Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D
40V	17mΩ@10V	23A
	24mΩ@4.5V	
-40V	38mΩ@-10V	-13A
	50mΩ@-4.5V	

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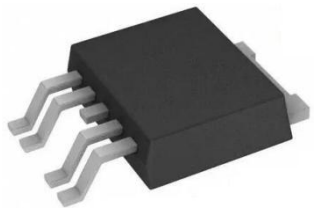
Feature

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

Applications

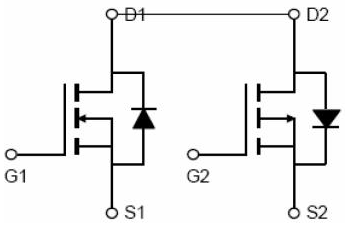
- Battery Protection
- Load Switch
- Power Management

Package

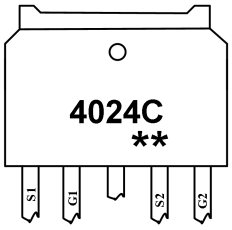


TO-252-4L

Circuit diagram



Marking



4024C :Device Code
** :Week Code

Order Information

Device	Package	Unit/Tape
SP4024CTM	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}	40	-40	V
Gate-Source Voltage	V_{GS}	±20	±20	V
Continuous Drain Current (T_C=25℃)	I_D	23	-13	A
Continuous Drain Current (T_C=100℃)	I_D	15	-9	A
Pulsed Drain Current	I_{DM}	92	-52	A
Single Pulse Avalanche Energy[1]	E_{AS}	25	20	mJ
Power Dissipation (T_C=25℃)	P_D	30		W
Thermal Resistance Junction-to-Case	$R_{\theta JC}$	4.2		℃/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	40	-	-	V
Drain-Source Leakage Current	I_{DSS}	VDS=32V , 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	1.7	2.5	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	VGS=10V, ID=8A	-	17	22	mΩ
		VGS=4.5V, ID=6A	-	24	32	
Dynamic characteristics						
Input Capacitance	C_{iss}	VDS=15V , VGS=0V , f=1MHz	-	834	-	pF
Output Capacitance	C_{oss}		-	51	-	
Reverse Transfer Capacitance	C_{rss}		-	45	-	
Total Gate Charge	Q_g	VDS=20V , VGS=4.5V , ID=5A	-	25	-	nC
Gate-Source Charge	Q_{gs}		-	6	-	
Gate-Drain Charge	Q_{gd}		-	5	-	
Switching Characteristics						
Turn-On Delay Time	$T_{d(on)}$	VDD=20V, VGS=10V , RG=3Ω, ID=5A	-	8	-	nS
Rise Time	T_r		-	7	-	
Turn-Off Delay Time	$T_{d(off)}$		-	26	-	
Fall Time	T_f		-	4	-	
Diode Characteristics						
Diode Forward Voltage	V_{SD}	VGS=0V , IS=1A , TJ=25℃	-	-	1.2	V
Maximum Body-Diode Continuous Current	I_S		-	-	23	A
Reverse Recovery Time	T_{rr}	I_S=20A, di/dt=100A/us, TJ=25℃	-	10	-	nS
Reverse Recovery Charge	Q_{rr}		-	5	-	nC

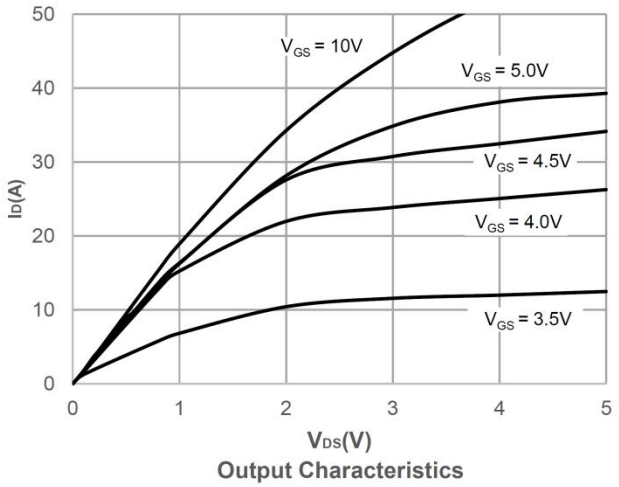
Note :
1.The EAS test condition is VDD=20V,VGS=10V,L=0.5mH,RG=25Ω

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

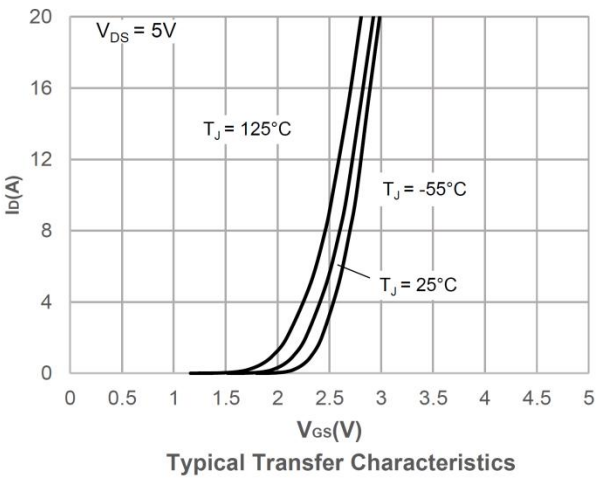
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	VGS=0V , ID=-250uA	-40	-	-	V
Drain-Source Leakage Current	I_{DSS}	VDS=-32V , VGS=0V , TJ=25℃	-	-	-1	uA
Gate-Source Leakage Current	I_{GSS}	VGS=±20V , VDS=0V	-	-	±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	VGS=VDS , ID =-250uA	-1	-1.6	-2.5	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	VGS=-10V , ID=-5A	-	38	45	mΩ
		VGS=-4.5V , ID=-4A	-	50	60	
Dynamic characteristics						
Input Capacitance	C_{iss}	VDS=-15V , VGS=0V , f=1MHz	-	915	-	pF
Output Capacitance	C_{oss}		-	104	-	
Reverse Transfer Capacitance	C_{rss}		-	92	-	
Total Gate Charge	Q_g	VDS=-15V , VGS=-4.5V , ID=-1A	-	24	-	nC
Gate-Source Charge	Q_{gs}		-	3	-	
Gate-Drain Charge	Q_{gd}		-	4	-	
Switching Characteristics						
Turn-On Delay Time	$T_{d(on)}$	VDD=-15V, VGS=-10V , RG=3Ω, ID=-1A	-	11	-	nS
Rise Time	T_r		-	17	-	
Turn-Off Delay Time	$T_{d(off)}$		-	55	-	
Fall Time	T_f		-	19	-	
Diode Characteristics						
Diode Forward Voltage	V_{SD}	VGS=0V , IS=-1A , TJ=25℃	-	-	-1.2	V
Maximum Body-Diode Continuous Current	I_S		-	-	-13	A
Reverse Recovery Time	T_{rr}	I_S=-5A, di/dt=100A/us, TJ=25℃	-	13	-	nS
Reverse Recovery Charge	Q_{rr}		-	7	-	nC

Note :
1.The EAS test condition is VDD=-20V,VGS=-10V,L=0.5mH,RG=25Ω

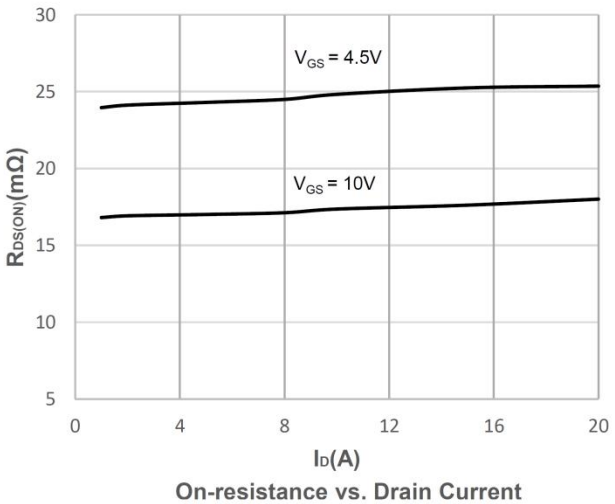
N-Channel Typical Characteristics



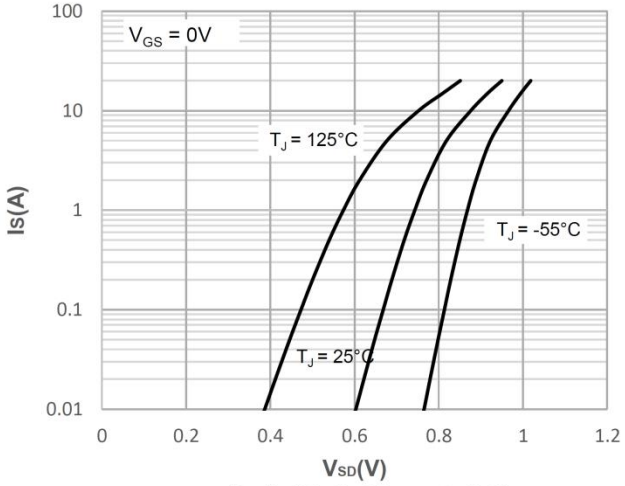
Output Characteristics



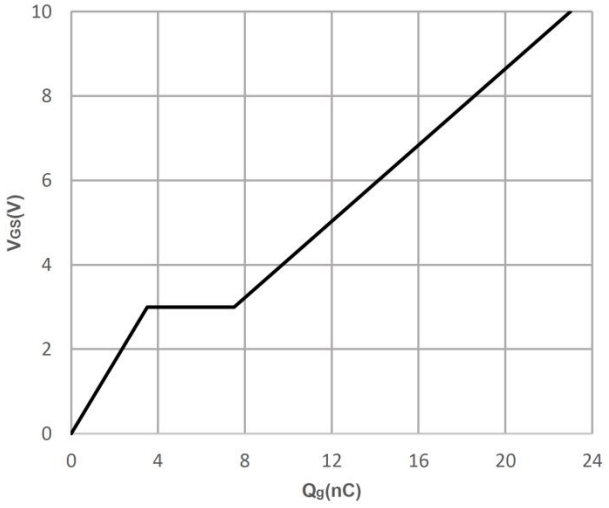
Typical Transfer Characteristics



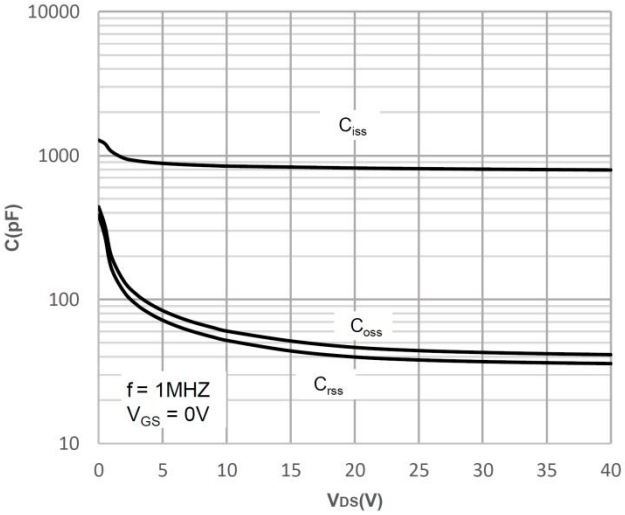
On-resistance vs. Drain Current



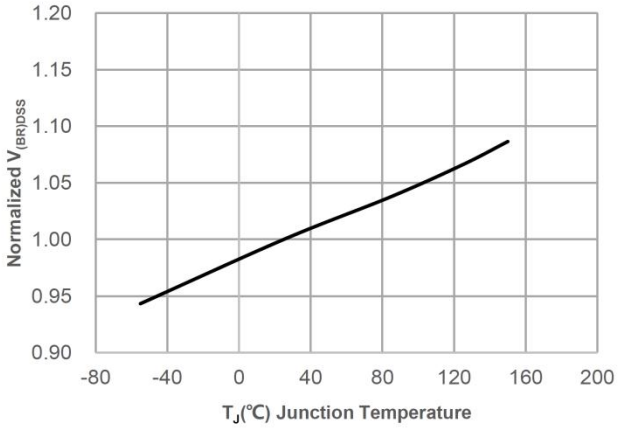
Body Diode Characteristics



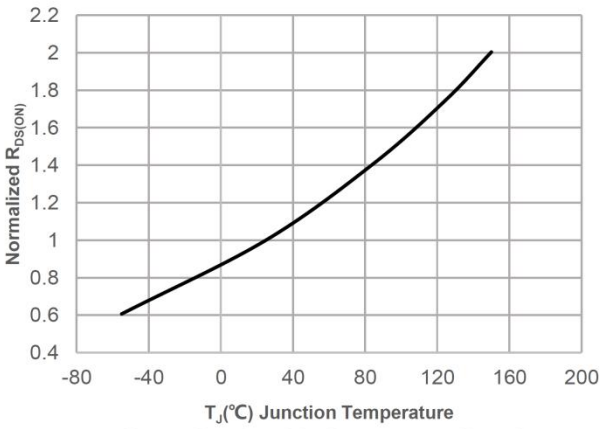
Gate Charge Characteristics



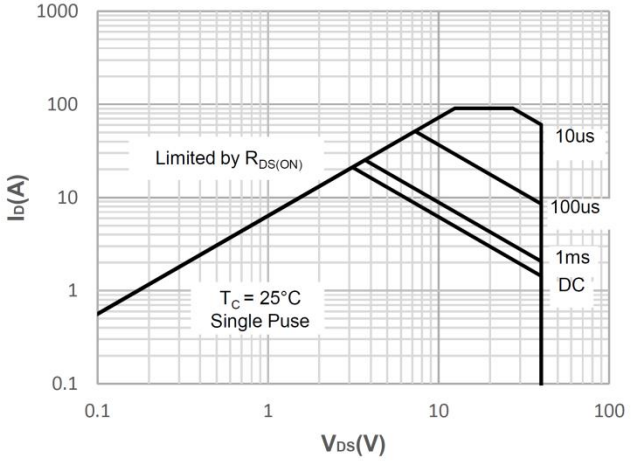
Capacitance Characteristics



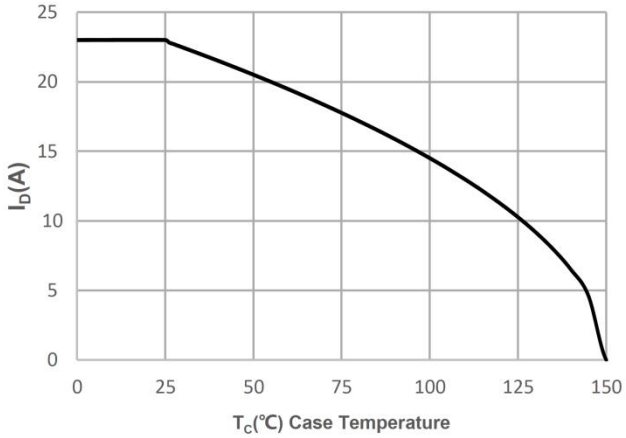
Normalized Breakdown voltage vs. Junction Temperature



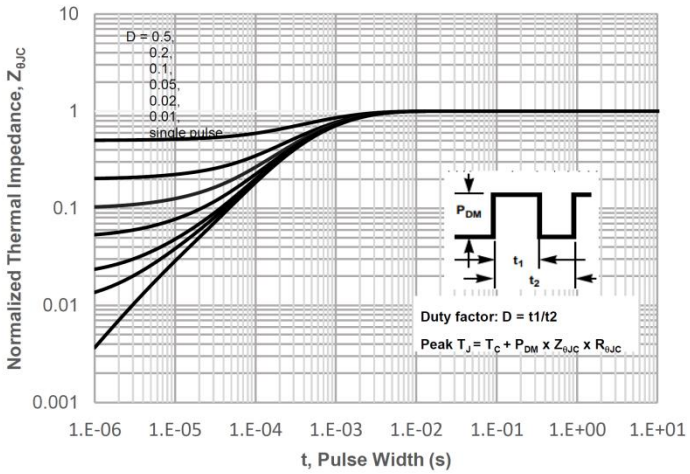
Normalized on Resistance vs. Junction Temperature



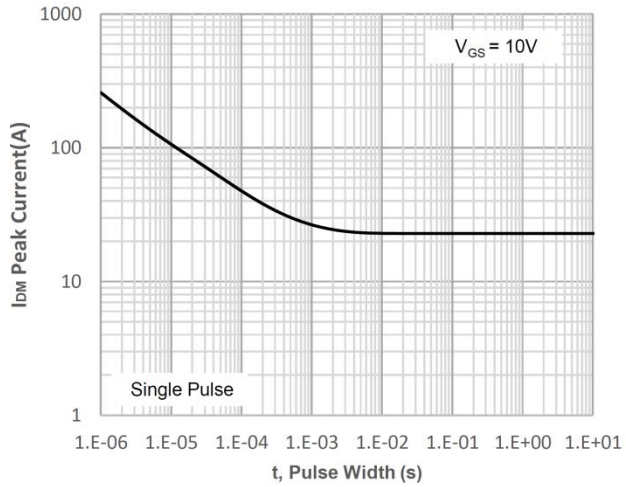
Maximum Safe Operating Area



Maximum Continuous Drian Current vs. Case Temperature

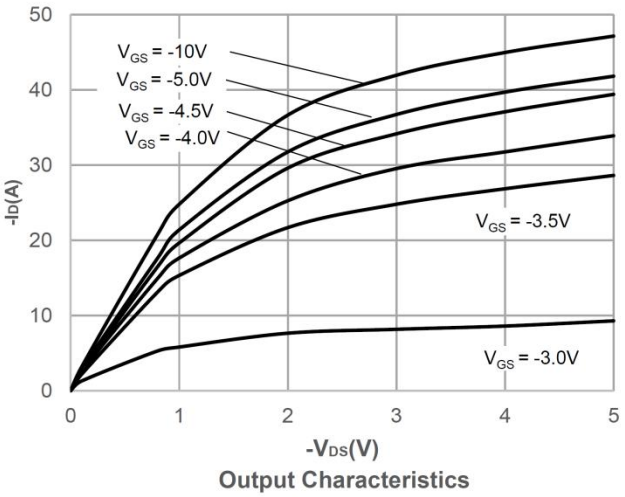


Normalized Maximum Transient Thermal Impedance

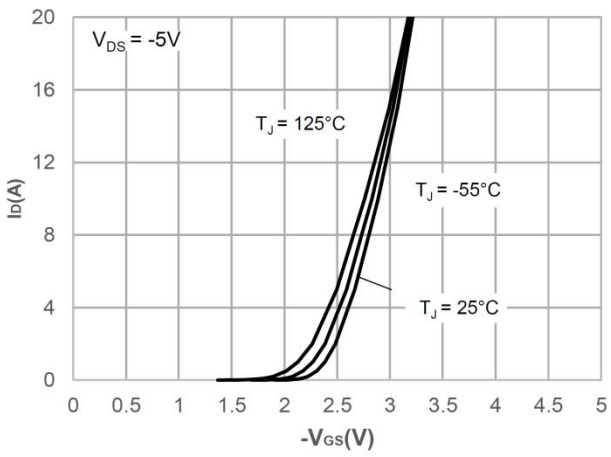


Peak Current Capacity

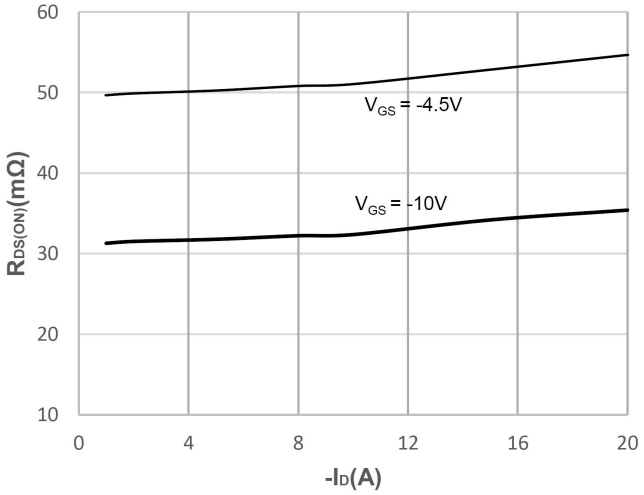
P-Channel Typical Characteristics



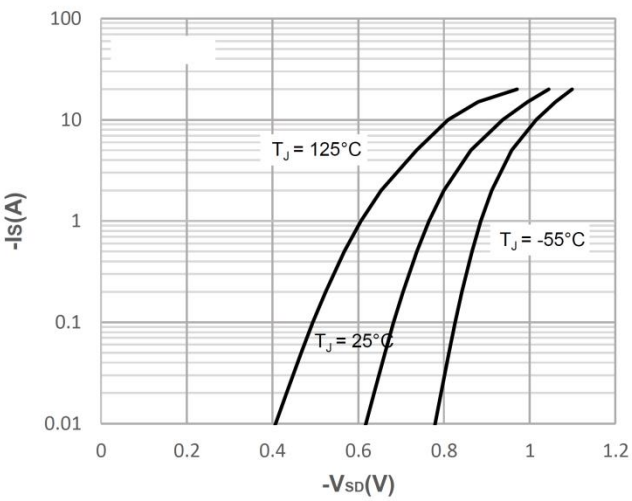
Output Characteristics



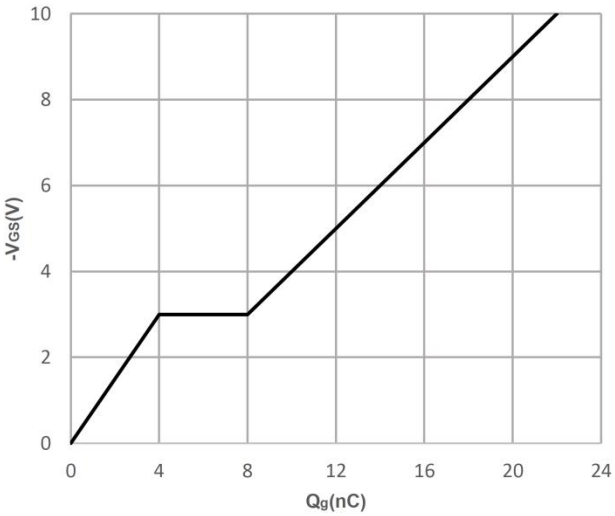
Typical Transfer Characteristics



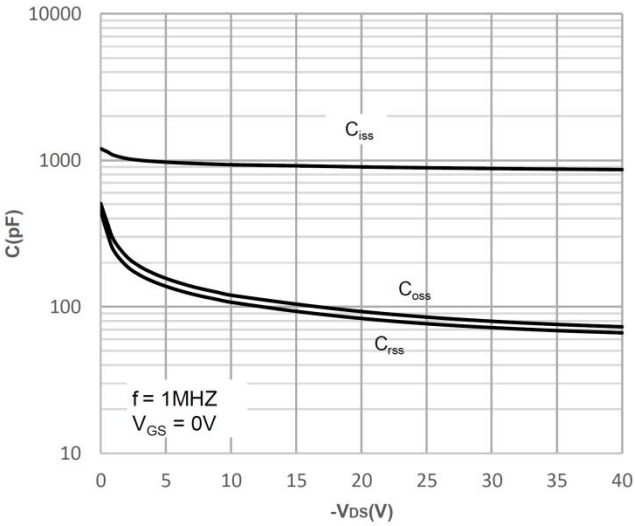
On-resistance vs. Drain Current



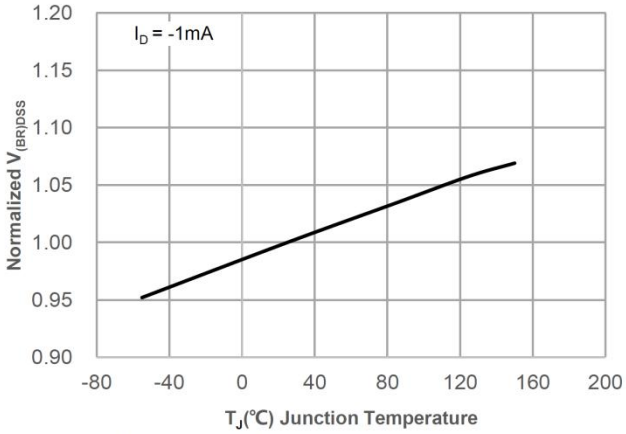
Body Diode Characteristics



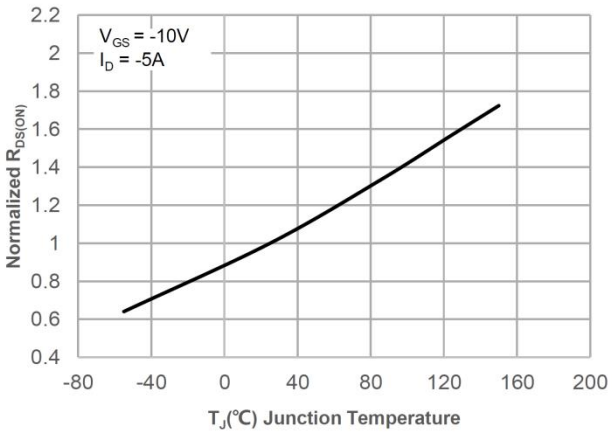
Gate Charge Characteristics



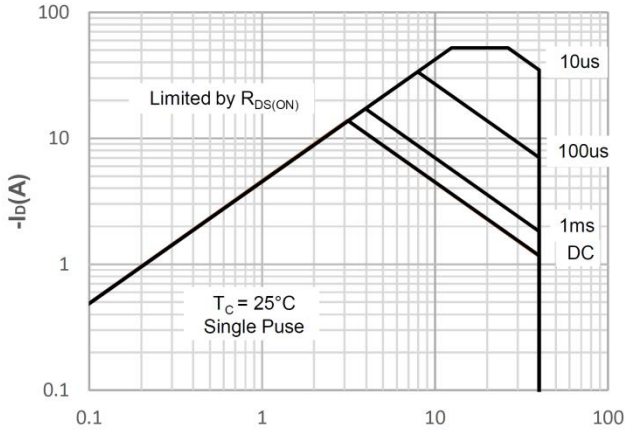
Capacitance Characteristics



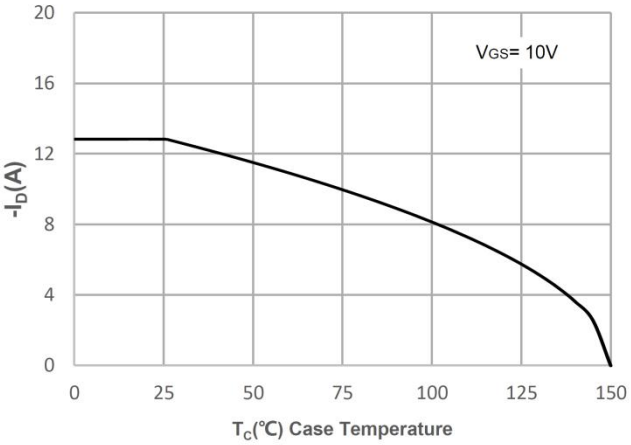
Normalized Breakdown voltage vs. Junction Temperature



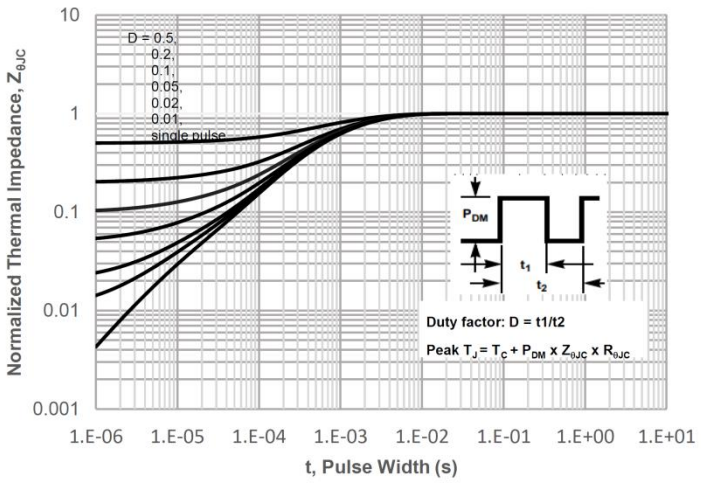
Normalized on Resistance vs. Junction Temperature



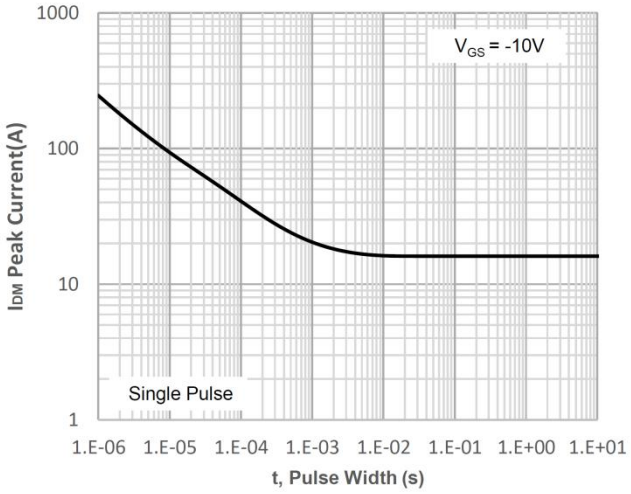
Maximum Safe Operating Area



Maximum Continuous Drian Current vs. Case

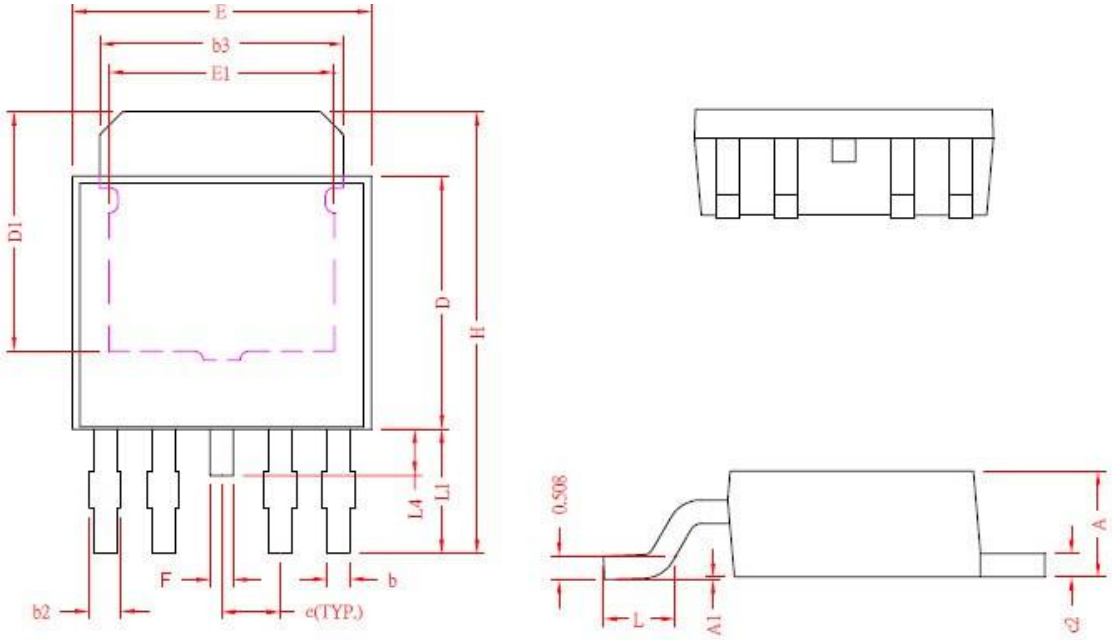


Normalized Maximum Transient Thermal Impedance



Peak Current Capacity

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