

**Features**

- $V_{DS} = -40V$   $I_D = -30A$
- $R_{DS(ON)} < -32m\Omega$  @  $V_{GS} = -10V$  (Type: 25m $\Omega$ )

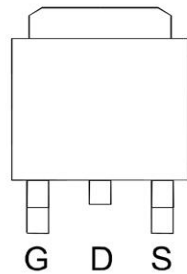
**Application**

- Load/Power Switching
- Interfacing Switching
- Battery Management for Ultra Small Portable Electronics
- Logic Level Shift

**Package and Pin Configuration**

(TO-252-3L)

Top View



**Marking:**



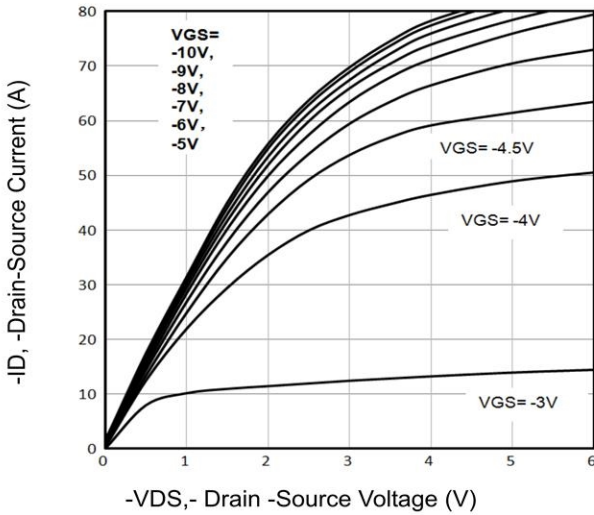
**Absolute Maximum Ratings ( $T_A = 25^\circ C$  unless otherwise noted)**

Symbol	Parameter	Value	Unit
VDS	Drain-Source Voltage ( $V_{GS} = 0V$ )	-40	V
VGS	Gate-Source Voltage ( $V_{DS} = 0V$ )	$\pm 20$	V
ID	Drain Current-Continuous ( $T_c = 25^\circ C$ )	-30	A
	Drain Current-Continuous ( $T_c = 100^\circ C$ )	-21	A
IDM (pluse)	Drain Current-Continuous@ Current-Pulsed	-99	A
PD	Maximum Power Dissipation ( $T_c = 25^\circ C$ )	59	w
	Maximum Power Dissipation ( $T_c = 100^\circ C$ )	23	w
EAS	Avalanche energy	260	mJ
TJ, TSTG	Operating Junction and Storage Temperature Range	-55 To 150	$^\circ C$
R $\theta$ JA	Thermal Resistance Junction-ambient (Steady State)	60	mJ
R $\theta$ JC	Thermal Resistance Junction-Case	2.1	$^\circ C$

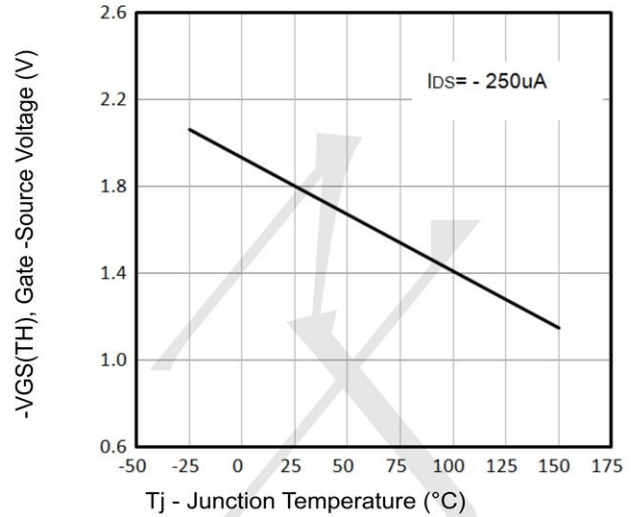
**Electrical Characteristics (T<sub>A</sub>=25°C unless otherwise noted)**

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>On/Off States</b>						
BVDSS	Drain-Source Breakdown Voltage	VGS=0V ID=-250μA	-40	--	--	V
IDSS	Zero Gate Voltage Drain Current	VDS=-40V,VGS=0V	--	--	-1	μA
IGSS	Gate-Body Leakage Current	VGS=±20V,VDS=0V	--	--	±100	nA
VGS(th)	Gate Threshold Voltage	VDS=VGS,ID=-250μA	-1.2	-1.6	-2.5	V
gFS	Forward Transconductance	VDS=5V,ID=-10A	--	10	--	S
RDS(on)	Drain-Source On-State Resistance	VGS=-10V, ID=-20A	--	25	32	mΩ
		VGS=-4.5V, ID=-15A	--	32	45	mΩ
<b>Dynamic Characteristics</b>						
Ciss	Input Capacitance	VDS=-15V,VGS=0V, F=1MHZ	--	1120	--	pF
Coss	Output Capacitance		--	120	--	pF
Crss	Reverse Transfer Capacitance		--	95	--	pF
Rg	Gate resistance	f=1.0MHz	--	1.2	--	Ω
<b>Switching Times</b>						
td(on)	Turn-on Delay Time	VGS=-10V,VDS=-25V, ID=-10A,RGEN=3.3Ω	--	13.5	--	nS
tr	Turn-on Rise Time		--	18	--	nS
td(off)	Turn-Off Delay Time		--	36	--	nS
tf	Turn-Off Fall Time		--	25	--	nS
Qg	Total Gate Charge	VGS=-10V, VDS=-25V, ID=-12A	--	27	--	nC
Qgs	Gate-Source Charge		--	7.3	--	nC
Qgd	Gate-Drain Charge		--	5.6	--	nC
<b>Source-Drain Diode Characteristics</b>						
ISD	Source-Drain Current(Body Diode)		--	--	-30	A
VSD	Forward on Voltage	VGS=0V,IS=-20A	--	--	-1.2	V
trr	Reverse Recovery Time	Isd=-20A , dI/dt=100A/μs , TJ=25°C	--	--	--	ns
Qrr	Reverse Recovery Charge		--	--	--	nc

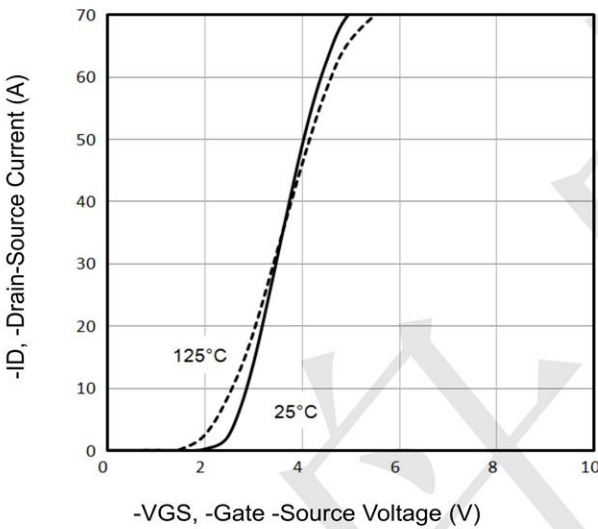
## Typical Characteristics



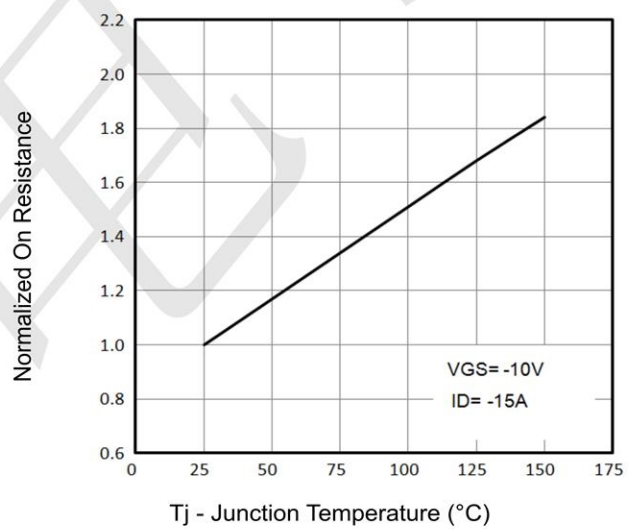
**Fig1.** Typical Output Characteristics



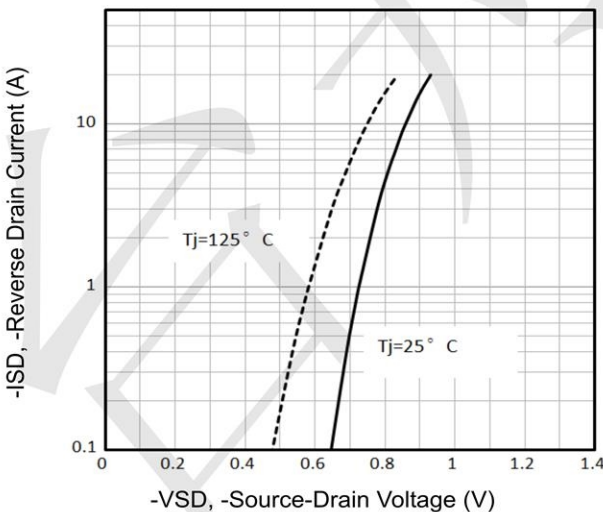
**Fig2.**  $-V_{GS(TH)}$  Gate -Source Voltage Vs.  $T_j$



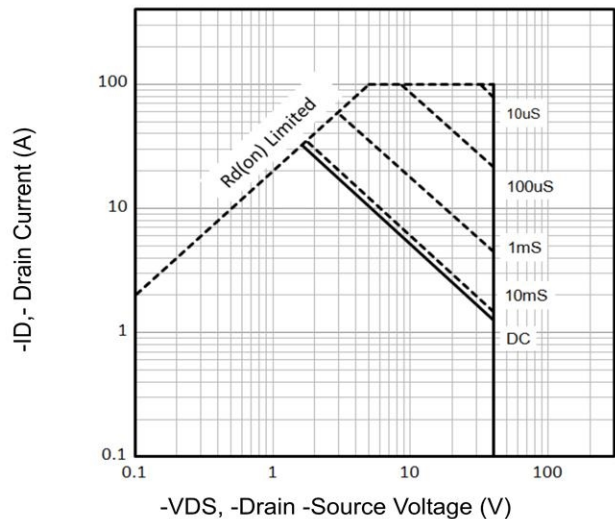
**Fig3.** Typical Transfer Characteristics



**Fig4.** Normalized On-Resistance Vs.  $T_j$

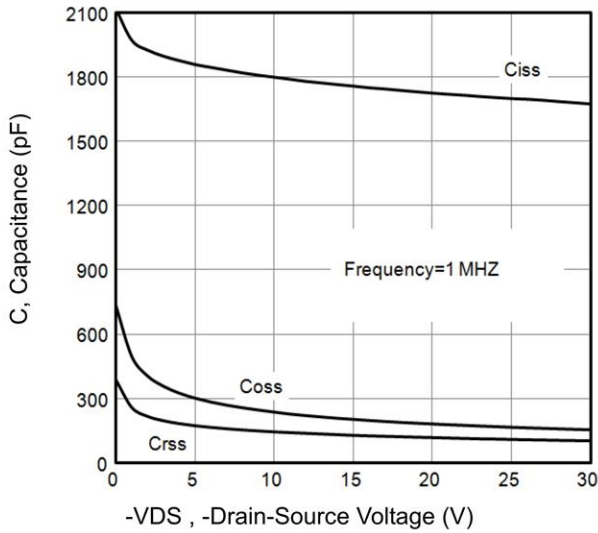


**Fig5.** Typical Source-Drain Diode Forward Voltage

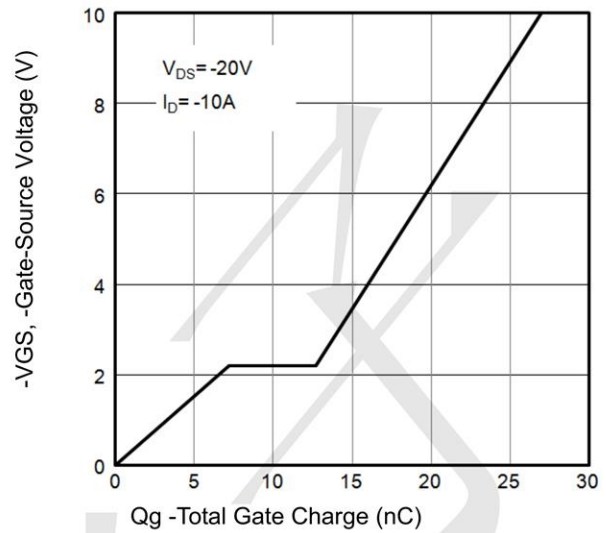


**Fig6.** Maximum Safe Operating Area

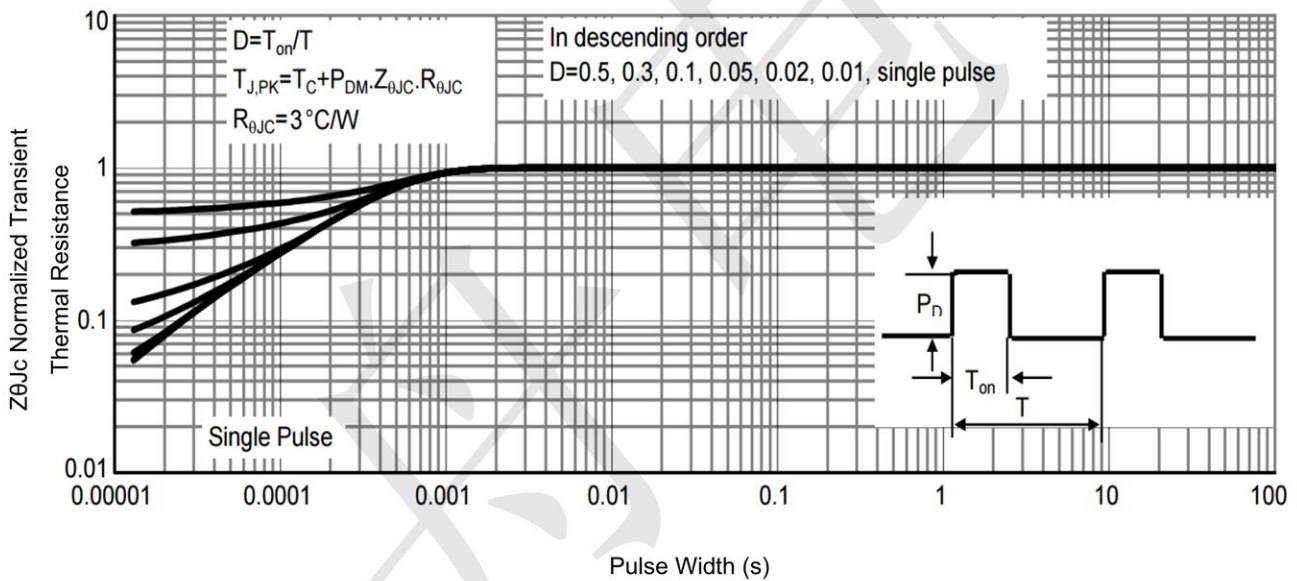
## Typical Characteristics



**Fig7.** Typical Capacitance Vs. Drain-Source Voltage

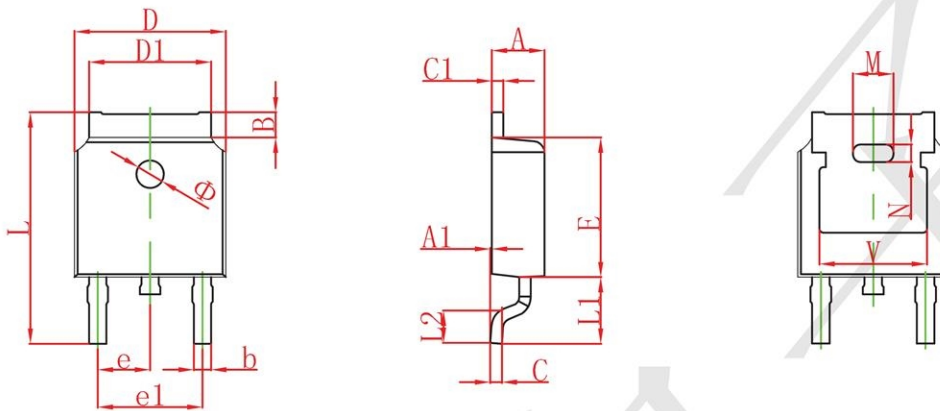


**Fig8.** Typical Gate Charge Vs. Gate-Source Voltage



**Fig9.** Normalized Maximum Transient Thermal Impedance

**TO252 Package Information**



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.380	0.087	0.094
A1	0.000	0.100	0.000	0.004
B	0.800	1.400	0.031	0.055
b	0.710	0.810	0.028	0.032
c	0.460	0.560	0.018	0.022
c1	0.460	0.560	0.018	0.022
D	6.500	6.700	0.256	0.264
D1	5.130	5.460	0.202	0.215
E	6.000	6.200	0.236	0.244
e	2.286 TYP.		0.090 TYP.	
e1	4.327	4.727	0.170	0.186
M	1.778 REF.		0.070 REF.	
N	0.762 REF.		0.018 REF.	
L	9.800	10.400	0.386	0.409
L1	2.9 REF.		0.114 REF.	
L2	1.400	1.700	0.055	0.067
V	4.830 REF.		0.190 REF.	
Φ	1.100	1.300	0.043	0.051