



## Description

The IRLR7843TRPBF 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.



TO252-2L

## General Features

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

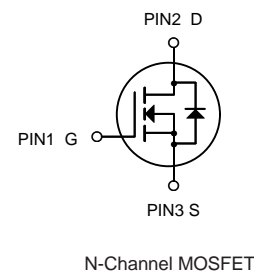
$R_{DS(ON)} < 3.8m\Omega @ V_{GS}=10V$

## Application

Battery protection

Load switch

Uninterruptible power supply



## Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
IRLR7843TRPBF	TO252-2L	120N03 XXXX YYYY	2500

## Absolute Maximum Ratings ( $T_C=25^\circ C$ unless otherwise noted)

Symbol	Parameter	Rating	Units
$V_{DS}$	Drain-Source Voltage	30	V
$V_{GS}$	Gate-Source Voltage	$\pm 20$	V
$I_D @ T_C=25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	120	A
$I_D @ T_C=100^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	75	A
$I_{DM}$	Pulsed Drain Current <sup>2</sup>	384	A
EAS	Single Pulse Avalanche Energy <sup>3</sup>	196	mJ
$I_{AS}$	Avalanche Current	53.8	A
$P_D @ T_C=25^\circ C$	Total Power Dissipation <sup>4</sup>	62.5	W
$T_{STG}$	Storage Temperature Range	-55 to 150	$^\circ C$
$T_J$	Operating Junction Temperature Range	-55 to 150	$^\circ C$
$R_{\theta JA}$	Thermal Resistance Junction-Ambient <sup>1</sup>	62	$^\circ C/W$



**Electrical Characteristics (T<sub>J</sub>=25 °C, unless otherwise noted)**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
<b>Static Characteristics</b>						
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>DS</sub> =250μA	30	-	-	V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> =24V, V <sub>GS</sub> =0V T <sub>J</sub> =85°C	-	-	1 30	μA
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>DS</sub> =250μA	1.4	1.7	2.5	V
I <sub>GSS</sub>	Gate Leakage Current	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V	-	-	±100	nA
R <sub>DS(ON)</sub> <sup>d</sup>	Drain-Source On-state Resistance	V <sub>GS</sub> =10V, I <sub>DS</sub> =20A T <sub>J</sub> =125°C	-	3 4.4	3.8 -	mΩ
		V <sub>GS</sub> =4.5V, I <sub>DS</sub> =15A	-	4.0	5.5	
Gfs	Forward Transconductance	V <sub>DS</sub> =5V, I <sub>DS</sub> =10A	-	24.6	-	S
<b>Diode Characteristics</b>						
V <sub>SD</sub> <sup>d</sup>	Diode Forward Voltage	I <sub>SD</sub> =20A, V <sub>GS</sub> =0V	-	0.8	1.1	V
t <sub>rr</sub>	Reverse Recovery Time	I <sub>DS</sub> =20A, di <sub>SD</sub> /dt=100A/μs	-	35.6	-	ns
t <sub>a</sub>	Charge Time		-	19.3	-	
t <sub>b</sub>	Discharge Time		-	16.3	-	
Q <sub>rr</sub>	Reverse Recovery Charge		-	26	-	
<b>Dynamic Characteristics<sup>e</sup></b>						
R <sub>G</sub>	Gate Resistance	V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, F=1MHz	-	1	2	Ω
C <sub>iss</sub>	Input Capacitance	V <sub>GS</sub> =0V, V <sub>DS</sub> =15V, Frequency=1.0MHz	-	2485	2971	pF
C <sub>oss</sub>	Output Capacitance		-	850	-	
C <sub>riss</sub>	Reverse Transfer Capacitance		-	85	-	
t <sub>d(ON)</sub>	Turn-on Delay Time	V <sub>DD</sub> =15V, R <sub>L</sub> =15Ω, I <sub>DS</sub> =1A, V <sub>GEN</sub> =10V, R <sub>G</sub> =6Ω	-	12.4	23	ns
t <sub>r</sub>	Turn-on Rise Time		-	9.5	18	
t <sub>d(OFF)</sub>	Turn-off Delay Time		-	27.2	49	
t <sub>f</sub>	Turn-off Fall Time		-	35.2	64	
<b>Gate Charge Characteristics<sup>e</sup></b>						
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =15V, V <sub>GS</sub> =10V, I <sub>DS</sub> =20A	-	20.6	28.8	nC
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =15V, V <sub>GS</sub> =4.5V, I <sub>DS</sub> =20A	-	9.8	-	
Q <sub>gth</sub>	Threshold Gate Charge		-	1.8	-	
Q <sub>gs</sub>	Gate-Source Charge		-	3.8	-	
Q <sub>gd</sub>	Gate-Drain Charge		-	3.7	-	

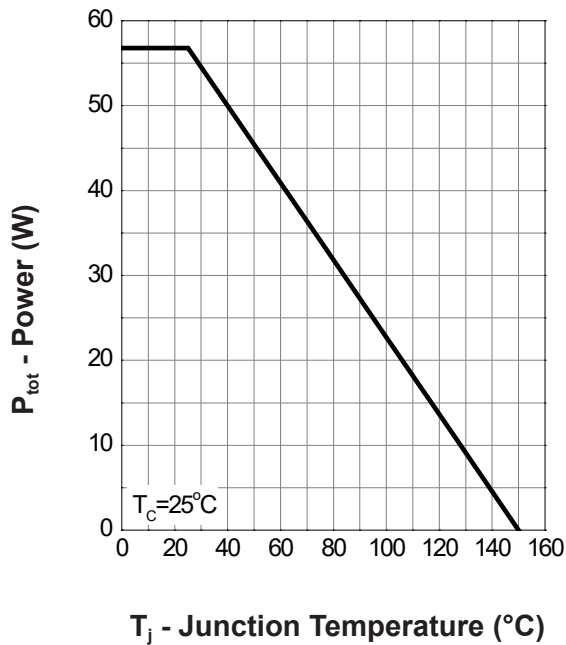
Note d : Pulse test ; pulse width≤300μs, duty cycle≤2%.

Note e : Guaranteed by design, not subject to production testing.

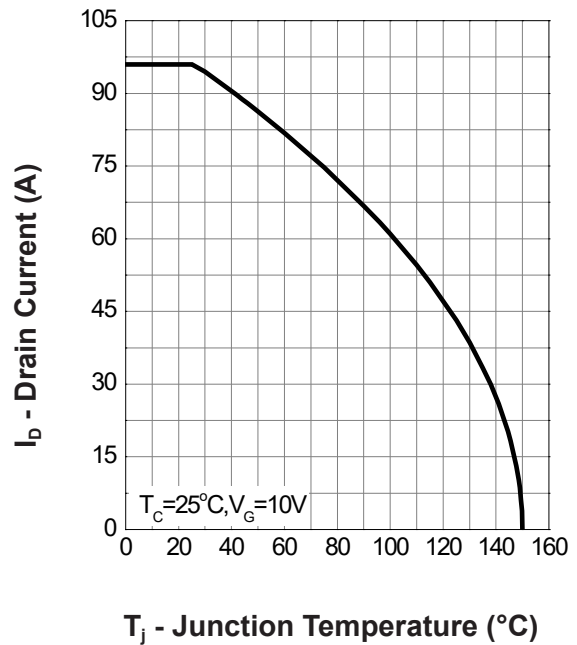


## Typical Operating Characteristics

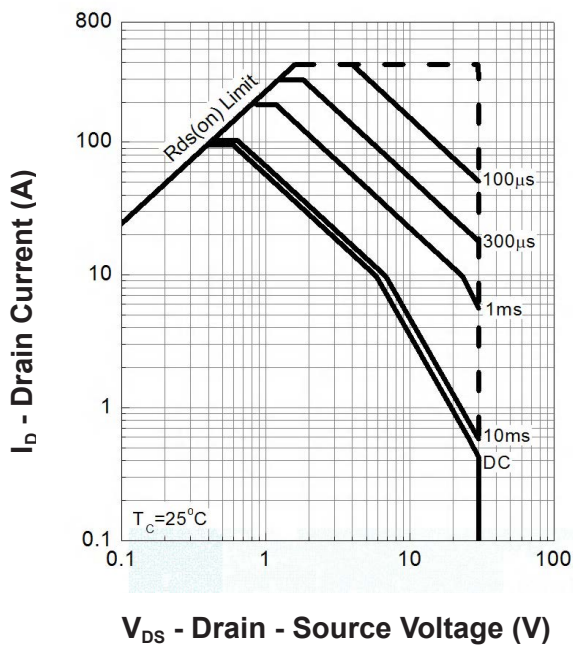
### Power Dissipation



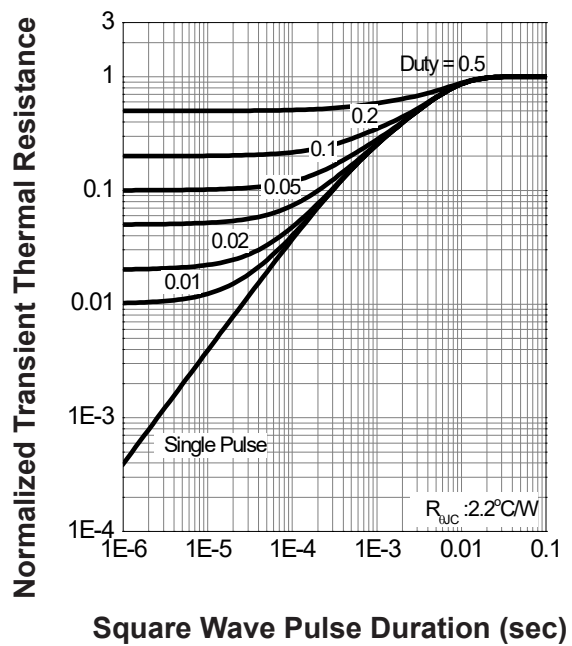
### Drain Current



### Safe Operation Area



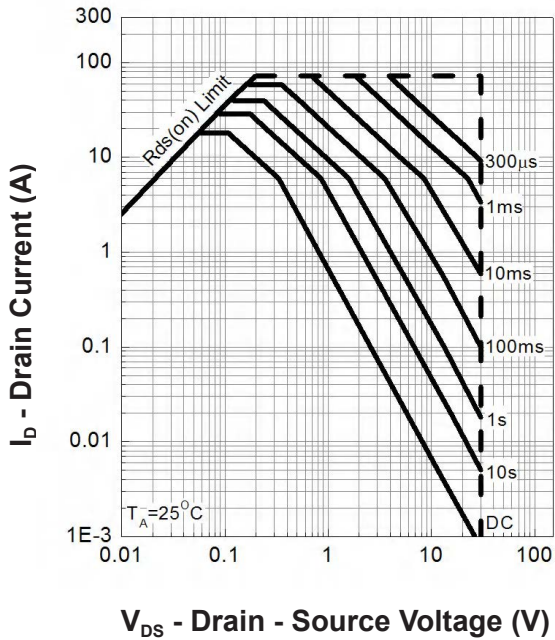
### Thermal Transient Impedance



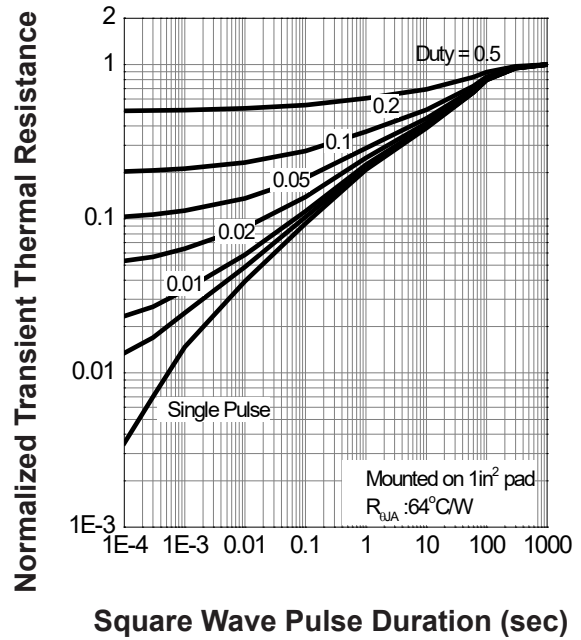


### Typical Operating Characteristics(Cont.)

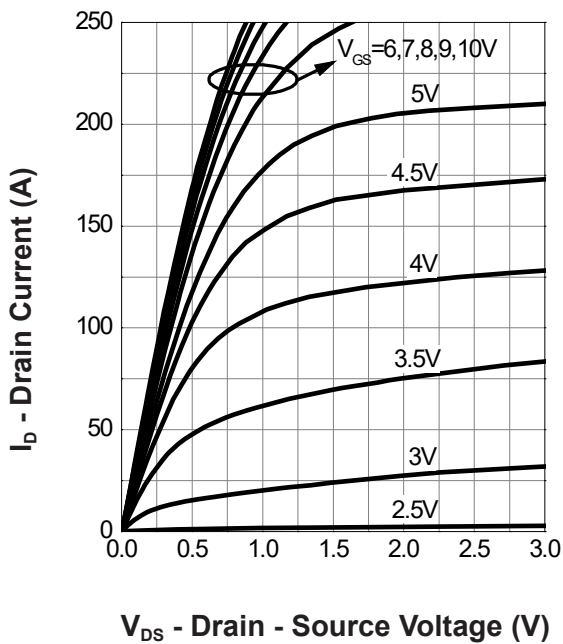
#### Safe Operation Area



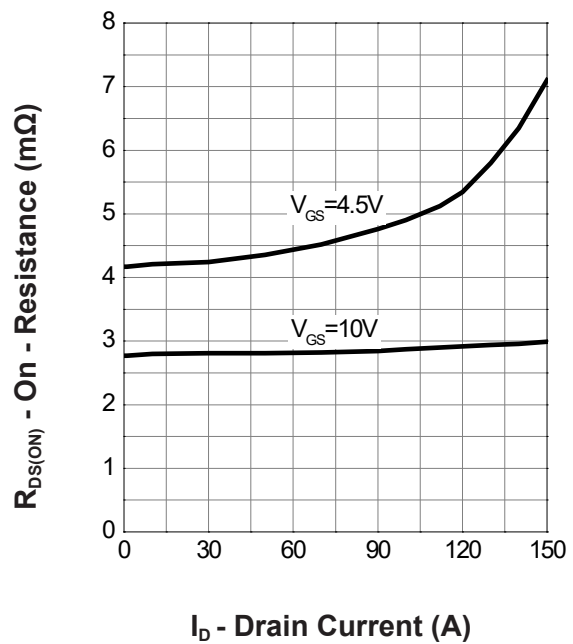
#### Thermal Transient Impedance



#### Output Characteristics



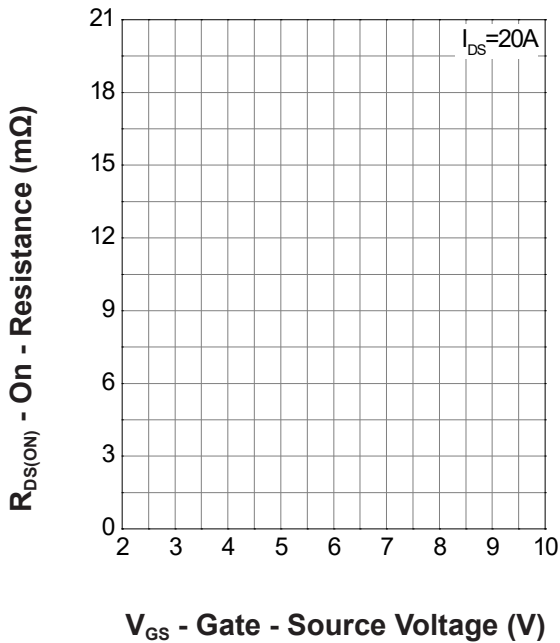
#### Drain-Source On Resistance



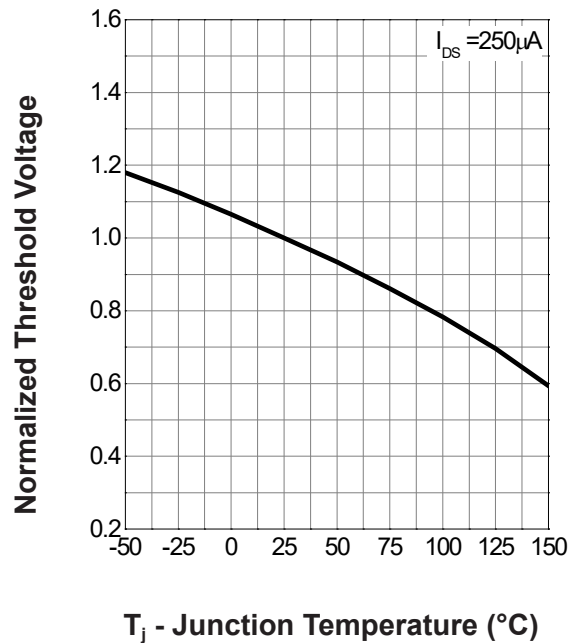


### Typical Operating Characteristics(Cont.)

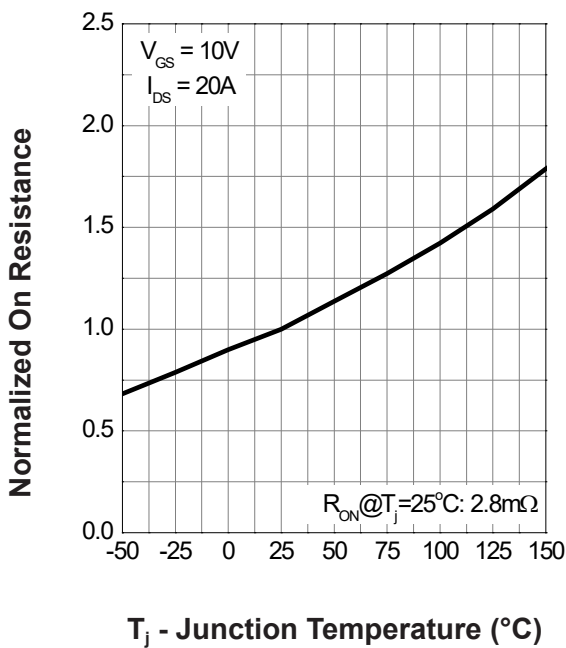
#### Gate-Source On Resistance



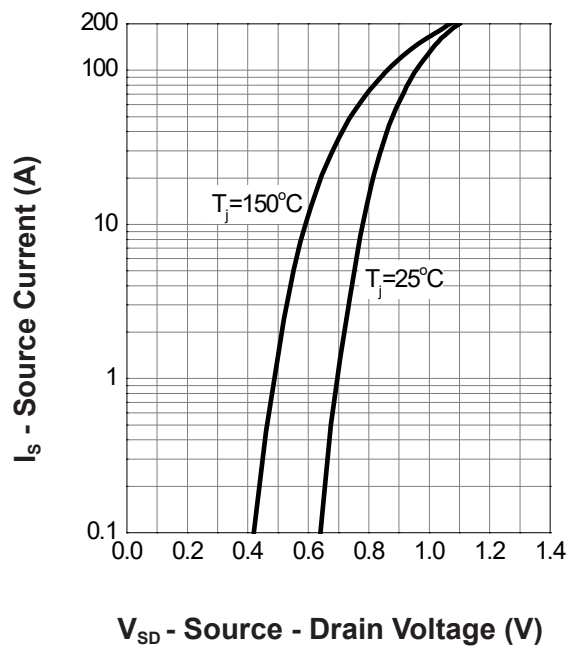
#### Gate Threshold Voltage



#### Drain-Source On Resistance



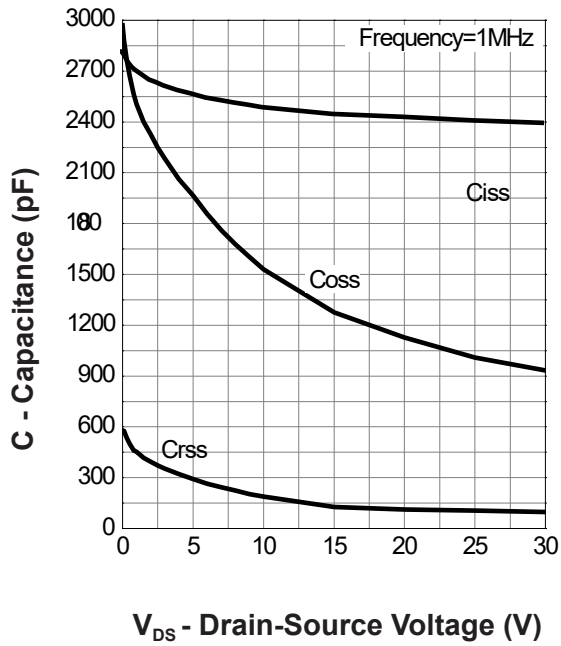
#### Source-Drain Diode Forward



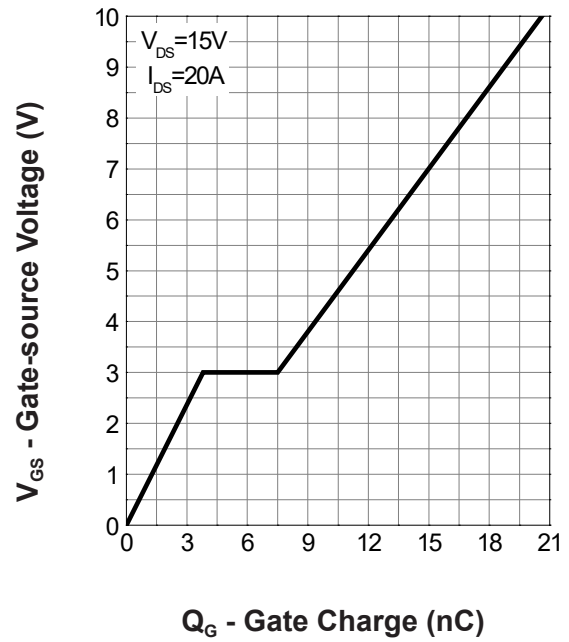


### Typical Operating Characteristics(Cont.)

Capacitance

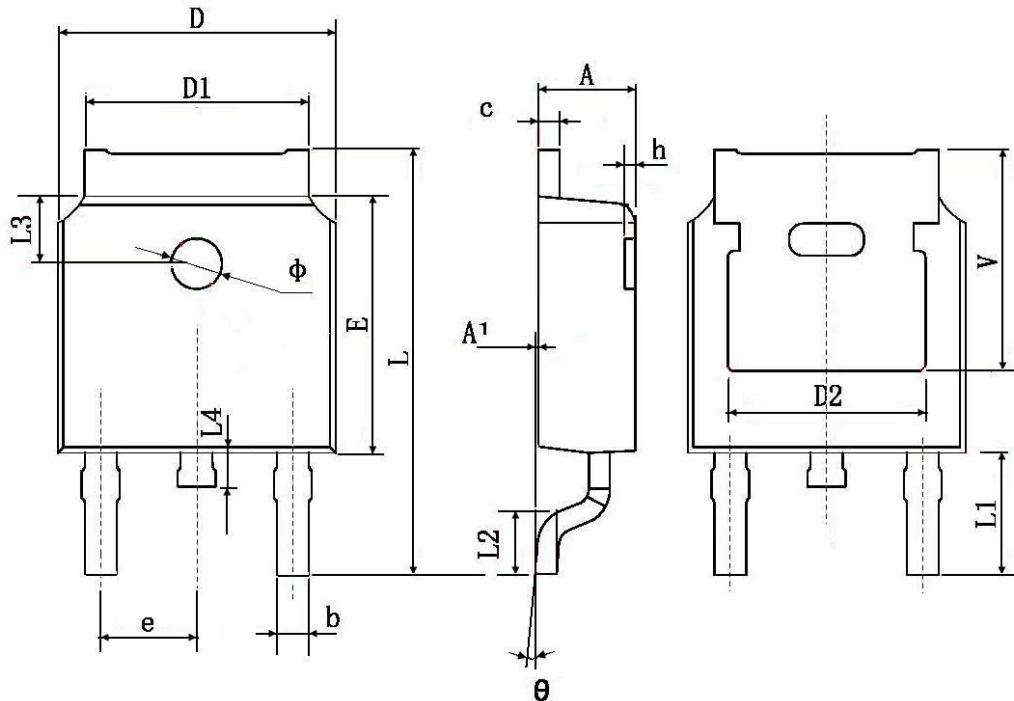


Gate Charge





**TO252-2L 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	0.483 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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