Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D
40V	10mΩ@10V	25A
	13mΩ@4.5V	
-40V	20mΩ@-10V	-21A
	27mΩ@-4.5V	

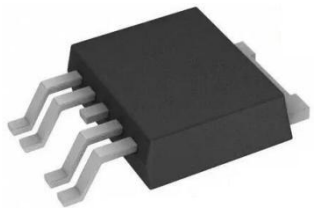
Feature

- High power and current handing capability
- Lead free product is acquired
- Surface mount package
- 100% Single Pluse avalanche energy Test

Applications

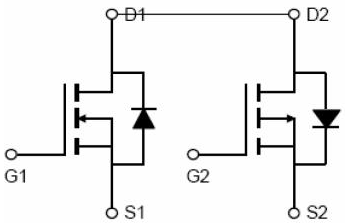
- Battery Protection
- Load Switch
- Power Management

Package

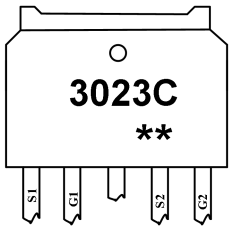


TO-252-4L

Circuit diagram



Marking



3023C :Device Code
** :Week Code

Order Information

Device	Package	Unit/Tape
SP3023CTM	TO-252-4L	2500

Absolute maximum ratings (Ta=25℃,unless otherwise noted)

Parameter	Symbol	Value		Units
		N-Channel	P-Channel	
Drain-Source Voltage	V_{DS}	30	-30	V
Gate-Source Voltage	V_{GS}	±20	±20	V
Continuous Drain Current (T_C=25℃)	I_D	25	-21	A
Continuous Drain Current (T_C=100℃)	I_D	17	-14	A
Pulsed Drain Current	I_{DM}	100	-84	A
Single Pulse Avalanche Energy[1]	E_{AS}	29	34	mJ
Power Dissipation (T_C=25℃)	P_D	21		W
Thermal Resistance Junction-to-Case	$R_{\theta JC}$	6		℃/W
Storage Temperature Range	T_{STG}	-55 to 150		℃
Operating Junction Temperature Range	T_J	-55 to 150		℃

N-Channel Electrical characteristics (Ta=25℃, unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	VGS=0V , ID=250uA	30	-	-	V
Drain-Source Leakage Current	I_{DSS}	VDS=24V , VGS=0V , TJ=25℃	-	-	1	uA
Gate-Source Leakage Current	I_{GSS}	VGS=±20V , VDS=0V	-	-	±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	VGS=VDS , ID =250uA	1.0	1.5	2.5	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	VGS=10V , ID=8A	-	10	18	mΩ
		VGS=4.5V , ID=6A	-	13	22	
Dynamic characteristics						
Input Capacitance	C_{iss}	VDS=15V , VGS=0V , f=1MHz	-	583	-	pF
Output Capacitance	C_{oss}		-	77	-	
Reverse Transfer Capacitance	C_{rss}		-	59	-	
Total Gate Charge	Q_g	VDS=15V , VGS=4.5V , ID=7A	-	6	-	nC
Gate-Source Charge	Q_{gs}		-	2.2	-	
Gate-Drain Charge	Q_{gd}		-	2	-	
Switching Characteristics						
Turn-On Delay Time	$T_{d(on)}$	VDD=20V, VGS=10V , RG=3Ω, ID=7A	-	1.2	-	nS
Rise Time	T_r		-	40	-	
Turn-Off Delay Time	$T_{d(off)}$		-	18	-	
Fall Time	T_f		-	7.2	-	
Diode Characteristics						
Diode Forward Voltage	V_{SD}	VGS=0V , IS=1A , TJ=25℃	-	-	1.2	V
Maximum Body-Diode Continuous Current	I_S		-	-	25	A

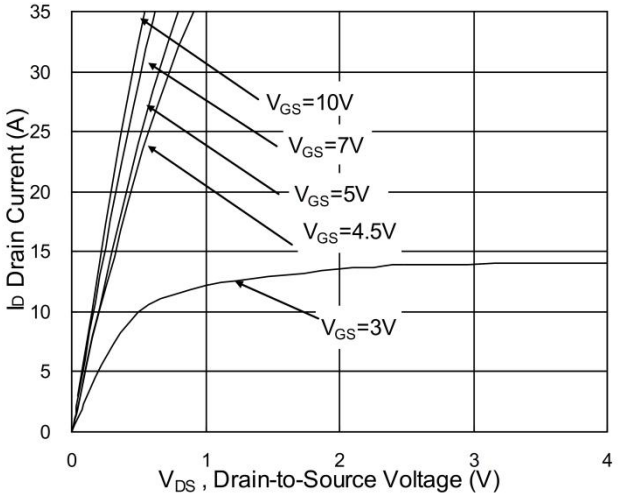
Note :
1.The EAS test condition is VDD=15V,VGS=10V,L=0.5mH,RG=25Ω

P-Channel Electrical characteristics (Ta=25℃, unless otherwise noted)

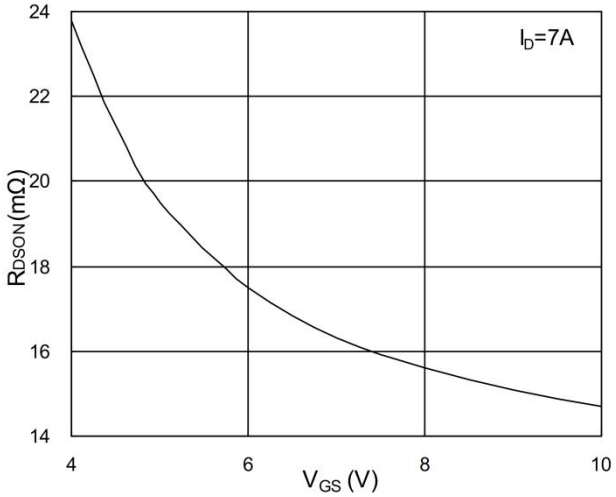
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	VGS=0V , ID=-250uA	-30	-	-	V
Drain-Source Leakage Current	I_{DSS}	VDS=-24V , VGS=0V , TJ=25℃	-	-	-1	uA
Gate-Source Leakage Current	I_{GSS}	VGS=±20V , VDS=0V	-	-	±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	VGS=VDS , ID =-250uA	-1	-1.5	-2.5	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	VGS=-10V , ID=-12A	-	20	30	mΩ
		VGS=-4.5V , ID=-6A	-	27	45	
Dynamic characteristics						
Input Capacitance	C_{iss}	VDS=-15V , VGS=0V , f=1MHz	-	930	-	pF
Output Capacitance	C_{oss}		-	148	-	
Reverse Transfer Capacitance	C_{rss}		-	115	-	
Total Gate Charge	Q_g	VDS=-20V , VGS=-4.5V , ID=-12A	-	9.8	-	nC
Gate-Source Charge	Q_{gs}		-	2.2	-	
Gate-Drain Charge	Q_{gd}		-	3.4	-	
Switching Characteristics						
Turn-On Delay Time	$T_{d(on)}$	VDD=-24V, VGS=-10V , RG=3Ω, ID=-1A	-	16.4	-	nS
Rise Time	T_r		-	20.2	-	
Turn-Off Delay Time	$T_{d(off)}$		-	55	-	
Fall Time	T_f		-	10	-	
Diode Characteristics						
Diode Forward Voltage	V_{SD}	VGS=0V , IS=-1A , TJ=25℃	-	-	-1.2	V
Maximum Body-Diode Continuous Current	I_S		-	-	-21	A

Note :
1.The EAS test condition is VDD=-15V,VGS=-10V,L=0.5mH,RG=25Ω

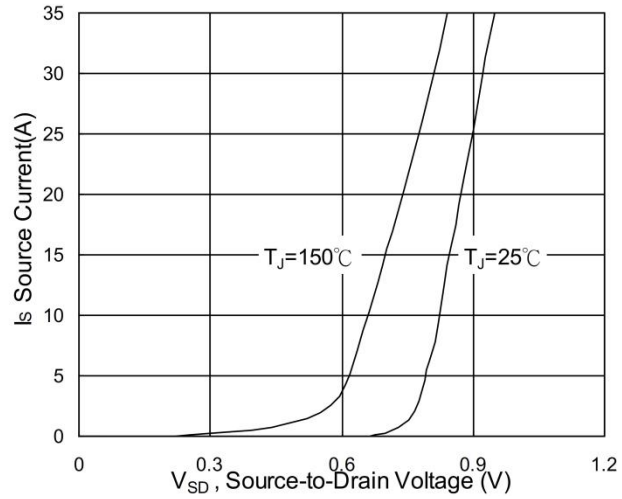
Channel Typical Characteristics



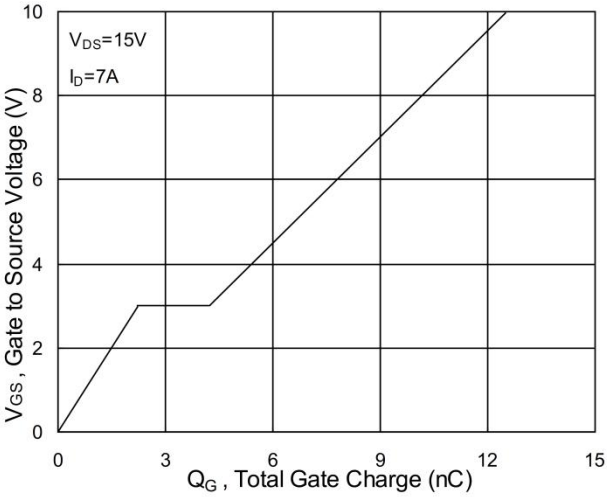
Typical Output Characteristics



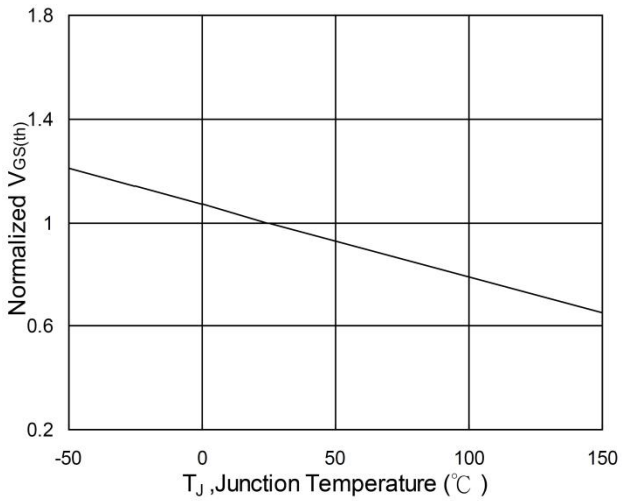
On-Resistance vs.Gate-Source



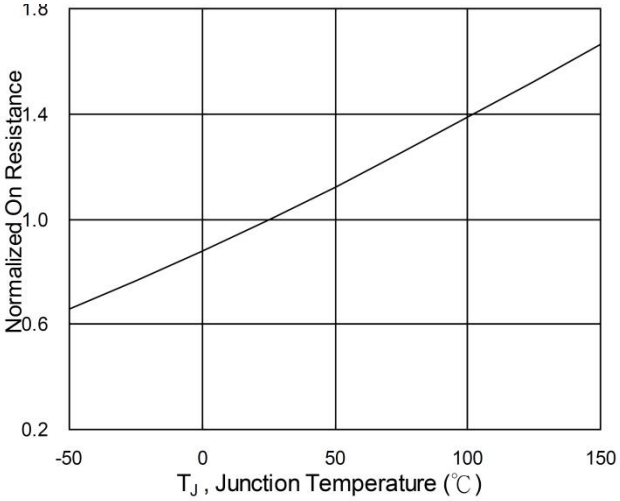
Forward Characteristics Of Reverse



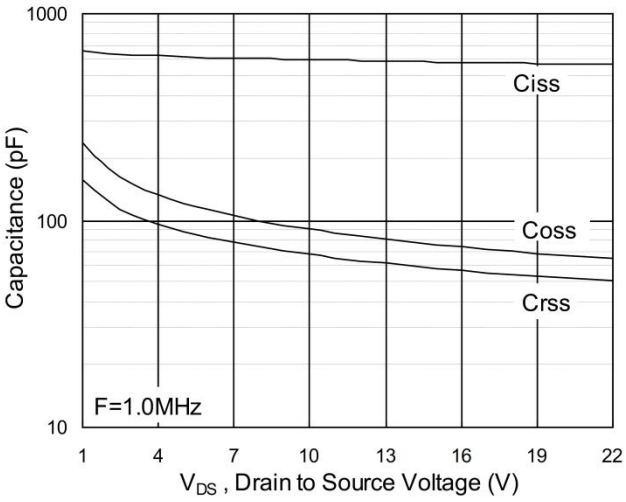
Gate-Charge Characteristics



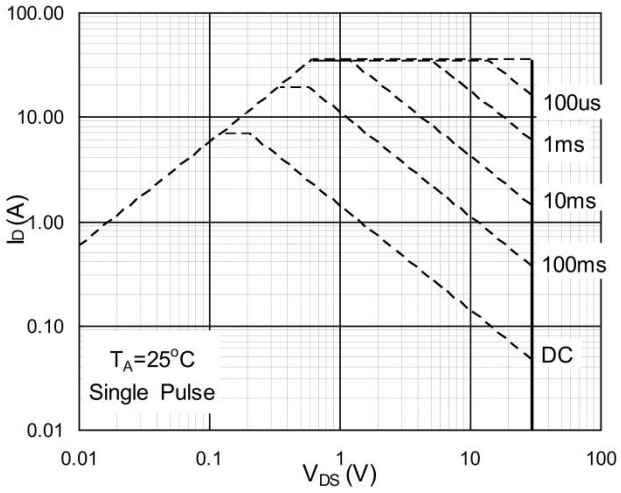
Normalized $V_{GS(th)}$ vs.T_J



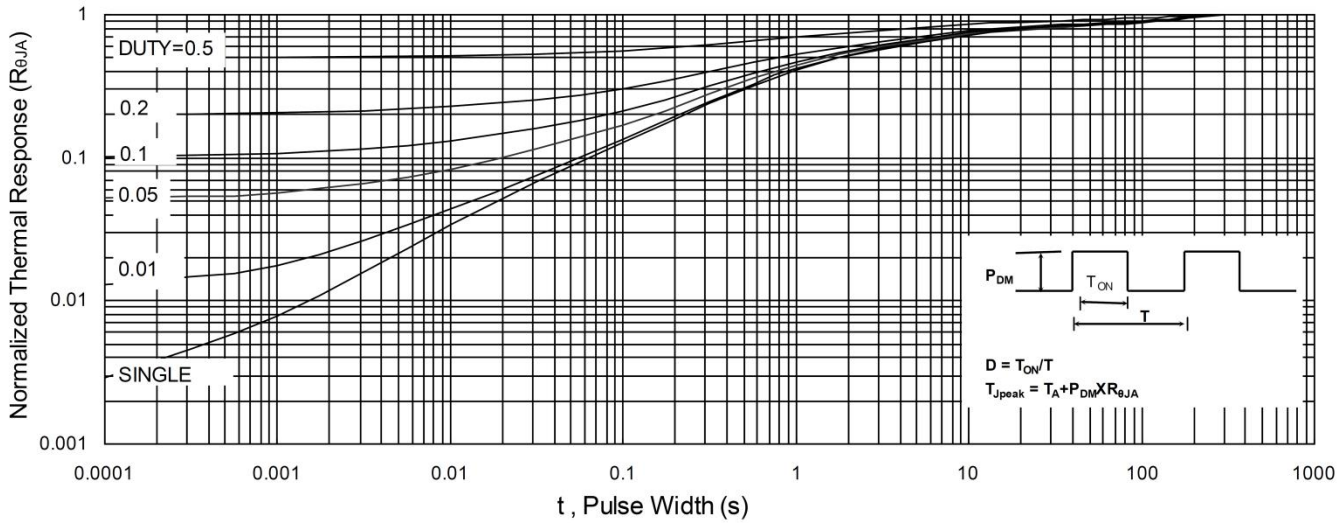
Normalized R_{DSON} vs.T_J



Capacitance

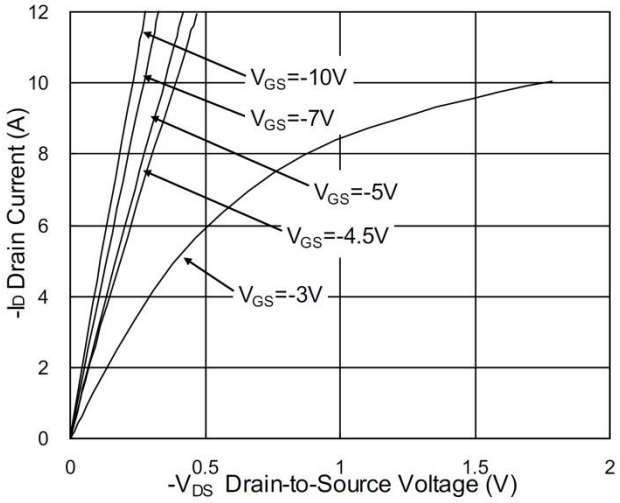


Safe Operating Area

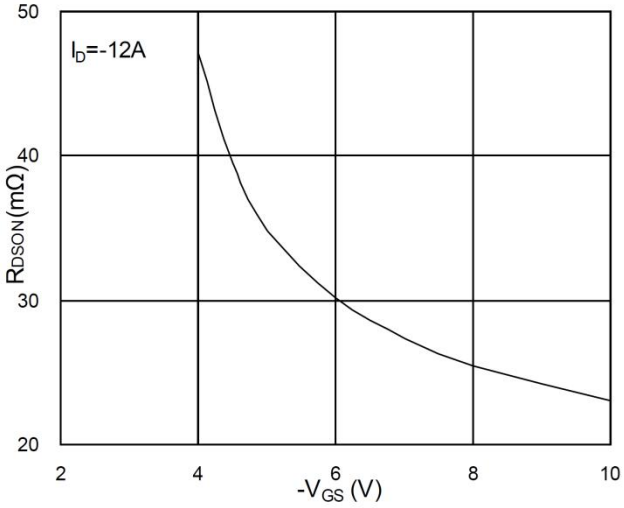


Normalized Maximum Transient Thermal Impedance

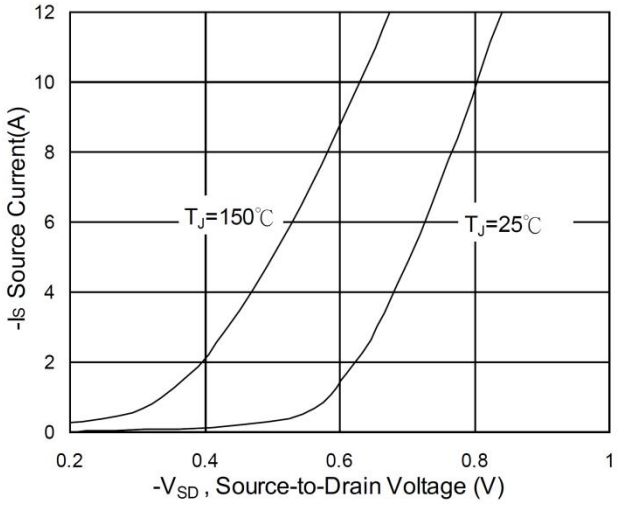
P-Channel Typical Characteristics



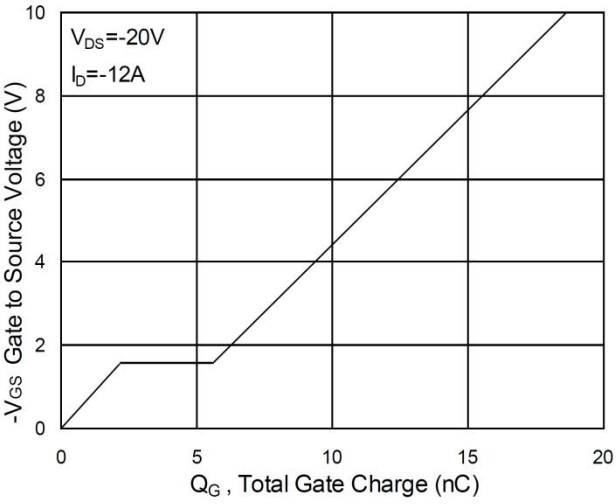
Output Characteristics



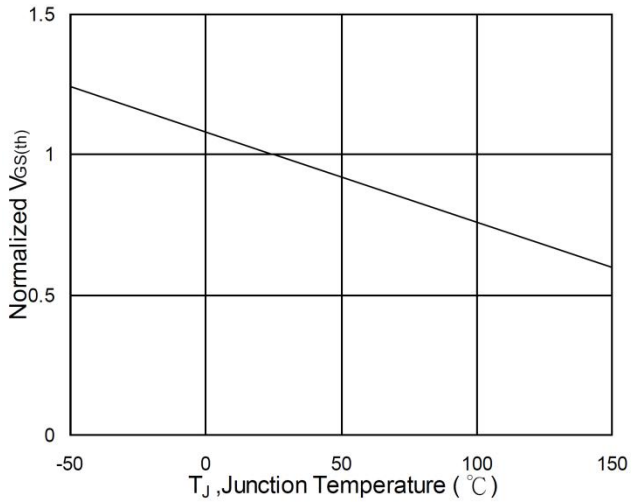
On-Resistance v.s Gate-Source



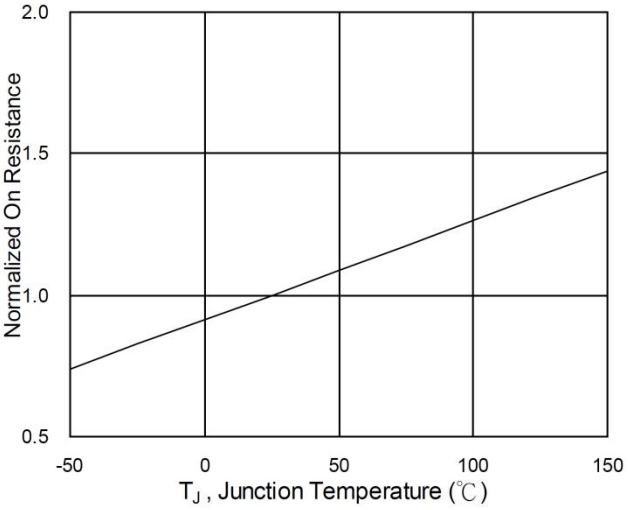
Forward Characteristics of Reverse



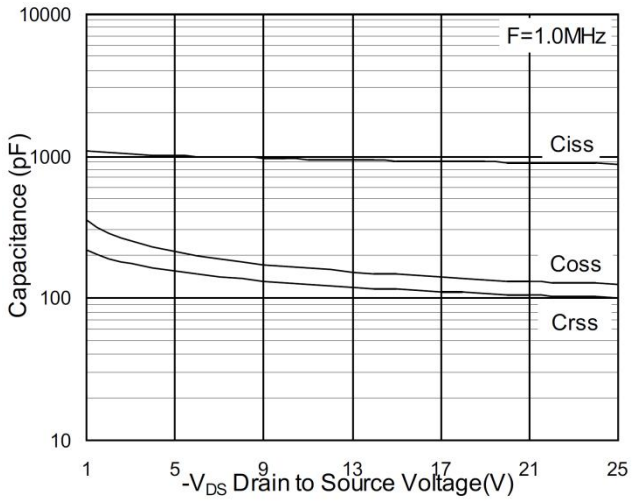
Gate-Charge Characteristics



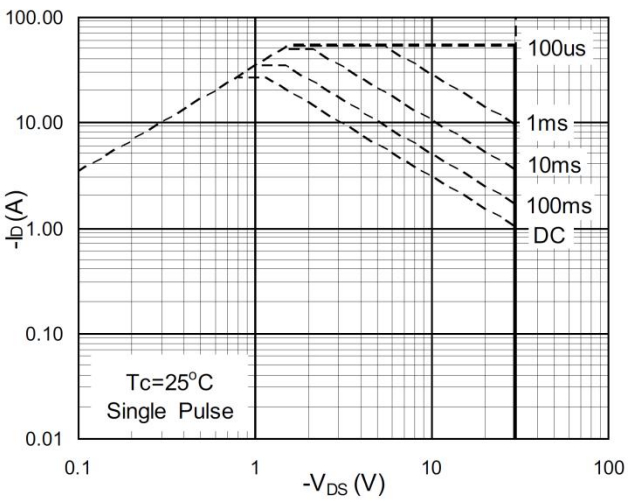
Normalized VGS(th) v.s TJ



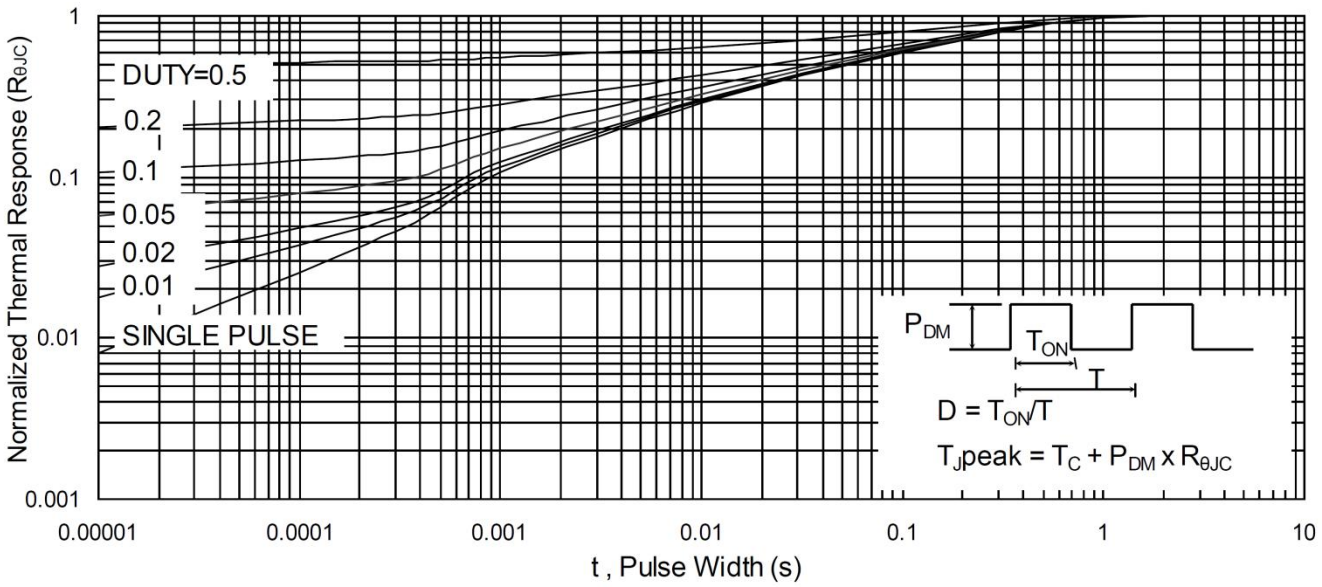
Normalized RDSON v.s TJ



Capacitance vs Vds

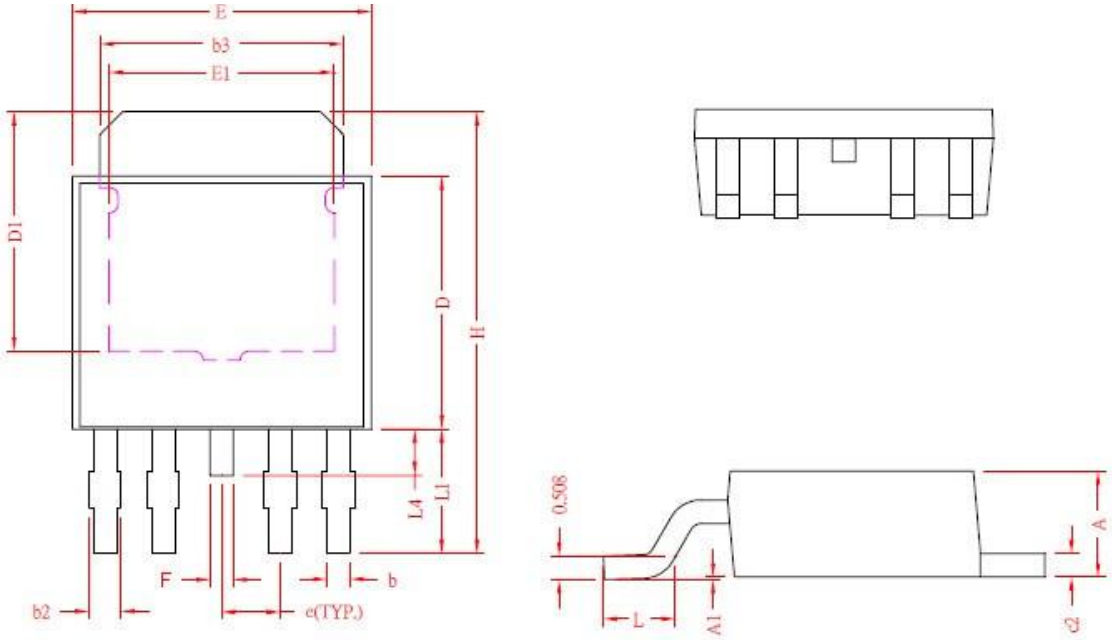


Safe Operating Area



Normalized Maximum Transient Thermal Impedance

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