

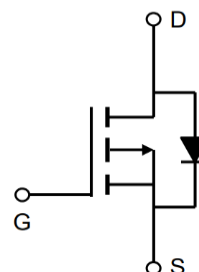
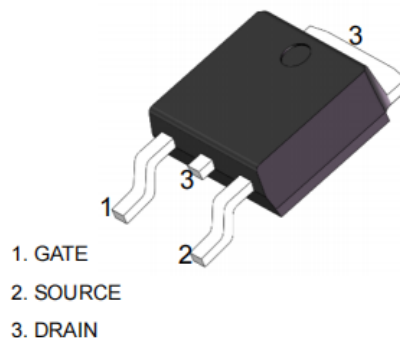
TO-252-2L
General Features
 $V_{DS} = -60V$ $I_D = -80A$
 $R_{DS(ON)} < 11m\Omega$ @ $V_{GS} = -10V$ (Type: $9m\Omega$)

Application

Lithium battery protection

Wireless impact

Mobile phone fast charging


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

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-60	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D @ T_c = 25^\circ C$	Continuous Drain Current, $-V_{GS}$ @ $-10V^1$	-80	A
$I_D @ T_c = 100^\circ C$	Continuous Drain Current, $-V_{GS}$ @ $-10V^1$	-50	A
I_{DM}	Pulsed Drain Current ²	-320	A
EAS	Single Pulse Avalanche Energy ³	450	mJ
I_{AS}	Avalanche Current	41	A
$P_D @ T_c = 25^\circ C$	Total Power Dissipation ⁴	110	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 ¹	1.1	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	60	$^\circ C/W$

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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BVDSS	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=-250\mu A$	-60	-68	---	V
$\Delta BVDSS/\Delta T_J$	BV_{DSS} Temperature Coefficient	Reference to 25°C , $I_D=-1mA$	---	-0.035	---	V/ $^{\circ}\text{C}$
RDS(ON)	Static Drain-Source On-Resistance ²	$V_{GS}=-10V, I_D=-20A$	---	9.0	12	m Ω
		$V_{GS}=-4.5V, I_D=-15A$	---	12	16	
VGS(th)	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=-250\mu A$	-1.0	-1.8	-2.5	V
$\Delta V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	4.28	---	mV/ $^{\circ}\text{C}$
IDSS	Drain-Source Leakage Current	$V_{DS}=-60V, V_{GS}=0V, T_J=25^{\circ}\text{C}$	---	---	1	μA
		$V_{DS}=-60V, V_{GS}=0V, T_J=55^{\circ}\text{C}$	---	---	5	
IGSS	Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	---	---	± 100	nA
gfs	Forward Transconductance	$V_{DS}=-5V, I_D=-20A$	---	50	---	S
Rg	Gate Resistance	$V_{DS}=0V, V_{GS}=0V, f=1MHz$	---	2.0	---	Ω
Qg	Total Gate Charge (-4.5V)	$V_{DS}=-30V, V_{GS}=-10V, I_D=-20A$	---	56	---	nC
Qgs	Gate-Source Charge		---	11	---	
Qgd	Gate-Drain Charge		---	9	---	
Td(on)	Turn-On Delay Time	$V_{DD}=-30V, V_{GS}=-10V, R_G=3\Omega, I_D=-20A$	---	4.5	---	ns
Tr	Rise Time		---	2.5	---	
Td(off)	Turn-Off Delay Time		---	14.5	---	
Tf	Fall Time		---	3.8	---	
Ciss	Input Capacitance	$V_{DS}=-15V, V_{GS}=0V, f=1MHz$	---	3500	---	pF
Coss	Output Capacitance		---	600	---	
Crss	Reverse Transfer Capacitance		---	25	---	
Is	Continuous Source Current ^{1,5}	$V_G=V_D=0V$, Force Current	---	---	-80	A
ISM	Pulsed Source Current ^{2,5}		---	---	-240	A
VSD	Diode Forward Voltage ²	$V_{GS}=0V, I_S=-1A, T_J=25^{\circ}\text{C}$	---	---	-1.2	V

Note :

- 1、The data tested by surface mounted on a 1 inch 2 FR-4 board with 2OZ copper.
- 2、The data tested by pulsed , pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
- 3、The EAS data shows Max. rating . The test condition is $V_{DD}=-48V, V_{GS}=-10V, L=0.1mH, I_{AS}=-41A$
- 4、The power dissipation is limited by 150°C junction temperature
- 5、The data is theoretically the same as I D and I DM , in real applications , should be limited by total power dissipation.

Typical Characteristics

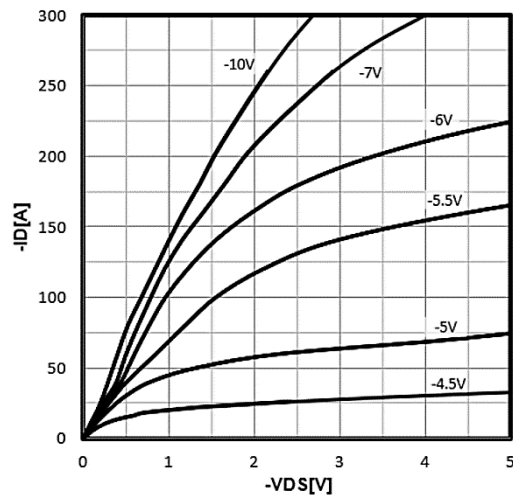


Figure 1. Type. Output Characteristics (Tj=25 °C)

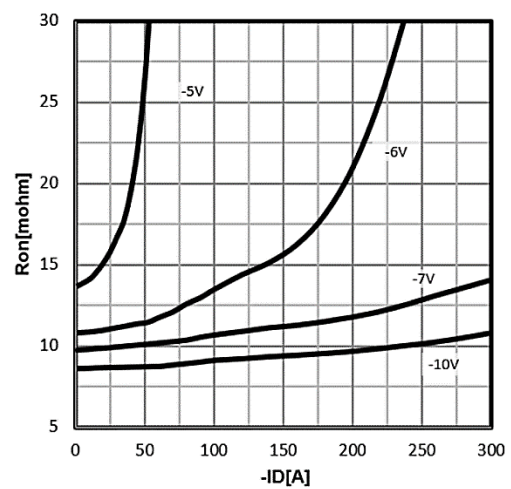


Figure 2. Type. drain-source on resistance

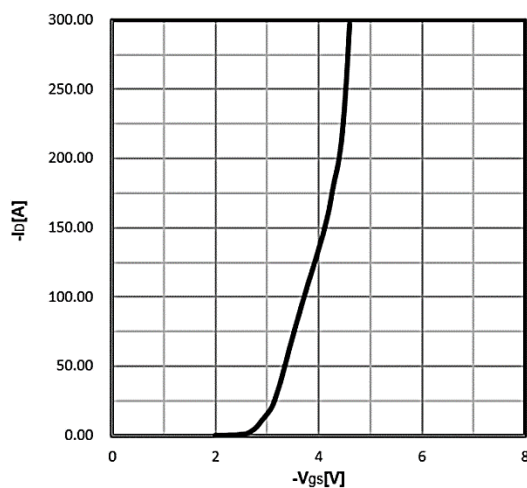


Figure 3. Type. transfer characteristics

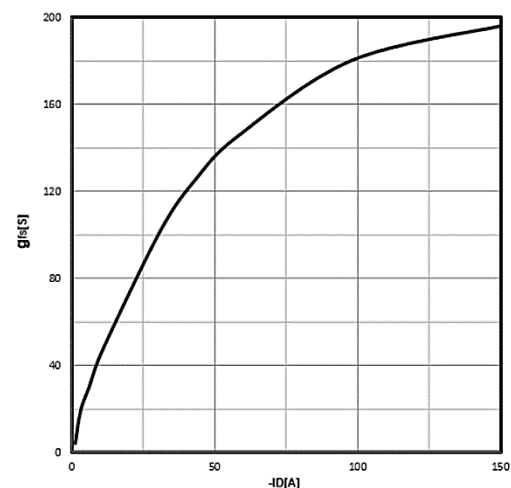


Figure 4. Type. forward transconductance

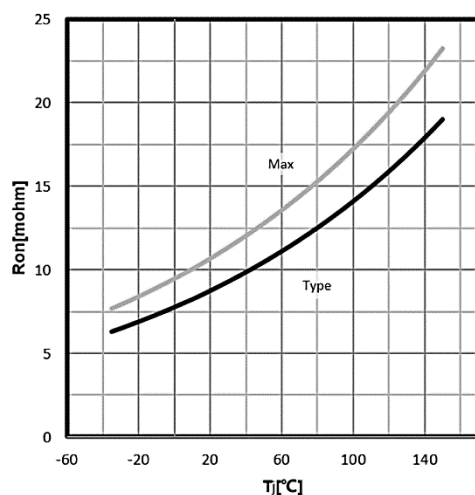


Figure 5. Drain-source on-state resistance
 $R_{DS(on)} = f(T_j)$; ID = 80A; VGS = 10V

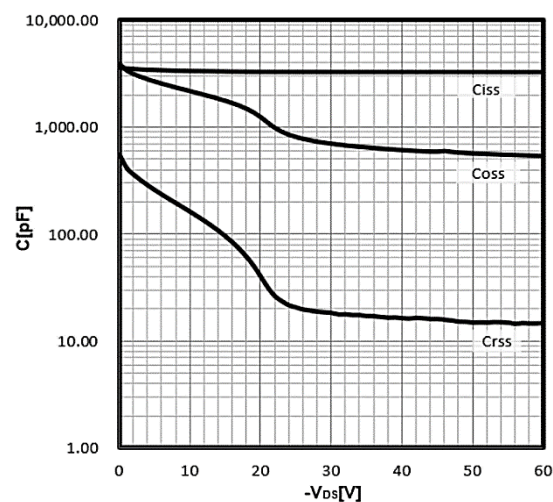


Figure 6 . Body-Diode Characteristics
 $C = f(V_{DS})$; VGS = 0V; f = 1MHz

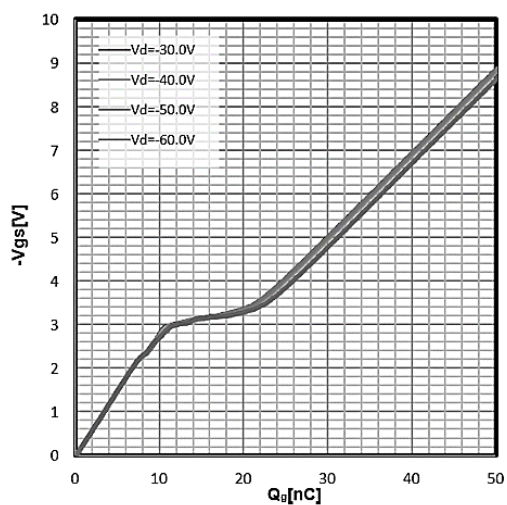


Figure 7. Typ. gate charge
 $V_{GS} = f(Q_{gate})$; $I_D = 20A$

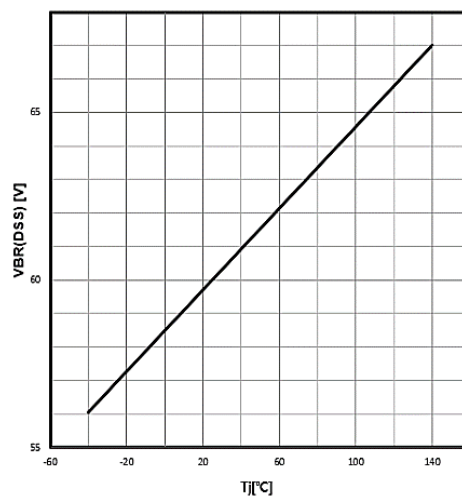


Figure 8. Drain Current Derating
 $V_{BR(DSS)} = f(T_j)$; $I_D = 250\mu A$

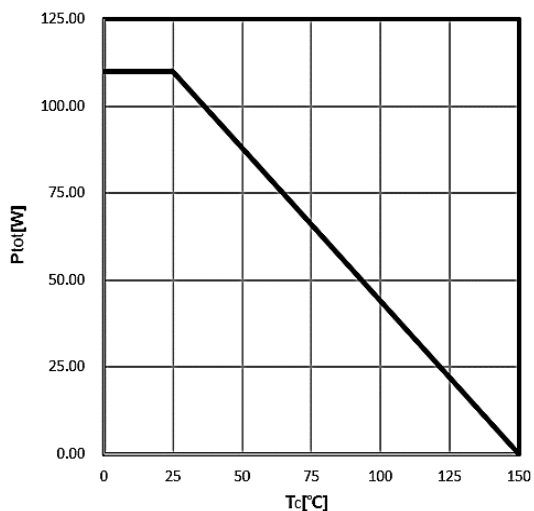


Figure 9. Power Dissipation

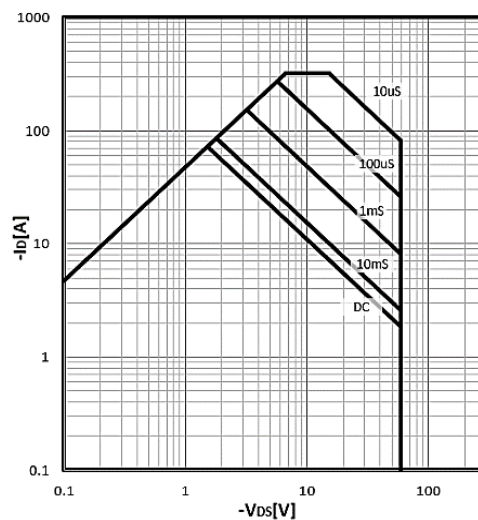


Figure 10. Safe operating area

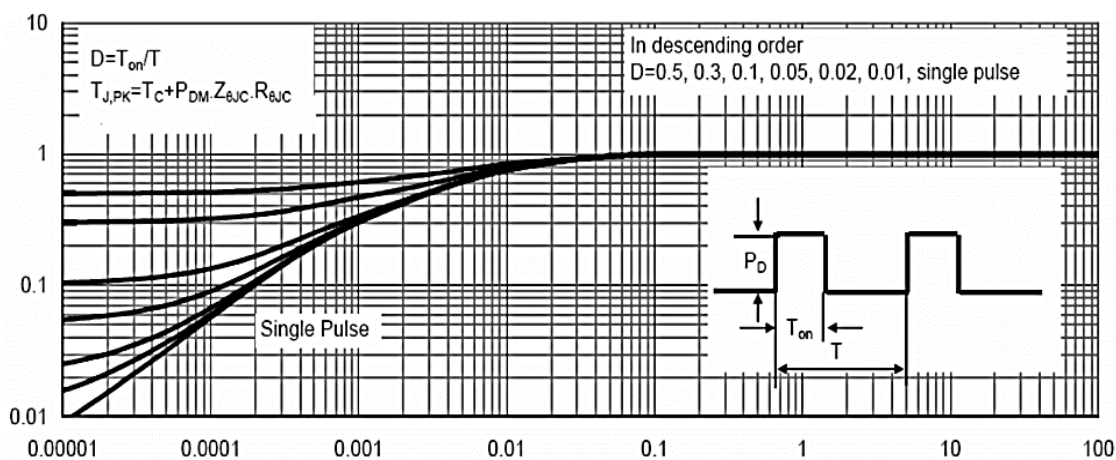
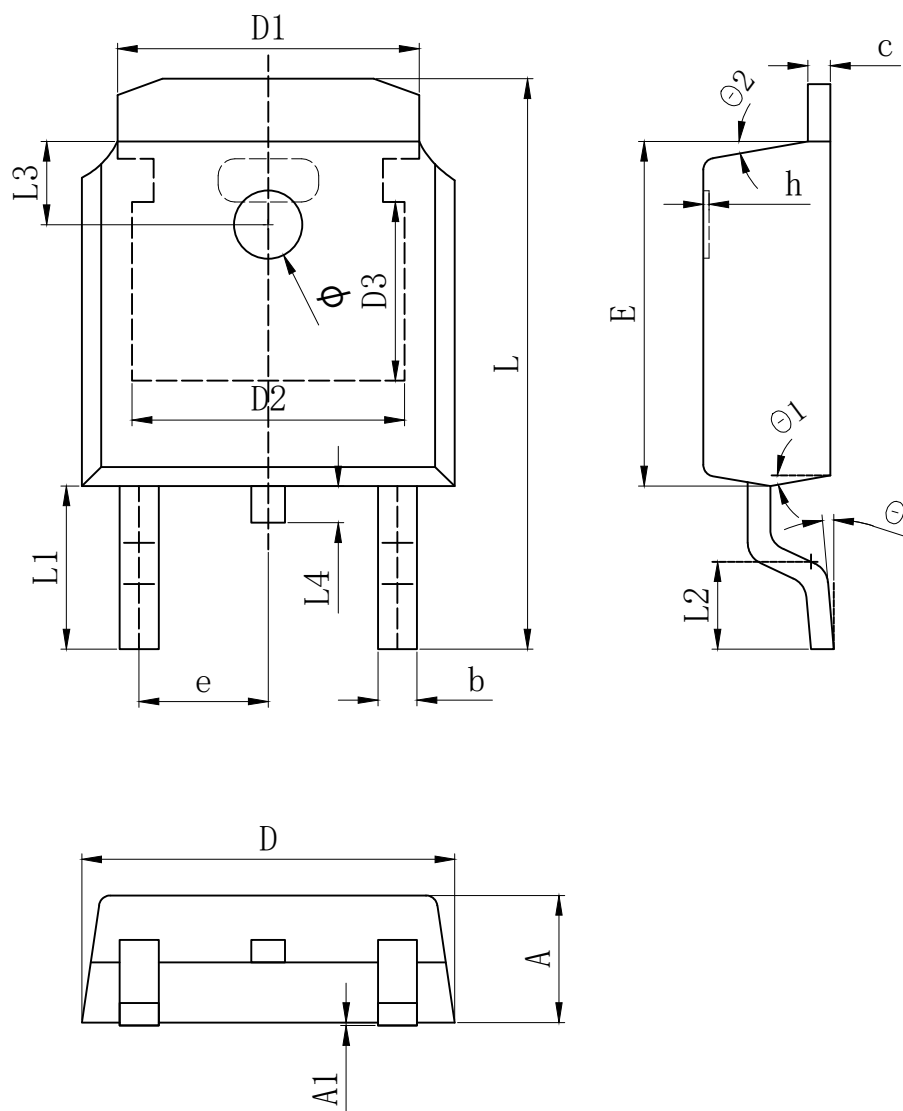


Figure 11. Max. transient thermal impedance

$$Z_{thJC} = f(t_p)$$

TO-252-2L Package Information


SYMBOL	MILLIMETER		
	MIN	Typ.	MAX
A	2.200	2.300	2.400
A1	0.000		0.127
b	0.640	0.690	0.740
c (电镀后)	0.460	0.520	0.580
D	6.500	6.600	6.700
D1	5.334 REF		
D2	4.826 REF		
D3	3.166 REF		
E	6.000	6.100	6.200
e	2.286 TYP		
h	0.000	0.100	0.200
L	9.900	10.100	10.300
L1	2.888 REF		
L2	1.400	1.550	1.700
L3	1.600 REF		
L4	0.600	0.800	1.000
ϕ	1.100	1.200	1.300
θ	0°		8°
$\theta 1$	9° TYP		
$\theta 2$	9° TYP		

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