



## Description

The IPD90P03P4L-04 uses advanced trench technology to provide excellent  $R_{DS(ON)}$ , low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a Battery protection or in other Switching application.

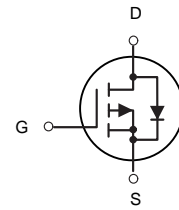


TO-252-2L

## General Features

$V_{DS} = -30V$   $I_D = -120A$

$R_{DS(ON)} < 4.5m\Omega @ V_{GS} = -10V$



P-Channel MOSFET

## Application

Lithium battery protection

Wireless impact

Mobile phone fast charging

## Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
IPD90P03P4L-04	TO-252-2L	90P03 XXXX	2500

## Absolute Maximum Ratings (TC=25°C unless otherwise noted)

Symbol	Parameter	Max.	Units
VDSS	Drain-Source Voltage	-30	V
VGSS	Gate-Source Voltage	±20	V
ID	Continuous Drain Current $T_C = 25^\circ C$	-120	A
ID	Continuous Drain Current $T_C = 100^\circ C$	-80	A
IDM	Pulsed Drain Current <sup>note1</sup>	-470	A
EAS	Single Pulsed Avalanche Energy <sup>note2</sup>	580	mJ
PD	Power Dissipation $T_C = 25^\circ C$	100	W
RθJC	Thermal Resistance, Junction to Case	1.4	°C/W
TJ, TSTG	Operating and Storage Temperature Range	-55 to +175	°C



**Electrical Characteristics ( $T_J=25^{\circ}\text{C}$  unless otherwise noted)**

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=-250\mu A$	-30			V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS}=-30V, V_{GS}=0V$			-1	$\mu A$
$I_{GSS}$	Gate-Body Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$			$\pm 100$	nA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=-250\mu A$	-1	-1.7	-2.5	V
$g_{FS}$	Forward Transconductance	$V_{DS}=-5V, I_D=-20A$		65		S
$R_{DS(on)}$	Drain-Source On-State Resistance	$V_{GS}=-10V, I_D=-20A$		3.7	4.5	m $\Omega$
		$V_{GS}=-4.5V, I_D=-20A$		6	8.2	m $\Omega$
$C_{iss}$	Input Capacitance	$V_{DS}=-15V, V_{GS}=0V,$ $f=1.0MHz$		7000		pF
$C_{oss}$	Output Capacitance			820		pF
$C_{rss}$	Reverse Transfer Capacitance			540		pF
$R_g$	Gate resistance	$V_{GS}=0V, V_{DS}=0V, f=1.0MHz$		2.2		$\Omega$
$t_{d(on)}$	Turn-on Delay Time	$V_{GS}=-10V, V_{DS}=-15V,$ $R_L=0.75\Omega, R_{GEN}=3\Omega$		14		nS
$t_r$	Turn-on Rise Time			13		nS
$t_{d(off)}$	Turn-Off Delay Time			65		nS
$t_f$	Turn-Off Fall Time			37		nS
$Q_g$	Total Gate Charge	$V_{GS}=-10V, V_{DS}=-15V, I_D=-20A$		130		nC
$Q_{gs}$	Gate-Source Charge			12		nC
$Q_{gd}$	Gate-Drain Charge			31		nC
$I_{SD}$	Source-Drain Current (Body Diode)				-108	A
$V_{SD}$	Forward on Voltage (Note 3)	$V_{GS}=0V, I_S=-20A$			-1.2	V
$t_{rr}$	Reverse Recovery Time	$I_F=-20A, di/dt=100A/\mu s$		30		ns
$Q_{rr}$	Reverse Recovery Charge	$I_F=-20A, di/dt=100A/\mu s$		40		nC

Notes 1.Repetitive Rating: Pulse width limited by maximum junction temperature.

Notes 2.EAS condition:  $T_J=25^{\circ}\text{C}, V_{DD}=15V, V_G=-10V, R_g=25\Omega, L=0.5mH$ .

Notes 3.Repetitive Rating: Pulse width limited by maximum junction temperature.



## Typical Electrical And Thermal Characteristics (Curves)

Figure 1. Output Characteristics

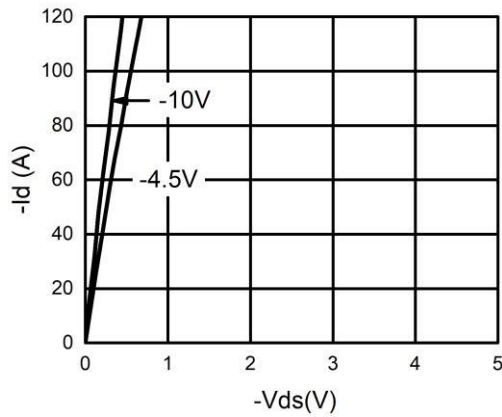


Figure 2. Transfer Characteristics

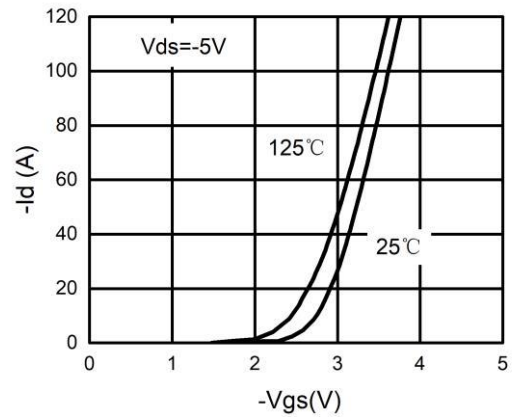


Figure 3. Power Dissipation

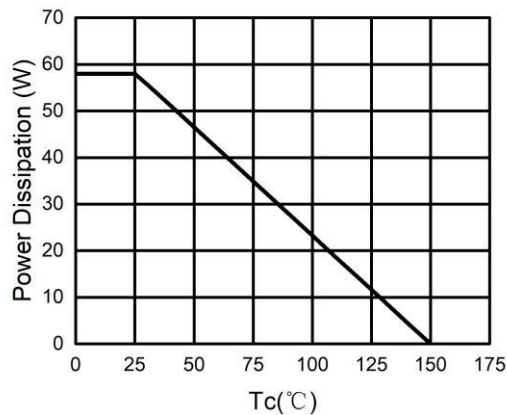


Figure 4. Drain Current

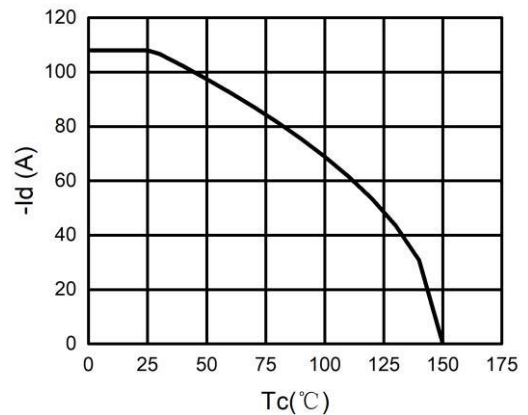


Figure 5.  $BV_{DSS}$  vs Junction Temperature

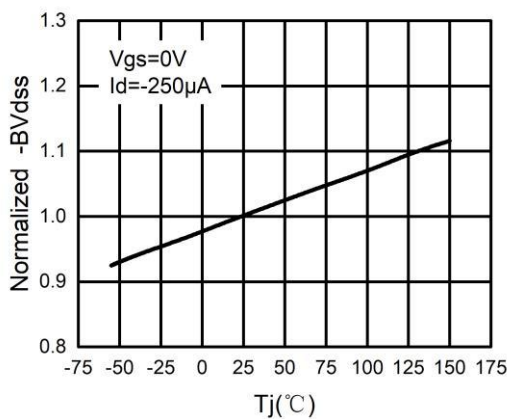


Figure 6.  $R_{DS(ON)}$  vs Junction Temperature

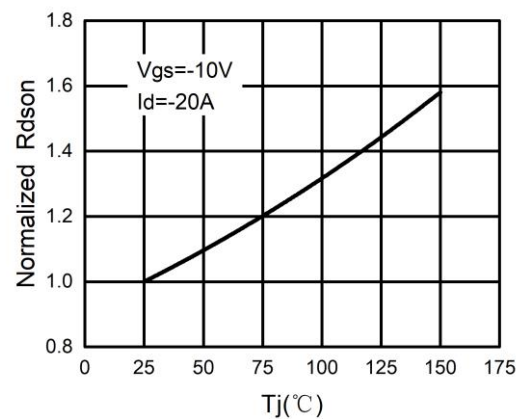




Figure 7. Gate Charge Waveforms

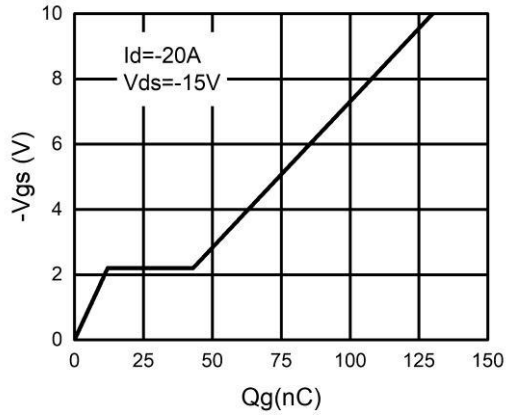


Figure 8. Capacitance

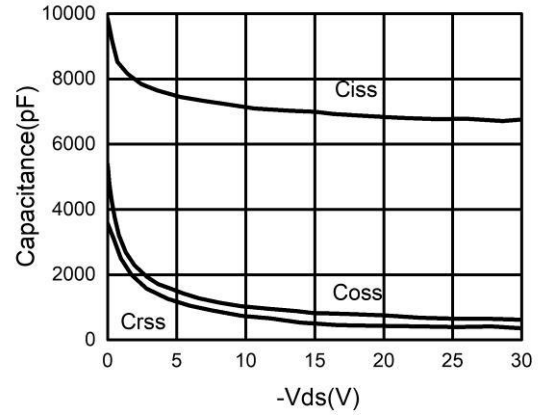


Figure 9. Body-Diode Characteristics

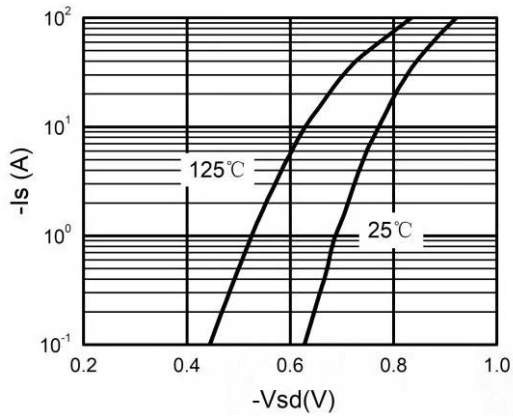
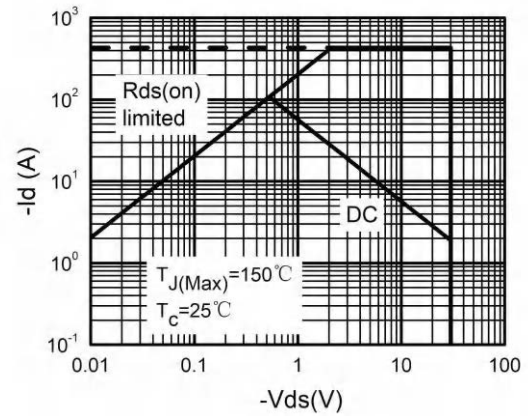
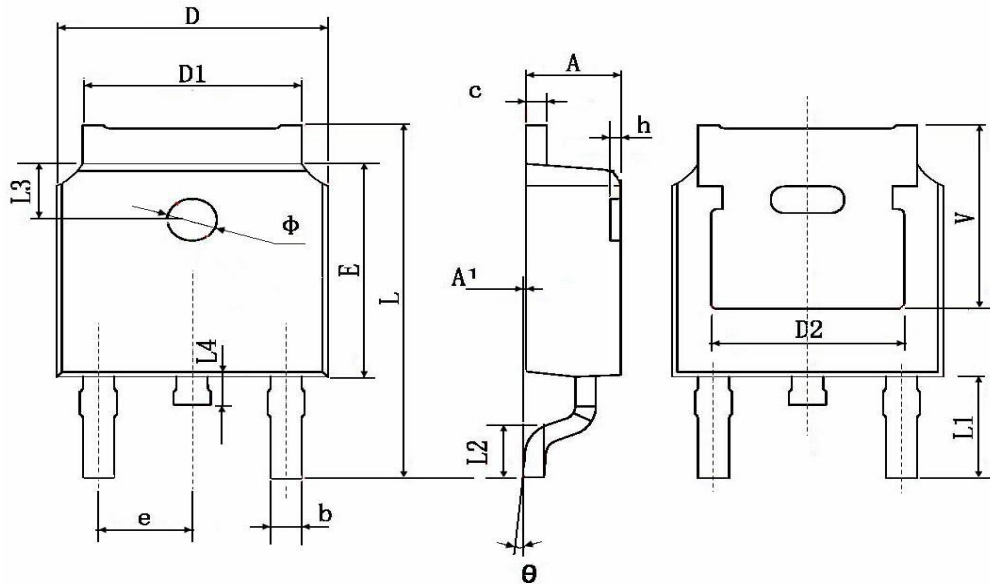


Figure 10. Maximum Safe Operating Area





### TO-252-2L Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.660	0.860	0.026	0.034
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	4.830 TYP.		0.190 TYP.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.800	10.400	0.386	0.409
L1	2.900 TYP.		0.114 TYP.	
L2	1.400	1.700	0.055	0.067
L3	1.600 TYP.		0.063 TYP.	
L4	0.600	1.000	0.024	0.039
φ	1.100	1.300	0.043	0.051
θ	0°	8°	0°	8°
h	0.000	0.300	0.000	0.012
V	5.350 TYP.		0.211 TYP.	



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