

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D
20V	8mΩ@10V	35A
	10mΩ@4.5V	
-20V	9mΩ@-10V	-38A
	11mΩ@-4.5V	

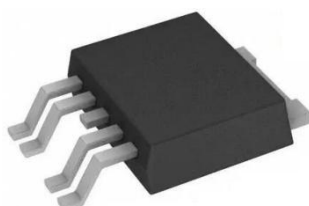
Feature

- TrenchFET Power MOSFET
- Excellent $R_{DS(on)}$ and Low Gate Charge
- Fast Switching Speed

Application

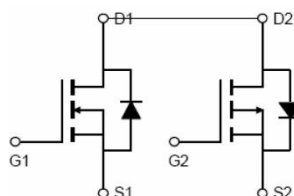
- Motor Control
- DC-DC Converters
- Power Management

Package

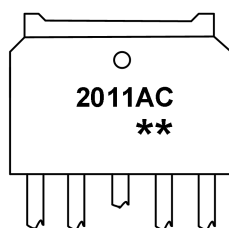


TO-252-4L

Circuit diagram



Marking



2011AC =Device Code
****** =Week Code.

Absolute maximum ratings (Ta=25°C unless otherwise noted)

Parameter	Symbol	Value		Unit
		N-Channel	P-Channel	
Drain-Source Voltage	V_{DS}	20	-20	V
Gate-Source Voltage	V_{GS}	± 12	± 12	V
Continuous Drain Current	I_D	35	-38	A
Drain Current – Pulsed	I_{DM}	140	152	A
Power Dissipation	P_D	32.8		W
Thermal Resistance from Junction to Cassette	$R_{\theta JC}$	3.8		°C/W
Junction Temperature	T_J	150		°C
Storage Temperature	T_{STG}	-55~ +150		°C

N-Channel Electrical characteristics (TA=25 °C, unless otherwise noted)

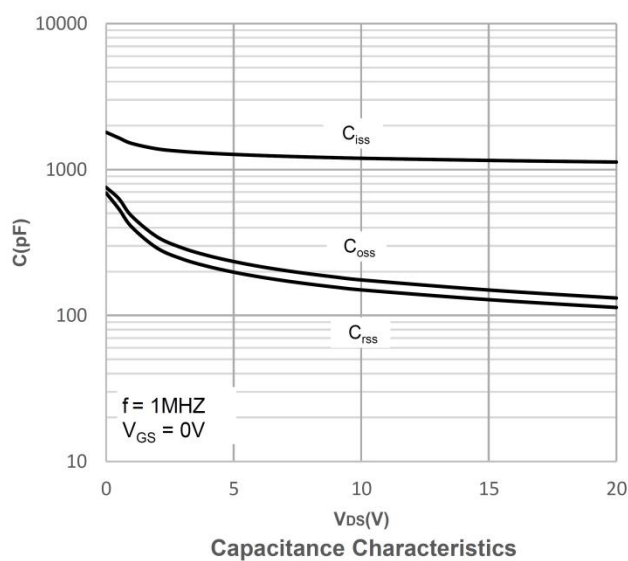
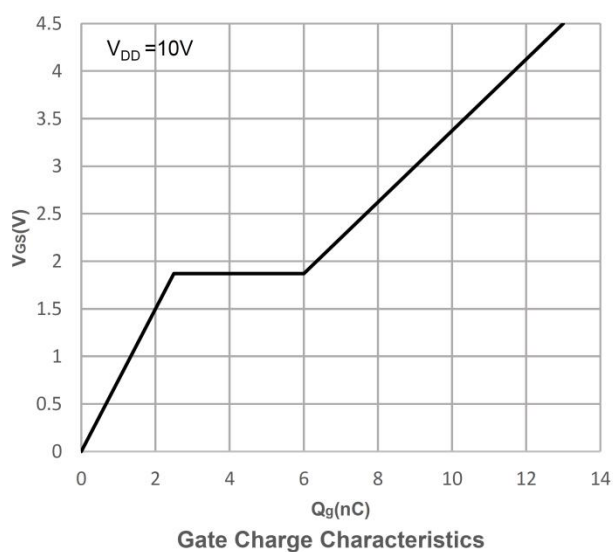
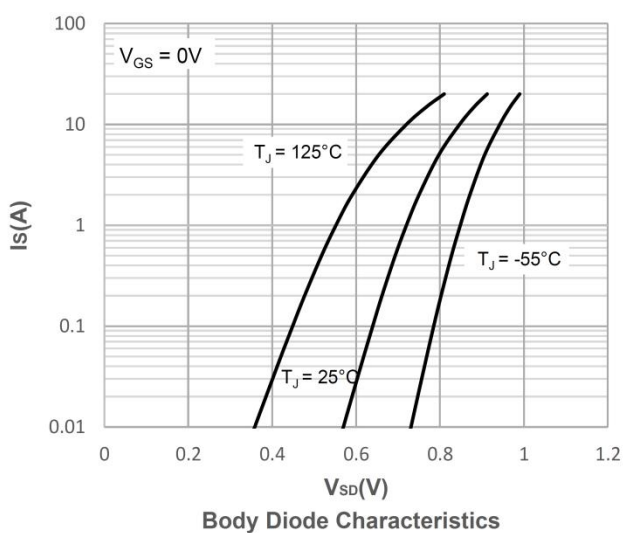
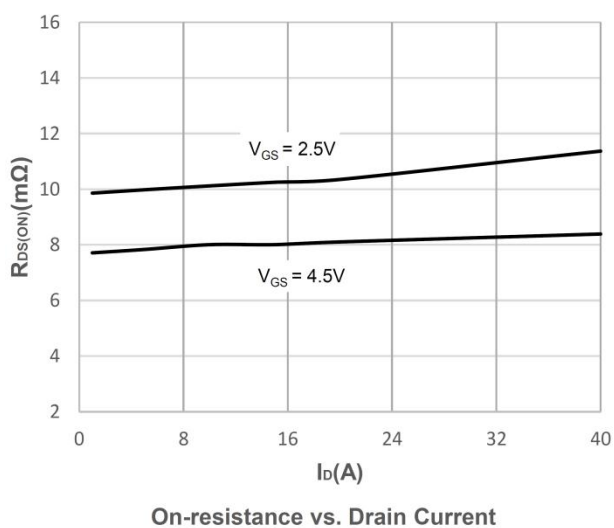
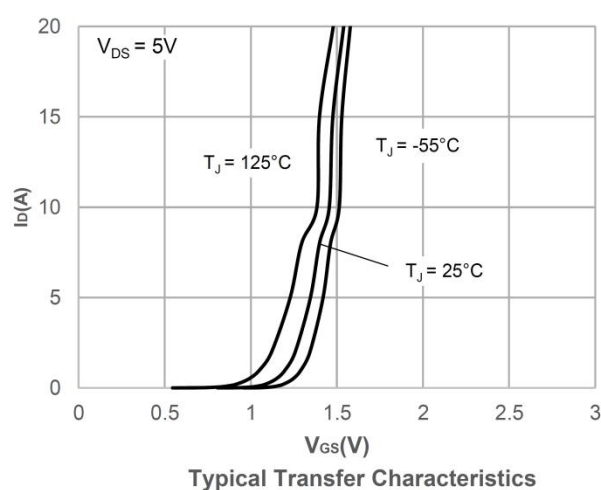
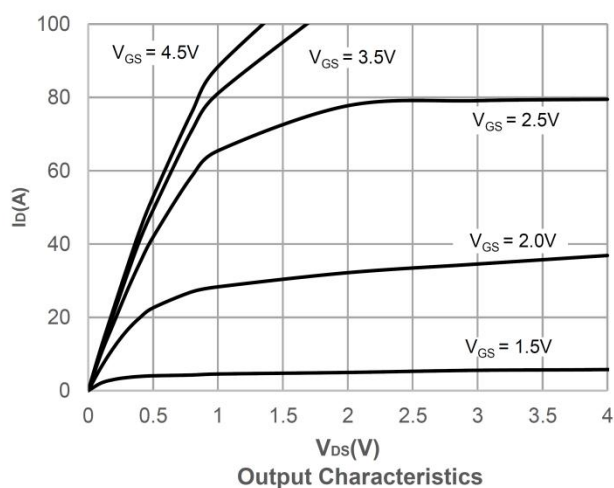
Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-source breakdown voltage	V _{(BR)DSS}	VGS = 0V, ID = 250μA	20	-	-	V
Zero gate voltage drain current	IDSS	VDS = 20V,VGS = 0V	-	-	1	μA
Gate-body leakage current	IGSS	VGS =±12V, VDS = 0V	-	-	±0.1	μA
Gate threshold voltage	VGS(th)	VDS =VGS, ID = 250μA	0.5	0.7	1.0	V
Drain-source on-resistance	RDS(on)	VGS = 4.5V, ID = 10A	-	8	10	mΩ
		VGS = 2.5V, ID = 8A	-	10	15	
Dynamic characteristics						
Input Capacitance	Ciss	VDS=10V , VGS=0V , f=1MHz	-	1196	-	pF
Output Capacitance	Coss		-	178	-	
Reverse Transfer Capacitance	Crss		-	146	-	
Switching Characteristics						
Total gate charge	Qg	VDS=10V , VGS=4.5V , ID=10A	-	13.4	-	nC
Gate-source charge	Qgs		-	2.6		
Gate-drain charge	Qgd		-	3.4	-	
Turn-on delay time	td(on)	VDD=10V , VGS=4.5V , RG=3.3Ω, ID=15A	---	7.8	-	ns
Turn-on rise time	tr		---	19.4	-	
Turn-off delay time	td(off)		---	31	-	
Turn-off fall time	tf		---	12	-	
Diode Characteristics						
Diode Forward Voltage	VSD	VGS=0V , IS=1A , TJ=25℃	-	-	1.2	V

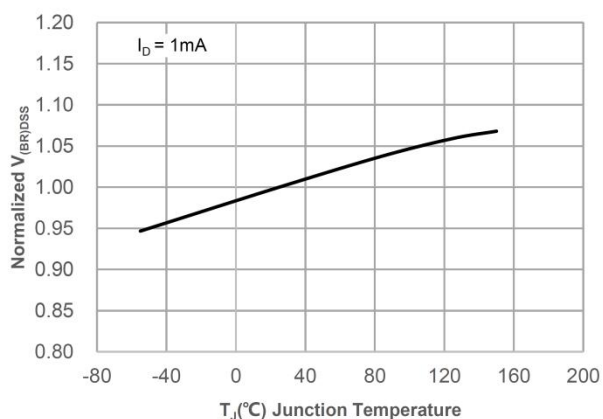
**P-Channel Electrical characteristics (T_A=25 °C, unless otherwise noted)**

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-source breakdown voltage	V _{(BR)DSS}	V _{GS} = 0V, I _D =-250μA	-20	-	-	V
Zero gate voltage drain current	I _{DSS}	V _{DS} = -20V,V _{GS} = 0V	-	-	-1	μA
Gate-body leakage current	I _{GSS}	V _{GS} =±12V, V _{DS} = 0V	-	-	±100	nA
Gate threshold voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =-250μA	-0.5	-0.7	-1.0	V
Drain-source on-resistance	R _{DS(on)}	V _{GS} =-10V, I _D =-10A	-	9	11.5	mΩ
		V _{GS} =-4.5V, I _D =-8A	-	11	15	
Dynamic characteristics						
Input Capacitance	C _{iss}	V _{DS} =-10V, V _{GS} =0V, f = 1MHz	-	2872	-	pF
Output Capacitance	C _{oss}		-	332	-	
Reverse Transfer Capacitance	C _{rss}		-	274	-	
Switching Characteristics						
Turn-on delay time	t _{d(on)}	V _{DD} =-10V, R _L = 4.7Ω V _{GEN} =-10V,R _{GEN} = 4.5Ω	-	8	-	ns
Turn-on rise time	t _r		-	33	-	
Turn-off delay time	t _{d(off)}		-	132	-	
Turn-off fall time	t _f		-	131	-	
Total gate charge	Q _g	V _{DS} =-10V, V _{GS} =-4.5V, I _D =-8A	-	72.8	-	nC
Gate-source charge	Q _{gs}		-	6.7	-	
Gate-drain charge	Q _{gd}		-	10.3	-	
Source-Drain Diode Characteristics						
Body Diode Voltage	V _{SD}	I _S =-1A, V _{GS} = 0V	-	-	-1.2	V

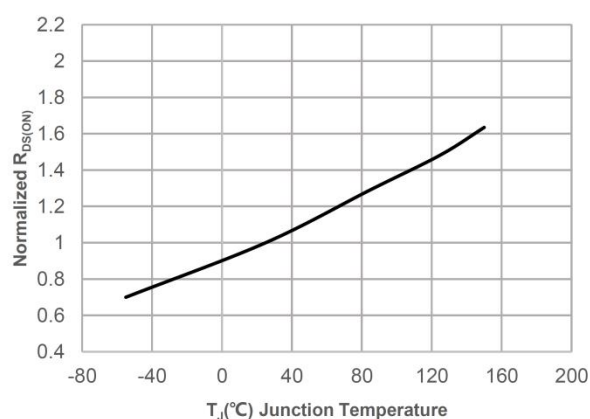


N-Channel Typical Characteristics

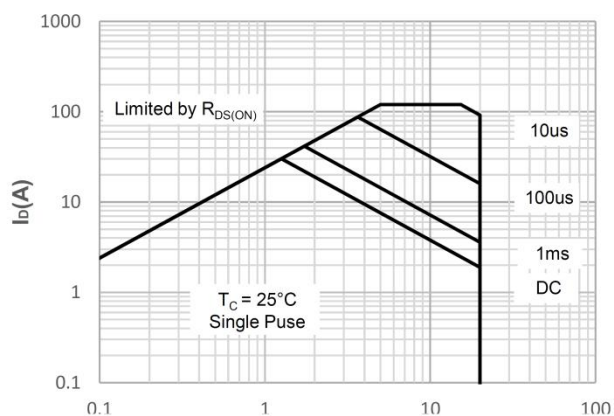




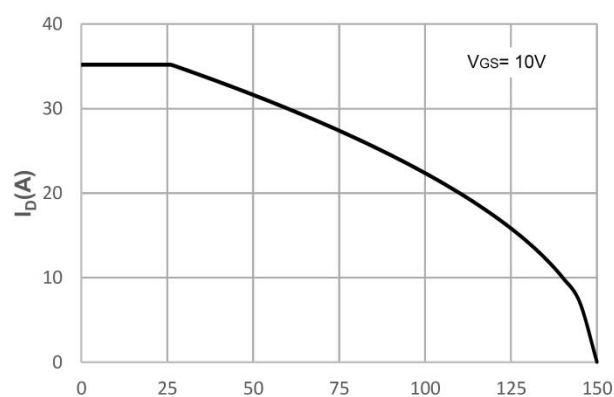
Normalized Breakdown voltage vs. Junction Temperature



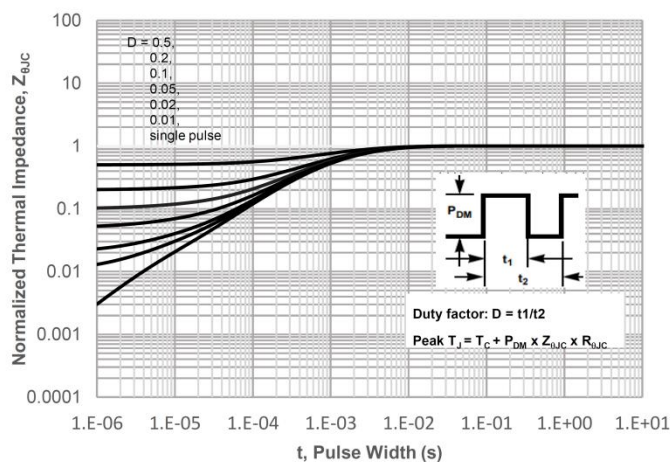
Normalized on Resistance vs. Junction Temperature



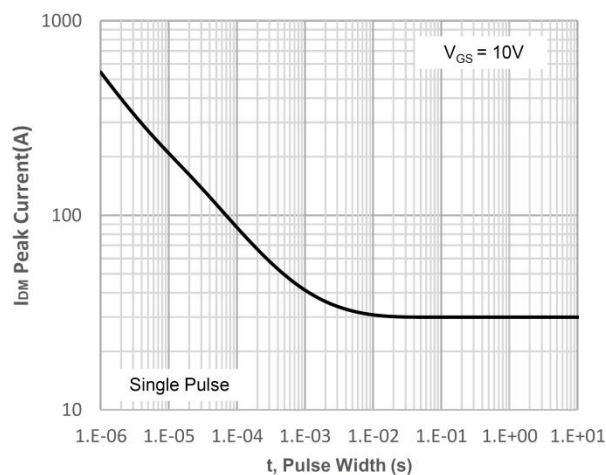
Maximum Safe Operating Area



Maximum Continuous Drain Current vs. Case Temperature



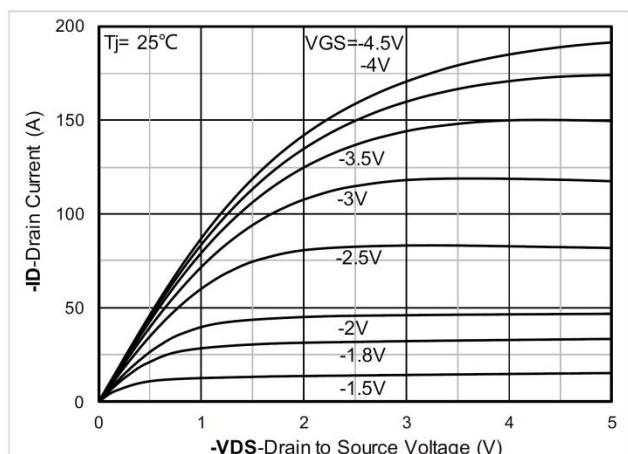
Normalized Maximum Transient Thermal Impedance



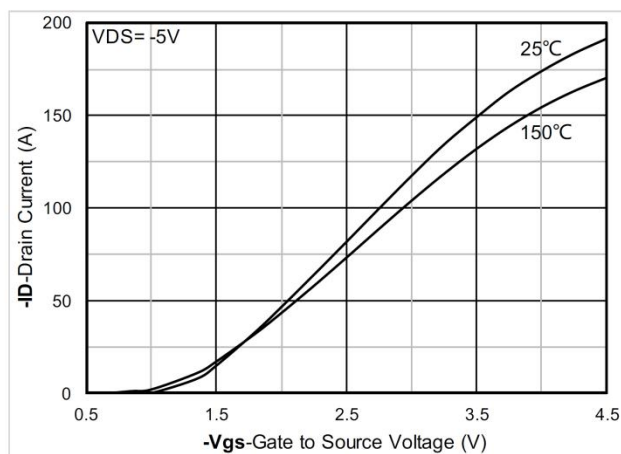
Peak Current Capacity



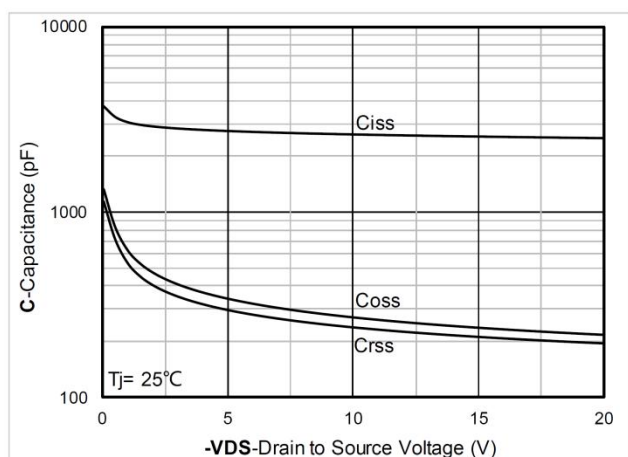
P-Channel Typical Characteristics



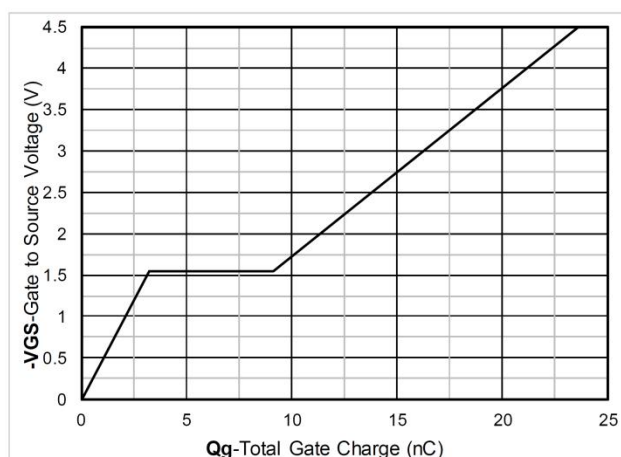
Output Characteristics



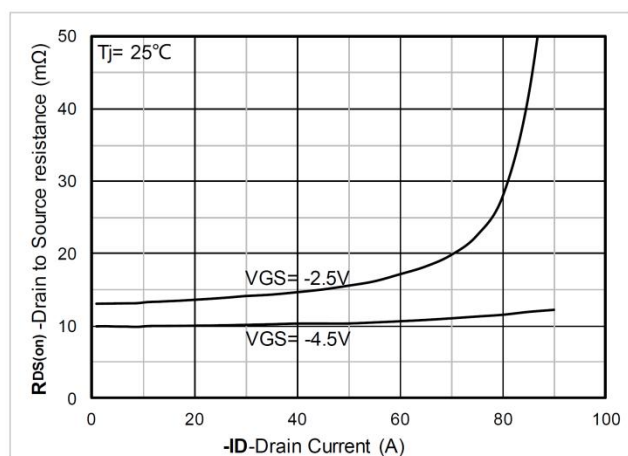
Transfer Characteristics



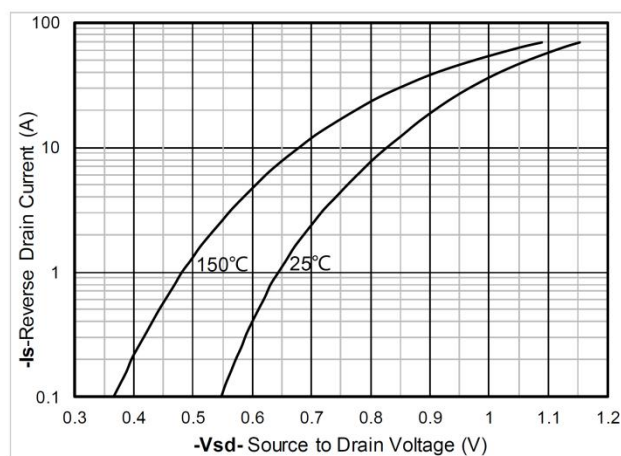
Capacitance Characteristics



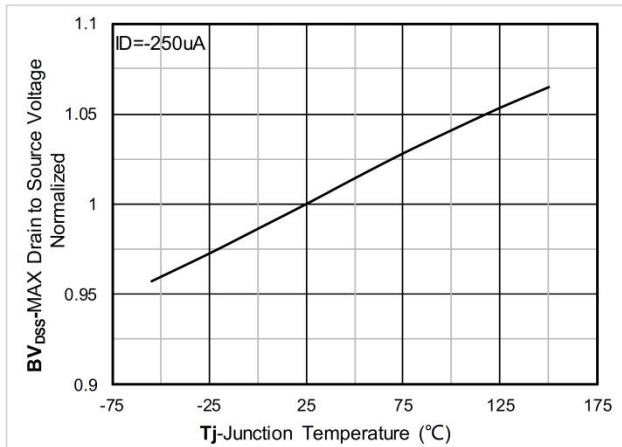
Gate Charge



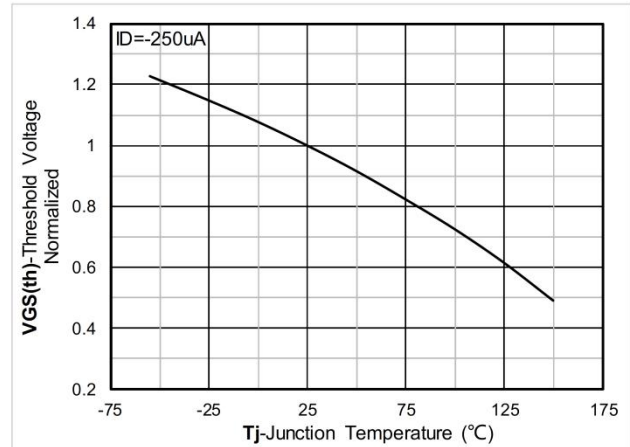
$R_{DS(on)}$ VS Drain Current



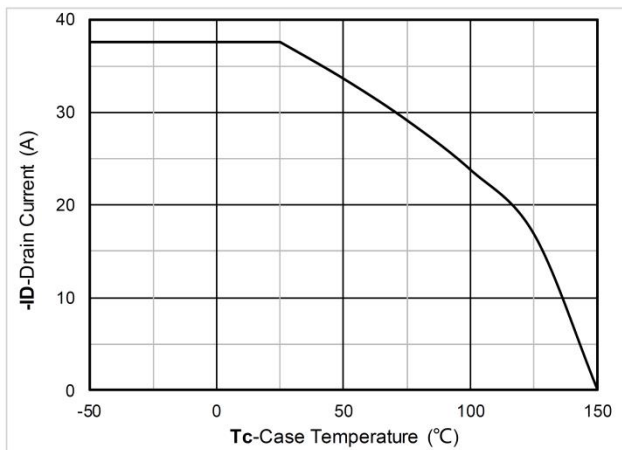
Forward characteristics of reverse diode



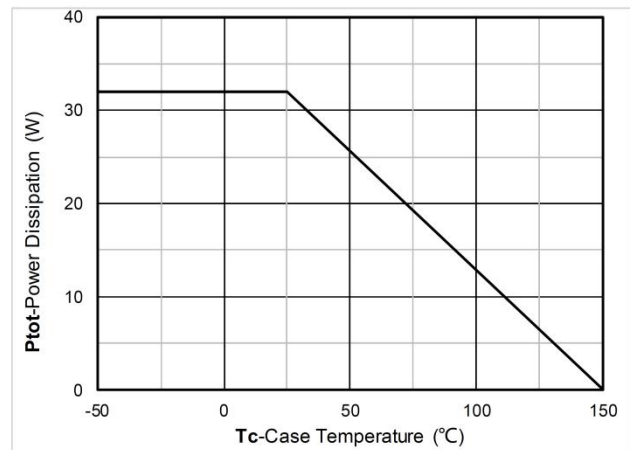
Normalized breakdown voltage



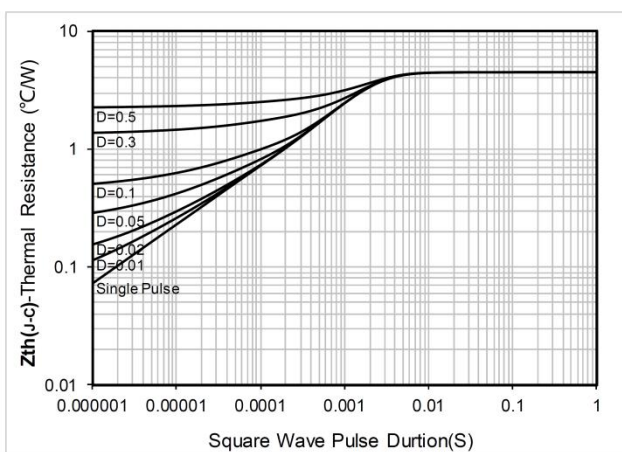
Normalized Threshold voltage



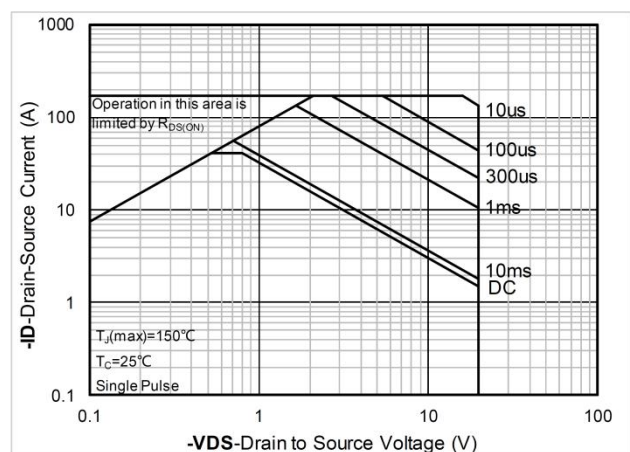
Current dissipation



Power dissipation



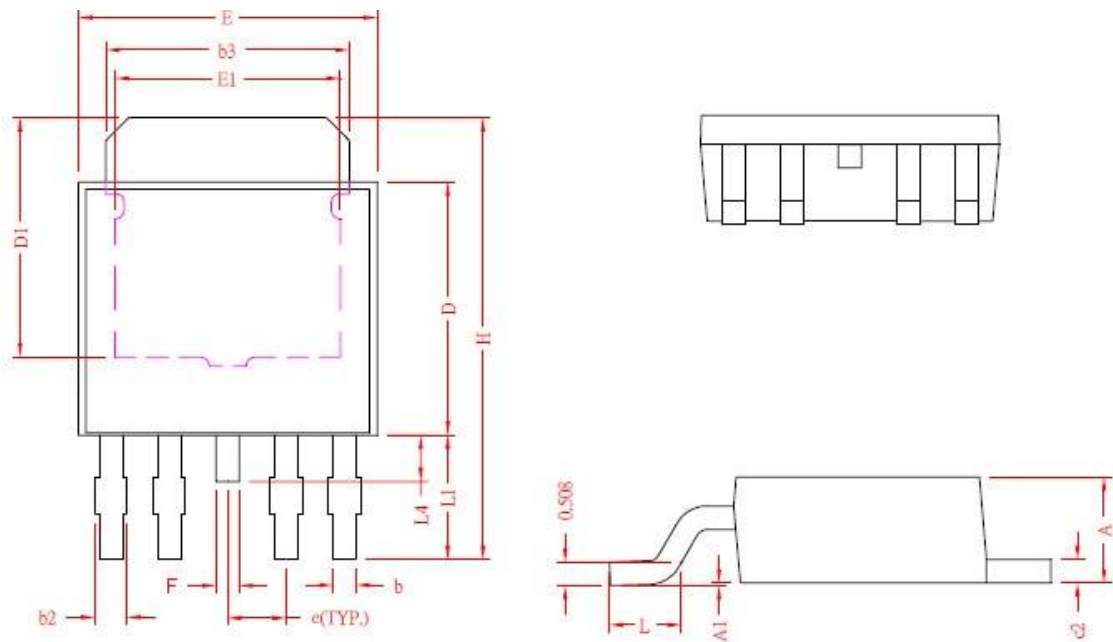
Maximum Transient Thermal Impedance



Safe Operation Area



TO-252-4L Package Information



Symbol	Dimensions In Millimeters	
	Min.	Max.
A	2.20	2.40
A1	0	0.15
b	0.40	0.60
b2	0.50	0.80
b3	5.20	5.50
c2	0.45	0.55
D	5.40	5.80
D1	4.57	-
E	6.40	6.80
E1	3.81	-
e	1.27REF.	
F	0.40	0.60
H	9.40	10.20
L	1.40	1.77
L1	2.40	3.00
L4	0.80	1.20