

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D
40V	18mΩ@10V	17A
	26mΩ@4.5V	
-40V	29mΩ@-10V	-14A
	36mΩ@-4.5V	

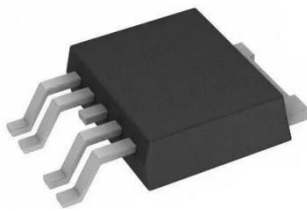
Feature

- High power and current handling capability
- Lead free product is acquired
- Surface mount package

Application

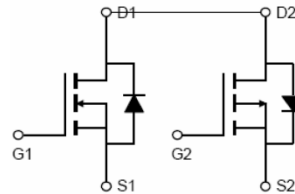
- Battery Protection
- Load Switch
- Power Management

Package

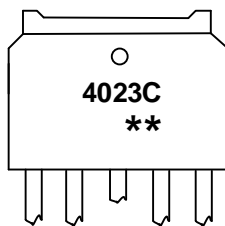


TO-252-4L

Circuit diagram



Marking



4023C =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}	40	-40	V
Gate-Source Voltage	V_{GS}	± 20	± 20	V
Continuous Drain Current	I_D	17	-14	A
Pulsed Drain Current	I_{DM}	68	-56	A
Maximum Power Dissipation	P_D	37.4		W
Thermal Resistance from Junction to Ambient($t \leq 10s$)	$R_{\theta JA}$	3.34		$^{\circ}C/W$
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 150	-55 To 150	$^{\circ}C$

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

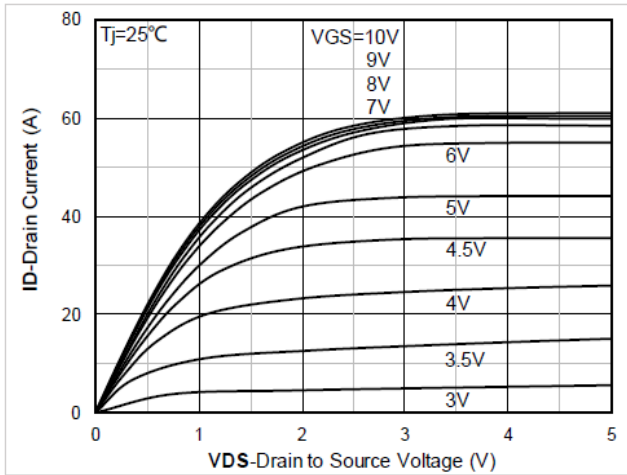
Parameter	Symbol	Condition	Min	Typ	Max	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS} = 0V, I_D = 250\mu A$	40	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 32V, V_{GS} = 0V$	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS} = \pm 20V, V_{DS} = 0V$	-	-	± 100	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	1	1.5	2.0	V
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 7A$	-	18	23	m Ω
		$V_{GS} = 4.5V, I_D = 6A$	-	26	35	m Ω
Dynamic Characteristics						
Input Capacitance	C_{iss}	$V_{DS} = 15V, V_{GS} = 0V, f = 1MHz$		1534	-	PF
Output Capacitance	C_{oss}			216	-	PF
Reverse Transfer Capacitance	C_{rss}			135	-	PF
Switching Characteristics						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD} = 20V, V_{GS} = 10V, R_G = 3.3\Omega, I_D = 7A$		3.8	-	nS
Turn-on Rise Time	t_r			11.7	-	nS
Turn-Off Delay Time	$t_{d(off)}$			20.8	-	nS
Turn-Off Fall Time	t_f			5.4	-	nS
Total Gate Charge	Q_g	$V_{DS} = 32V, V_{GS} = 4.5V, I_D = 7A$		20	-	nC
Gate-Source Charge	Q_{gs}			3.8	-	nC
Gate-Drain Charge	Q_{gd}			3.9	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage	V_{SD}	$V_{GS} = 0V, I_S = 1A, T_J = 25^{\circ}C$			1	V

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

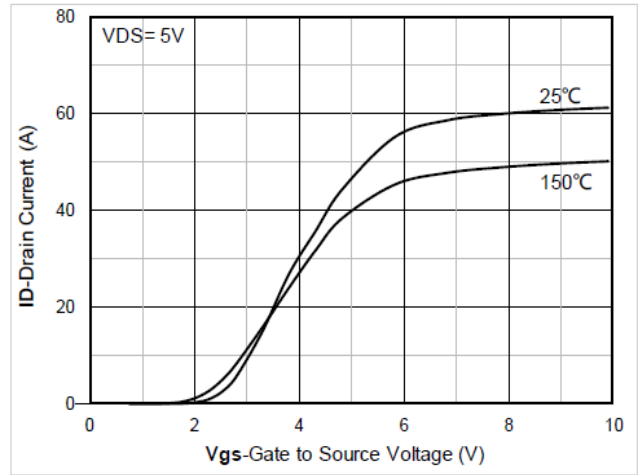
Parameter	Symbol	Condition	Min	Typ	Max	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} = 0V, I _D = -250μA	-40	-	-	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = -40V, V _{GS} = 0V	-	-	-1	μA
Gate-Body Leakage Current	I _{GSS}	V _{GS} = ±20V, V _{DS} = 0V	-	-	±100	nA
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = -250μA	-1.0	-1.5	-2.0	V
Drain-Source On-State Resistance	R _{DS(on)}	V _{GS} = -10V, I _D = -5A	-	29	37	mΩ
		V _{GS} = -4.5V, I _D = -4A	-	36	48	mΩ
Dynamic Characteristics						
Input Capacitance	C _{iss}	V _{DS} = -15V, V _{GS} = 0V, f = 1MHz	-	1215	-	PF
Output Capacitance	C _{oss}		-	184	-	PF
Reverse Transfer Capacitance	C _{rss}		-	102	-	PF
Switching Characteristics						
Turn-on Delay Time	t _{d(on)}	V _{DD} = -15V, V _{GS} = -10V, R _G = 3.3 Ω, I _D = -1A	-	11	-	nS
Turn-on Rise Time	t _r		-	15.7	-	nS
Turn-Off Delay Time	t _{d(off)}		-	31	-	nS
Turn-Off Fall Time	t _f		-	19	-	nS
Total Gate Charge	Q _g	V _{DS} = -15V, V _{GS} = -4.5V, I _D = -1A	-	21.5	-	nC
Gate-Source Charge	Q _{gs}		-	3.5	-	nC
Gate-Drain Charge	Q _{gd}		-	3.3	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage	V _{SD}	V _{GS} = 0V, I _S = -1A, T _J = 25°C	-	-	-1.2	V

Notes:

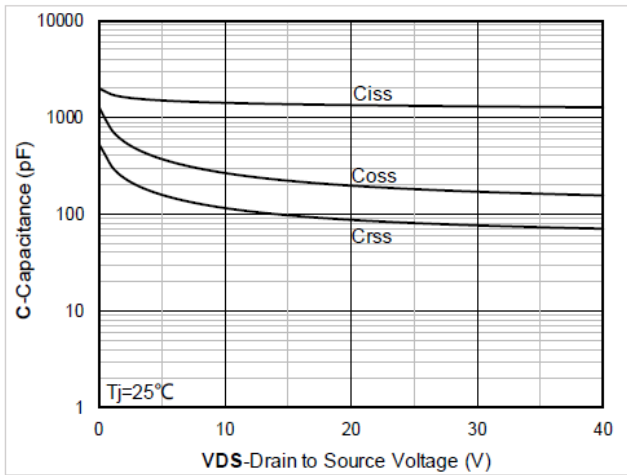
N-Channel Typical Characteristics



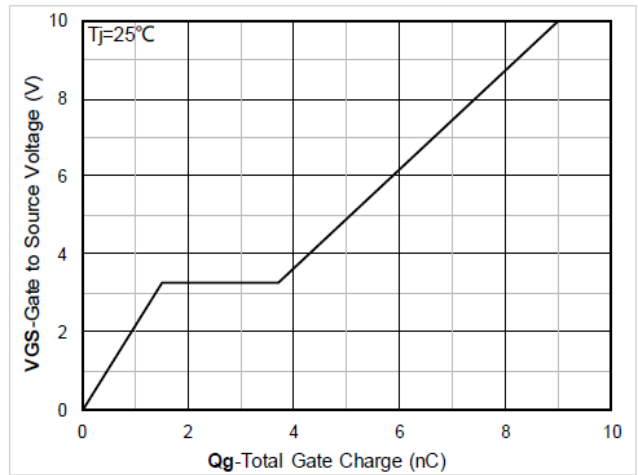
Output Characteristics



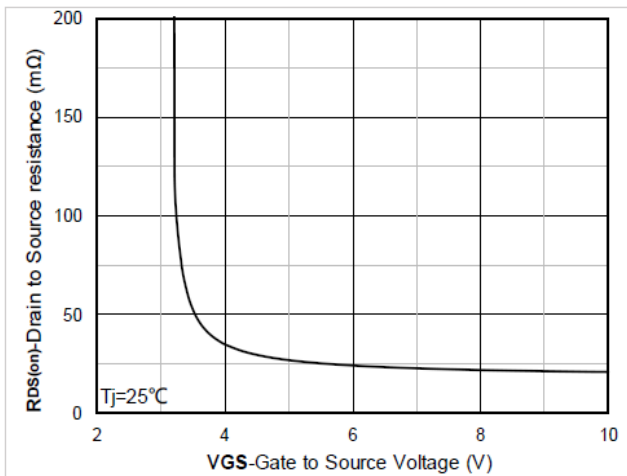
Transfer Characteristics



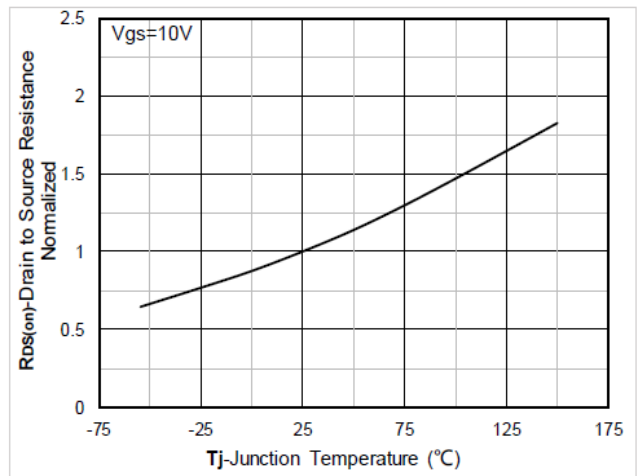
Capacitance Characteristics



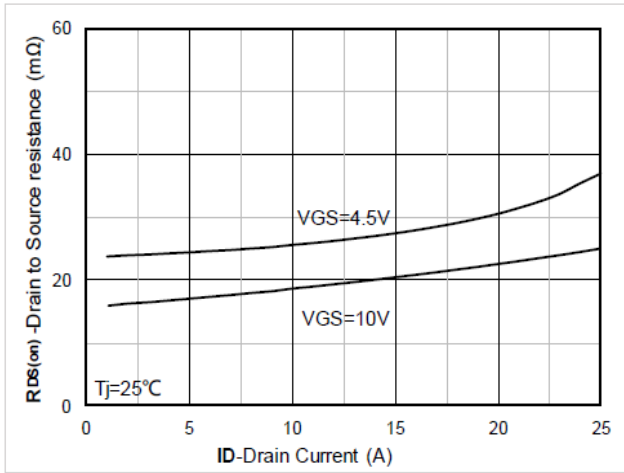
Gate Charge



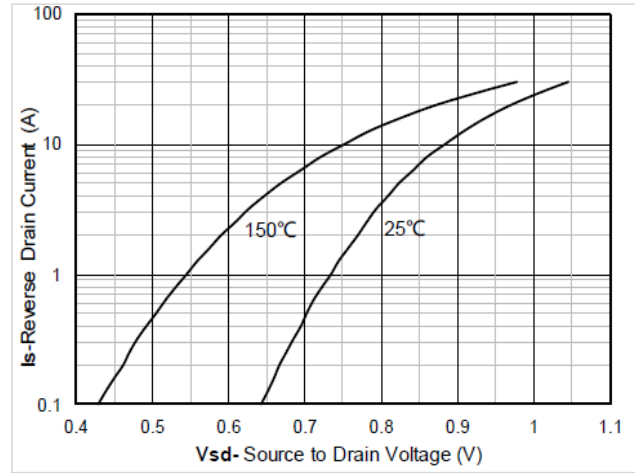
On-Resistance vs Gate to Source Voltage



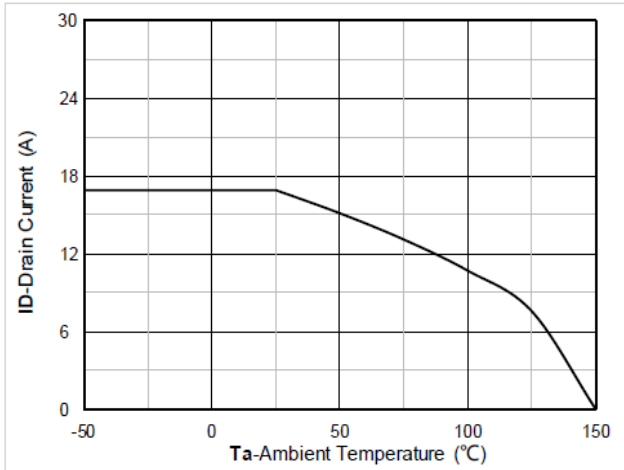
Normalized On- Resistance



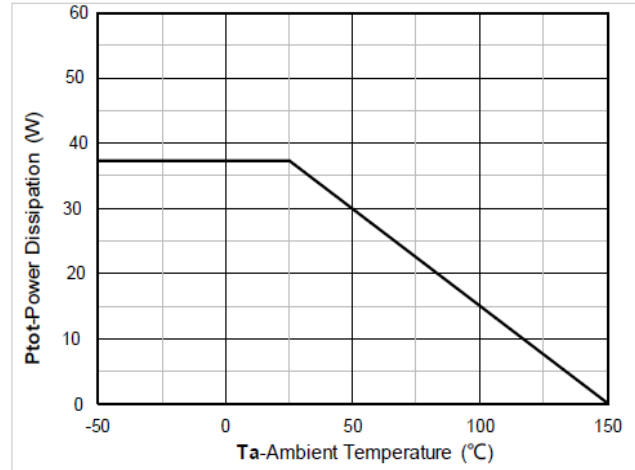
RDS(on) VS Drain Current



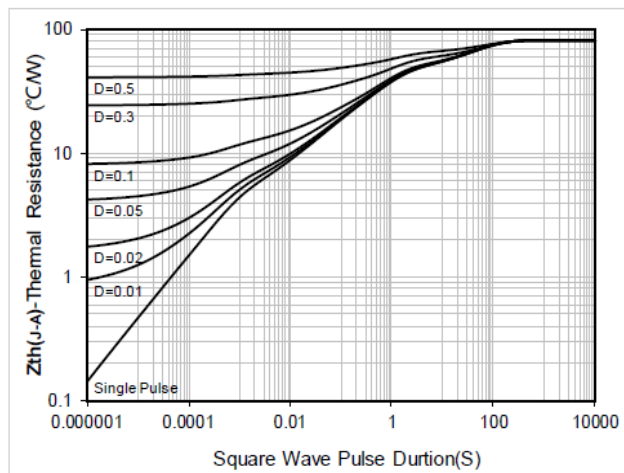
Forward characteristics of reverse diode



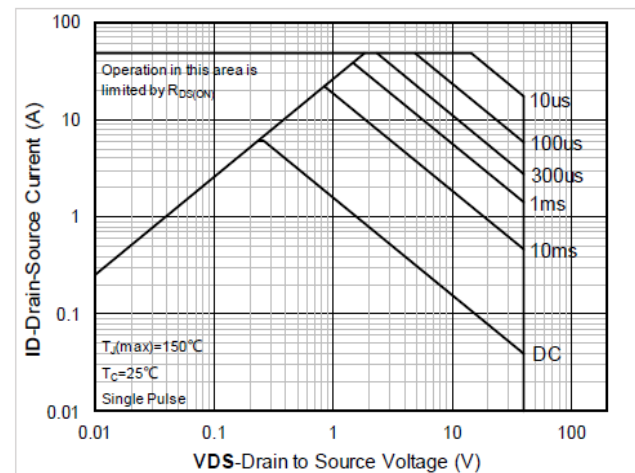
Current dissipation



Power dissipation

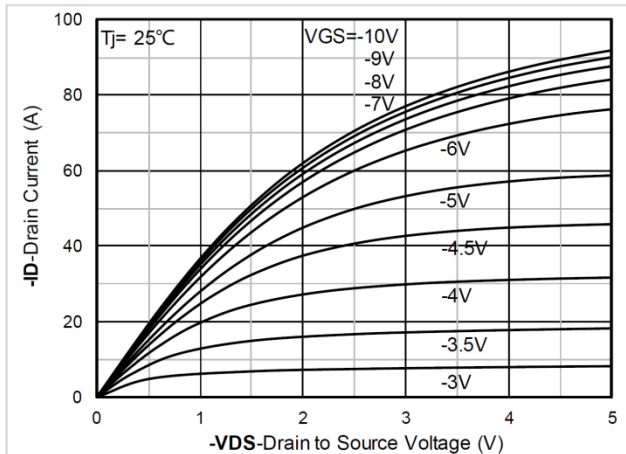


Maximum Transient Thermal Impedance

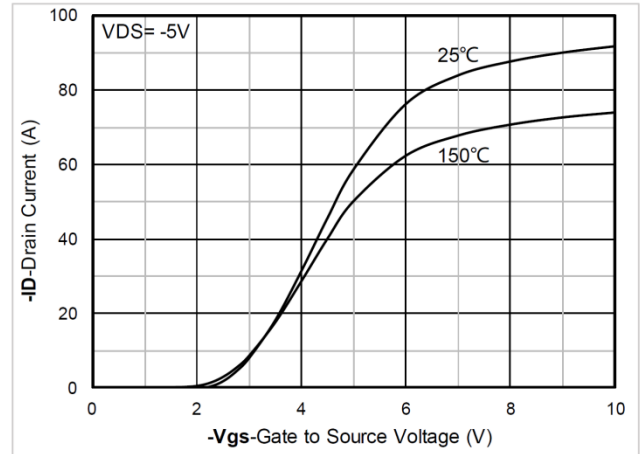


Safe Operation Area

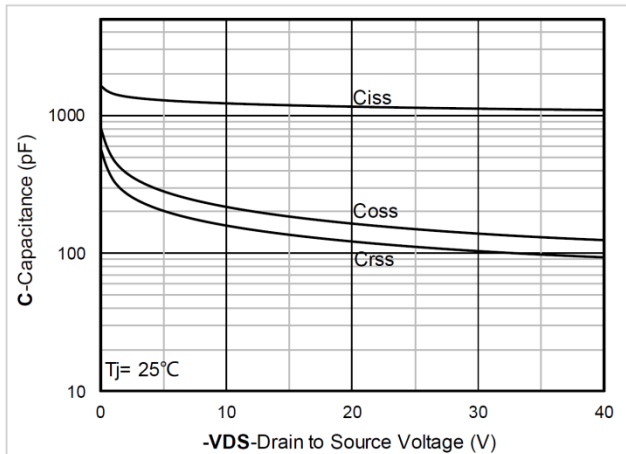
P-Channel Typical Characteristics



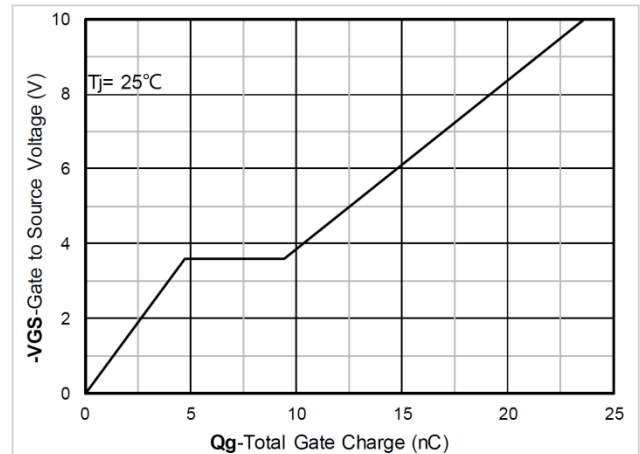
Output Characteristics



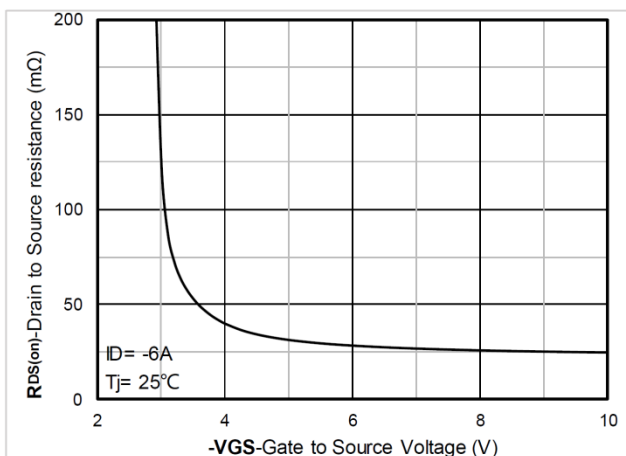
Transfer Characteristics



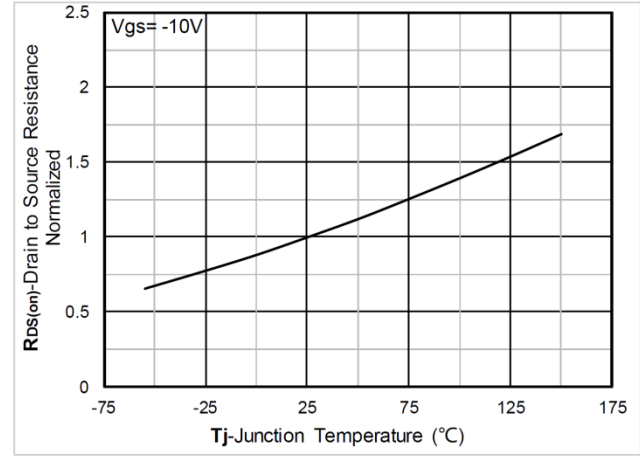
Capacitance Characteristics



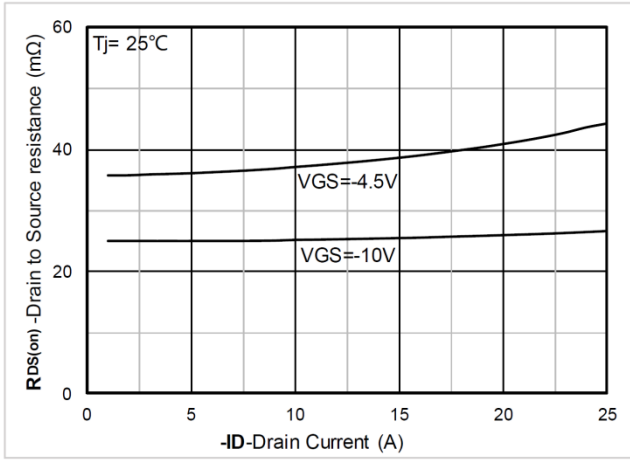
Gate Charge



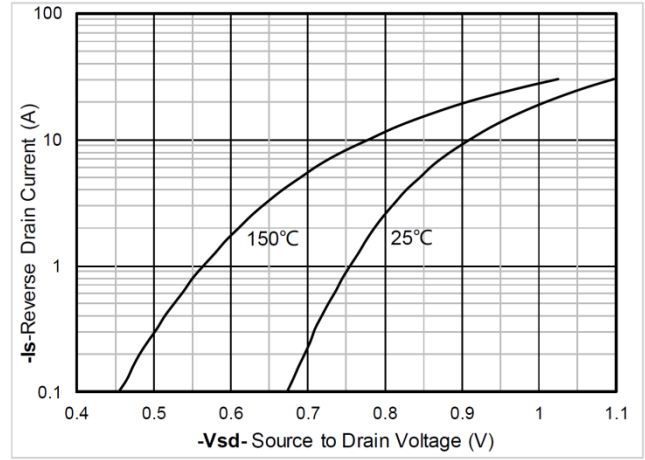
On-Resistance vs Gate to Source Voltage



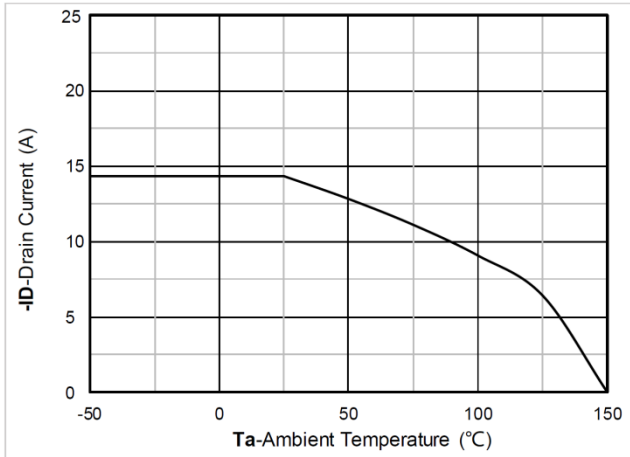
Normalized On-Resistance



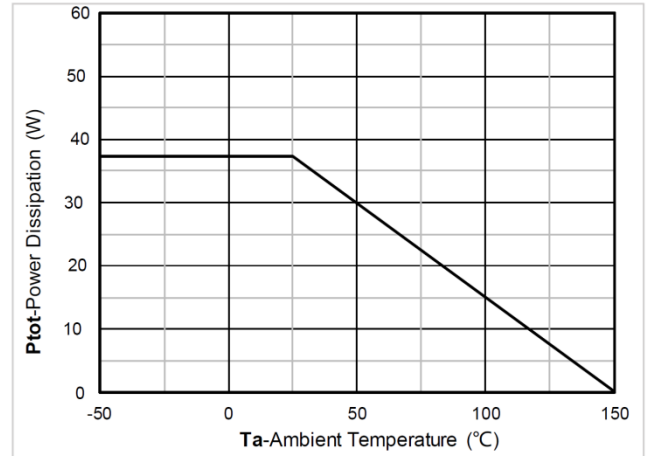
RDS(on) VS Drain Current



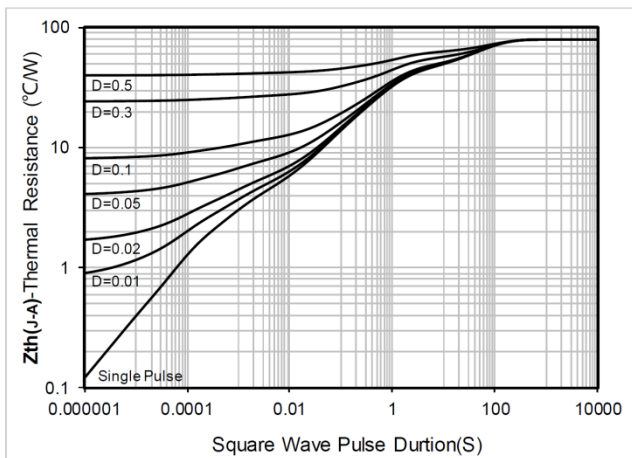
Forward characteristics of reverse diode



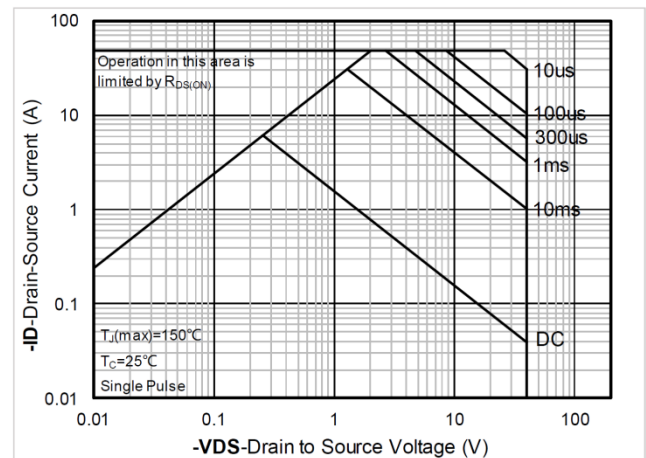
Current dissipation



Power dissipation



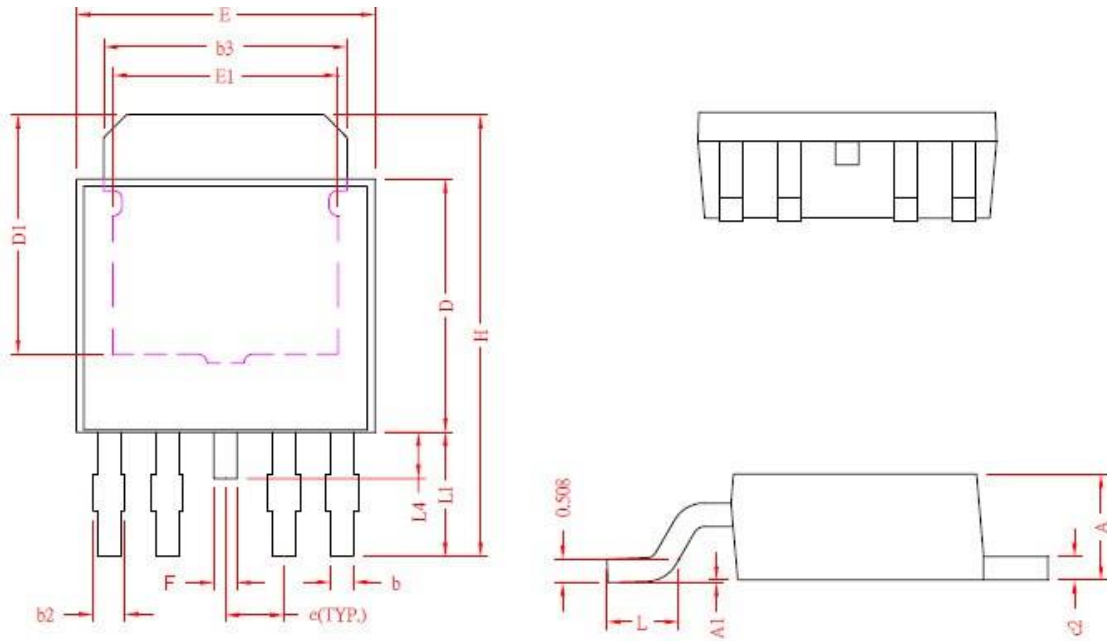
Maximum Transient Thermal Impedance



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

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