off Delay Time		-	177	-	
t _f	Turn-off Fall Time		-	109	-	
Gate Charge Characteristics^b						
Q _g	Total Gate Charge	V _{DS} = - 15 V, V _{GS} = - 10 V, I _{DS} = - 50 A	-	212	-	nC
Q _{gs}	Gate-Source Charge		-	60	-	
Q _{gd}	Gate-Drain Charge		-	35	-	

Notes :

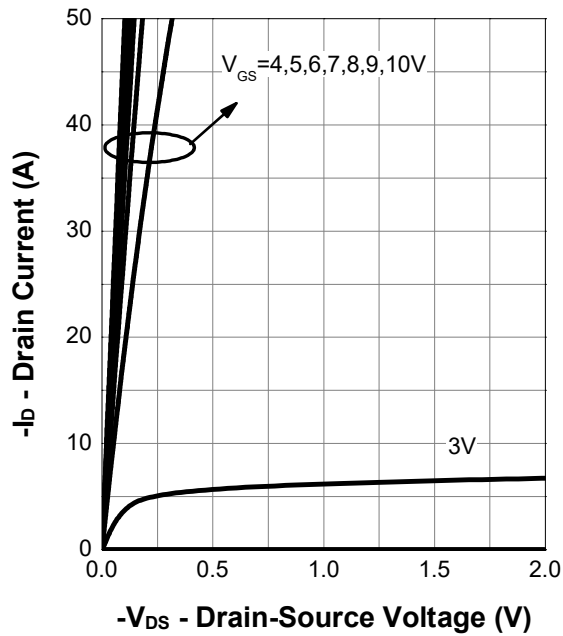
- a : Pulse test ; pulse width ≤ 300 μs, duty cycle ≤ 2 %
- b : Guaranteed by design, not subject to production testing

6. Typical Characteristics (Cont.)

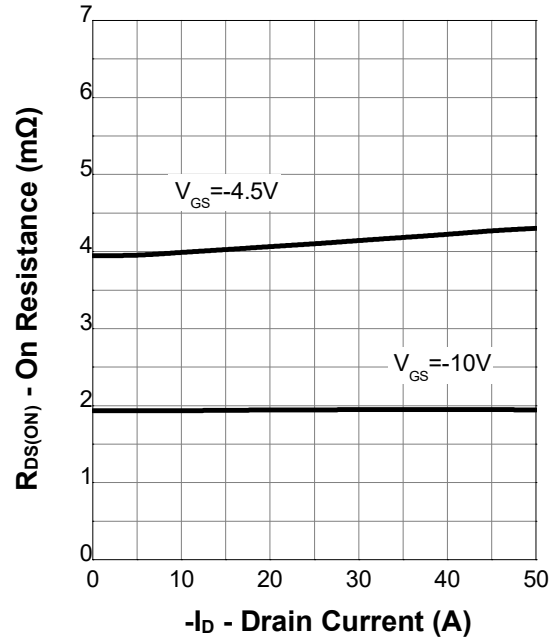


6. Typical Characteristics (Cont.)

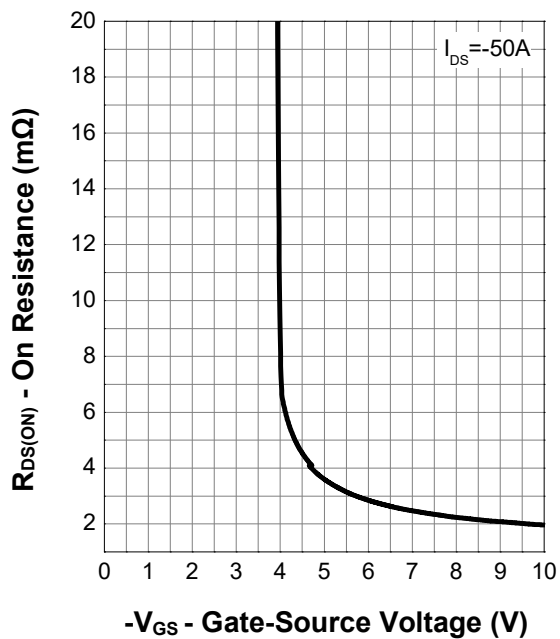
Output Characteristics



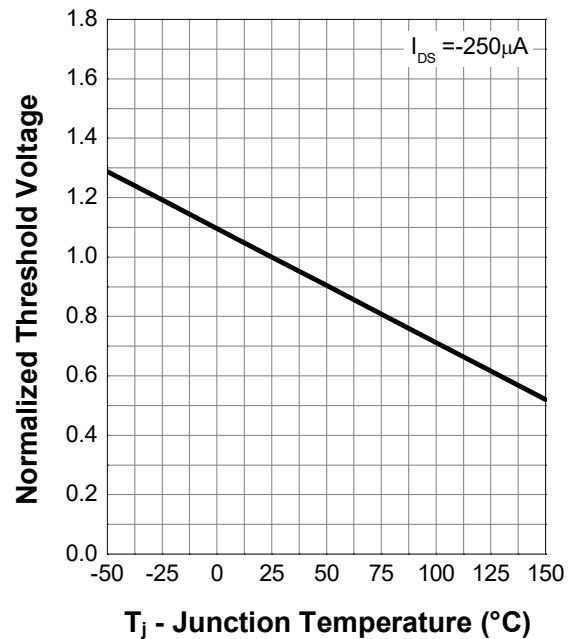
On Resistance



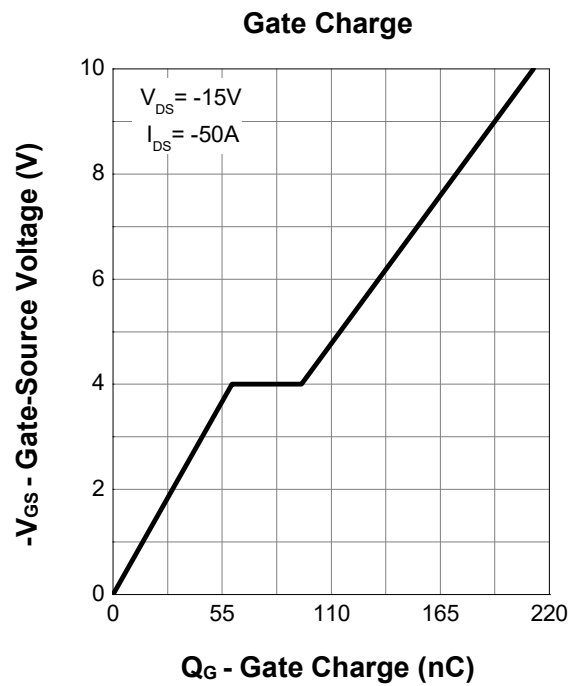
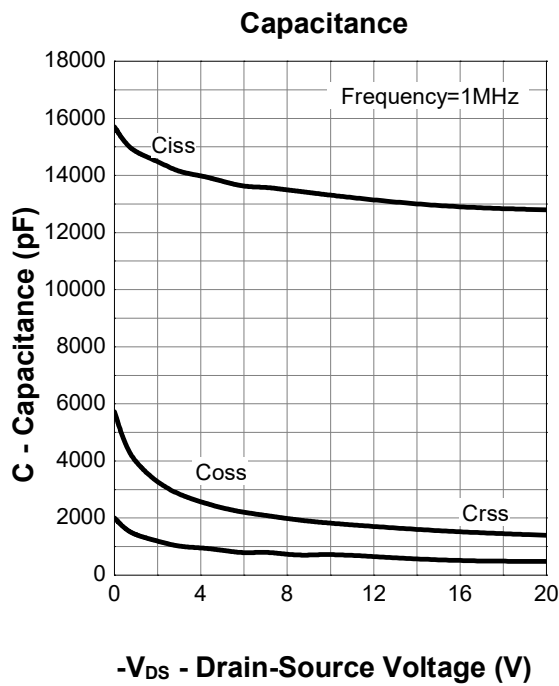
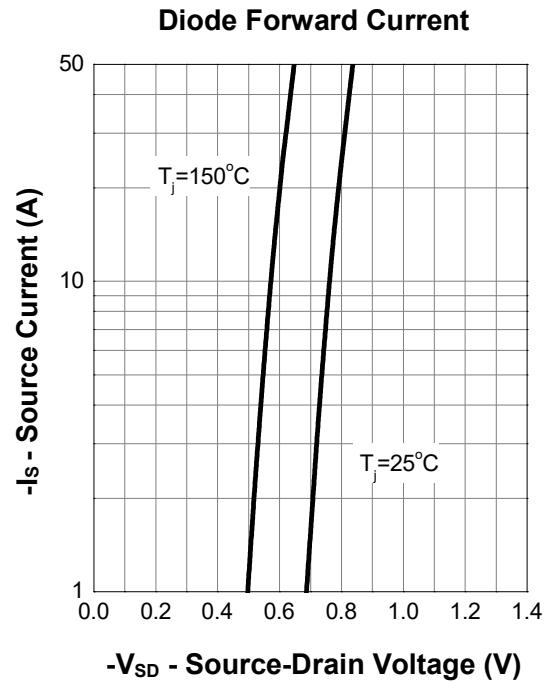
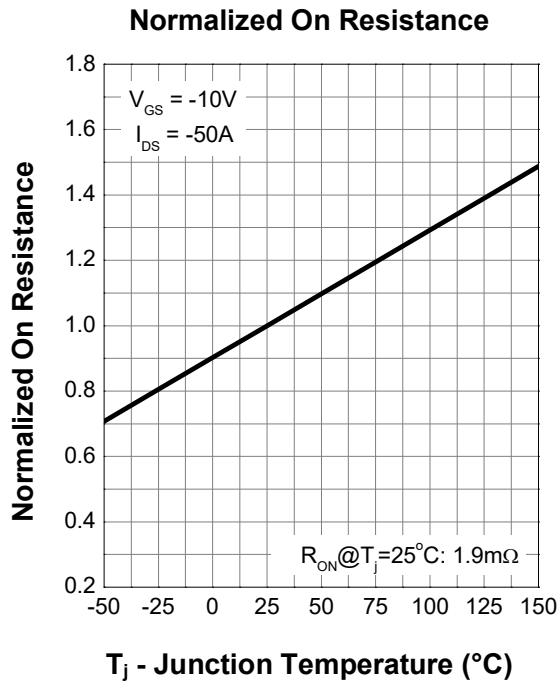
Transfer Characteristics



Normalized Threshold Voltage

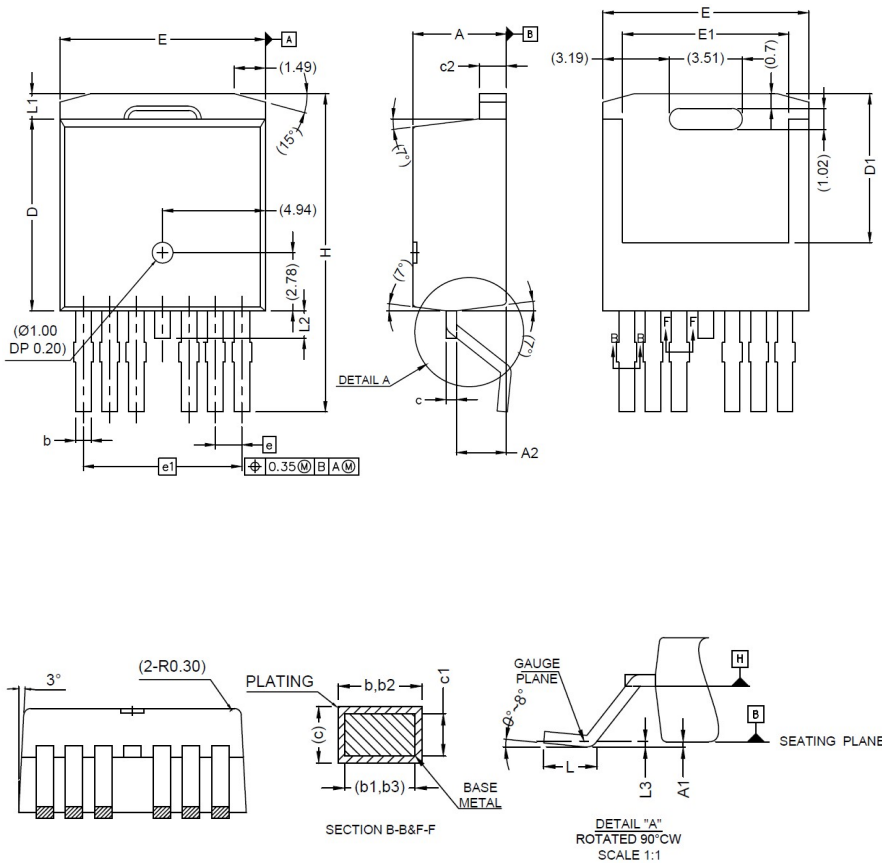


6. Typical Characteristics (Cont.)



7. Package Dimensions

TO-263-7L Package



Symbol	Dimensions In Millimeters	
	MIN.	MAX.
A	4.30	4.70
A1	-	0.25
A2	2.20	2.60
b	0.65	0.85
b1	0.65	0.80
b2	0.80	1.00
b3	0.80	0.95
c	0.45	0.60
c1	0.45	0.55
c2	1.25	1.40
D	9.00	9.40
D1	6.86	7.42
E	9.68	10.08
E1	7.70	8.30
e	1.27 BSC	
e1	7.62 BSC	
L	1.78	2.79
L1	-	1.60
L2	-	1.78
L3	0.25BSD	
H	14.61	15.88