

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	I_D	$V_{(BR)DSS}$	$R_{DS(on)MAX}$	I_D
30V	12mΩ@10V	25A	-30V	35mΩ@-10V	-19A
	18mΩ@4.5V			65mΩ@-4.5V	

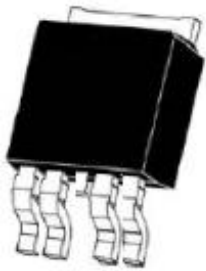
Feature

- High density cell design for ultra low Rdson
- Fully characterized avalanche voltage and current
- Good stability and uniformity with high E_{AS}
- Excellent package for good heat dissipation
- Suffix “-Q1” for AEC-Q101

Application

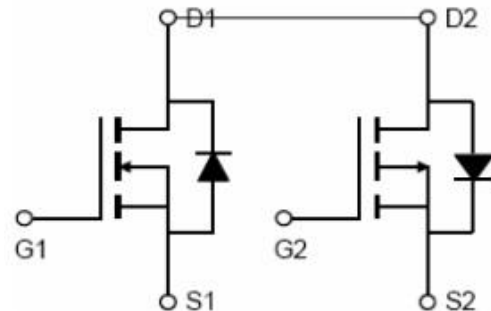
- H-bridge
- Inverters

Package

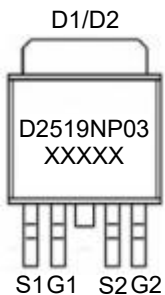


TO-252-4L

Circuit diagram



Marking



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

Parameter	Symbol	N-Channel	p-Channel	Unit
Drain-Source Voltage	V _{DS}	30	-30	V
Gate-Source Voltage	V _{GS}	±20	±20	V
Continuous Drain Current	I _D	25	-19	A
Pulsed Drain Current	I _{DM}	90	-60	A
Power Dissipation	P _D	21		W
Thermal Resistance, Junction-to-Ambient ¹⁾	R _{θjc}	7		°C/W
Junction Temperature	T _J	150		°C
Storage Temperature	T _{STG}	-55 ~ +150		°C

N-CH Electrical characteristics (T_c=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	30			V
Zero gate voltage drain current	I _{DSS}	V _{DS} = 30V, 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	2.0	3.0	V
Drain-source on-resistance ²⁾	R _{DS(on)}	V _{GS} = 10V, I _D = 7A		8.5	12	mΩ
		V _{GS} = 4.5V, I _D = 6A		11.8	18	mΩ
Dynamic characteristics³⁾						
Input Capacitance	C _{iss}	V _{DS} = 15V, V _{GS} = 0V, f = 1MHz		450		pF
Output Capacitance	C _{oss}			150		
Reverse Transfer Capacitance	C _{rss}			90		
Total Gate Charge	Q _g	V _{DS} = 15V, V _{GS} = 10V, I _D = 6A		9.5		nC
Gate-Source Charge	Q _{gs}			2.0		
Gate-Drain Charge	Q _{gd}			1.9		
Turn-on delay time	t _{d(on)}	V _{DD} = 15V, V _{GS} = 10V R _L = 2.5Ω, R _{GEN} = 3Ω		5		nS
Turn-on rise time	t _r			12		
Turn-off delay time	t _{d(off)}			19		
Turn-off fall time	t _f			6		
Source-Drain Diode characteristics						
Diode Forward Current	I _S				25	A
Diode Forward voltage	V _{DS}	V _{GS} = 0V, I _S = 25A			1.2	V

P-CH Electrical characteristics (T_c=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	-30			V
Zero gate voltage drain current	I _{DSS}	V _{DS} = -30V, 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	-1.8	-2.5	V
Drain-source on-resistance ²⁾	R _{DS(on)}	V _{GS} = -10V, I _D = -6A		28	35	mΩ
		V _{GS} = -4.5V, I _D = -5A		48	65	mΩ
Dynamic characteristics³⁾						
Input Capacitance	C _{iss}	V _{DS} = -15V, V _{GS} = 0V, f = 1MHz		920		pF
Output Capacitance	C _{oss}			140		
Reverse Transfer Capacitance	C _{rss}			90		
Total Gate Charge	Q _g	V _{DS} = -15V, V _{GS} = -10V, I _D = -6A		16.2		nC
Gate-Source Charge	Q _{gs}			2.9		
Gate-Drain Charge	Q _{gd}			3.6		
Turn-on delay time	t _{d(on)}	V _{DD} = -15V, V _{GS} = -10V, R _L = -2.5Ω, R _{GEN} = 3Ω		8		nS
Turn-on rise time	t _r			30		
Turn-off delay time	t _{d(off)}			22		
Turn-off fall time	t _f			26		
Source-Drain Diode characteristics						
Diode Forward Current	I _S				-19	A
Diode Forward voltage	V _{DS}	V _{GS} = 0V, I _S = -6A			-1.2	V

Notes:

- 1) Surface Mounted on FR4 Board, t_s ≤ 10 sec.
- 2) Pulse Test: Pulse Width < 300μs, Duty Cycle ≤ 2%.
- 3) Guaranteed by design, not subject to production testing.

N- Channel Typical Characteristics

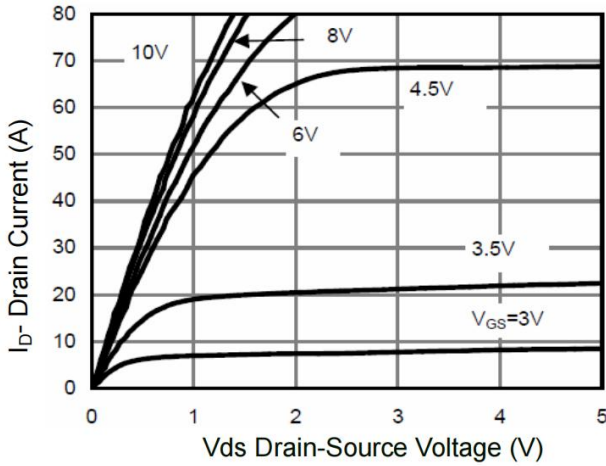


Figure 1 Output Characteristics

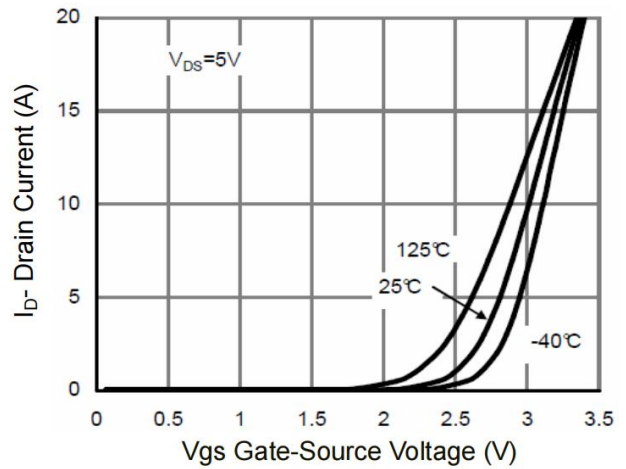


Figure 2 Transfer Characteristics

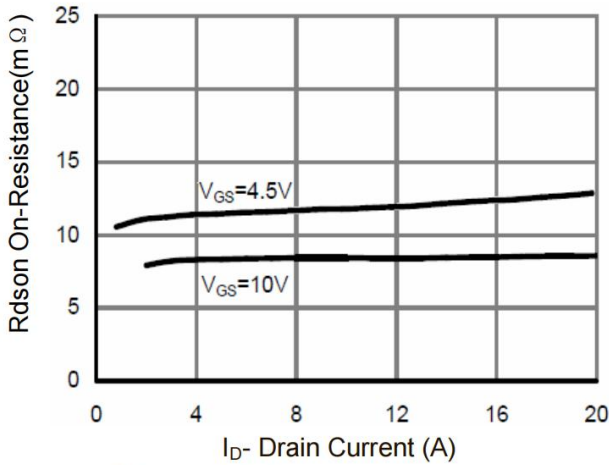


Figure 3 Rdson- Drain Current

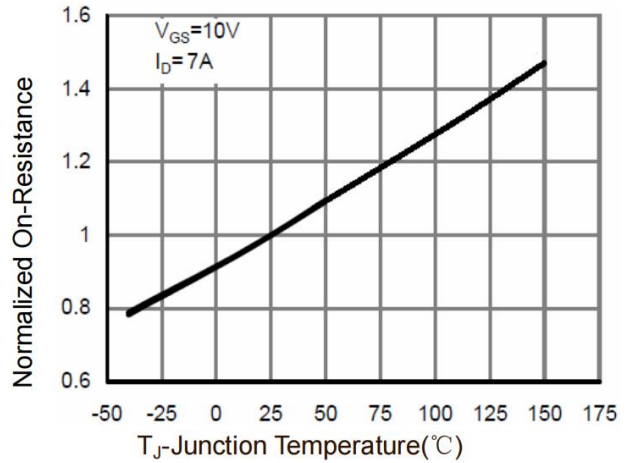


Figure 4 Rdson-Junction Temperature

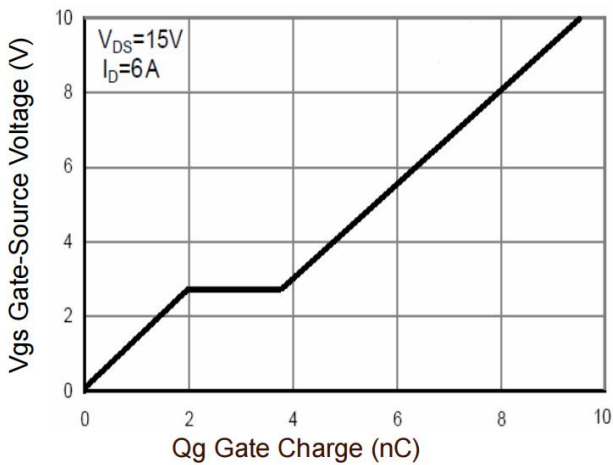


Figure 5 Gate Charge

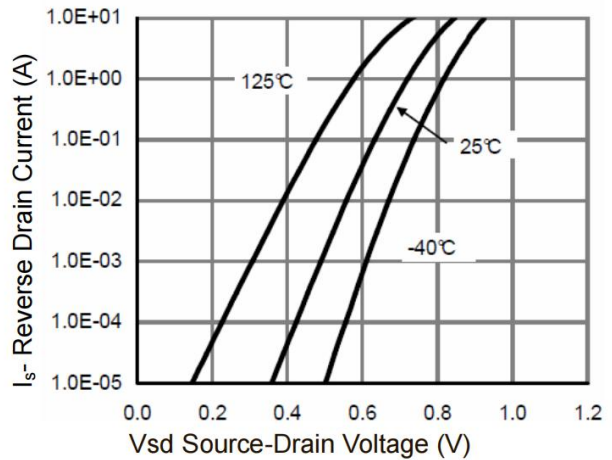


Figure 6 Source- Drain Diode Forward

N- Channel Typical Characteristics

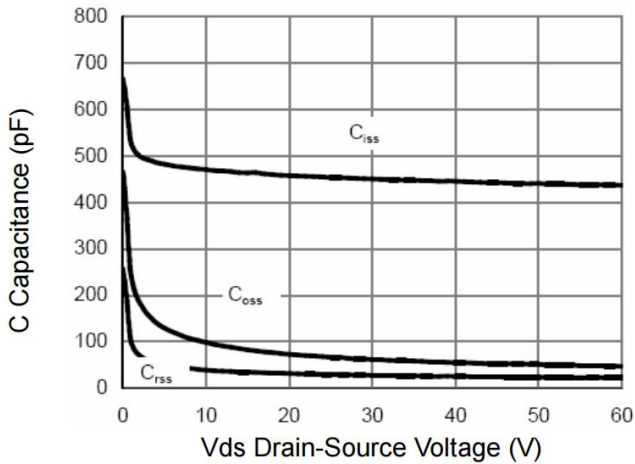


Figure 7 Capacitance vs Vds

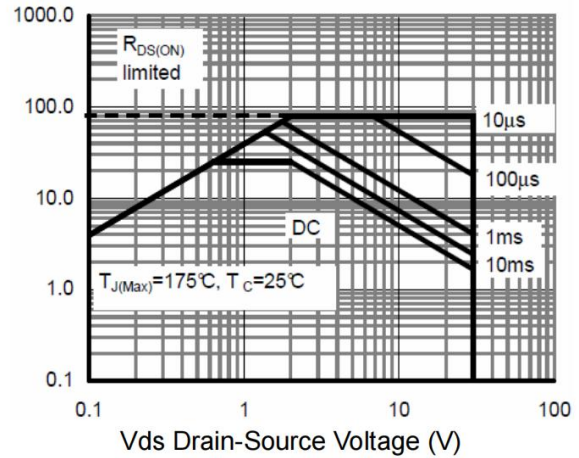


Figure 8 Safe Operation Area

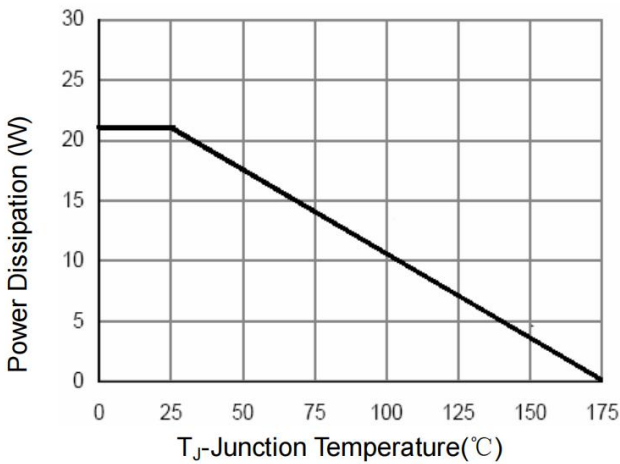


Figure 9 Power De-rating

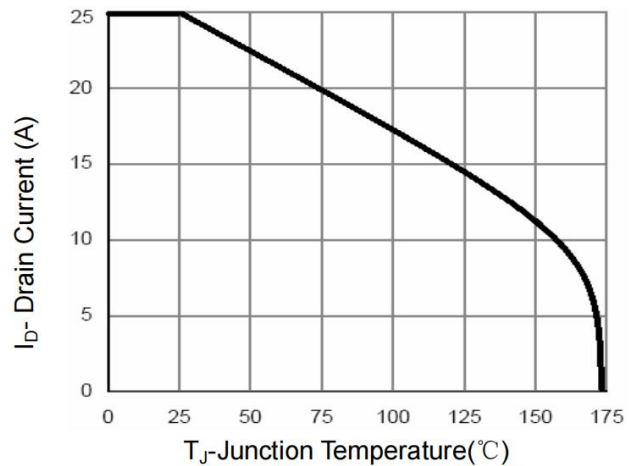


Figure 10 Current De-rating

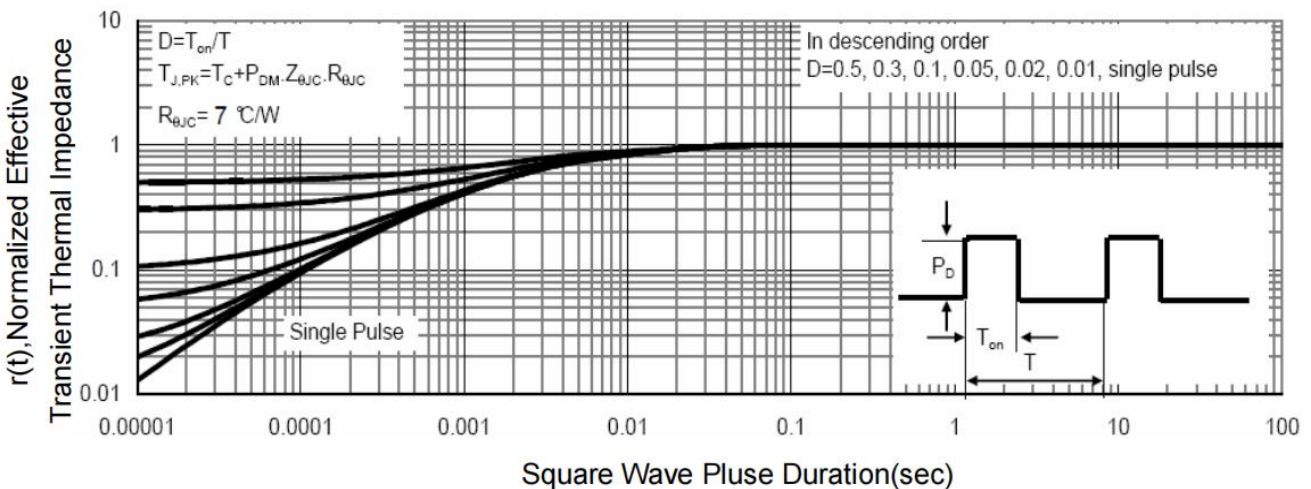


Figure 11 Normalized Maximum Transient Thermal Impedance

P- Channel Typical Characteristics

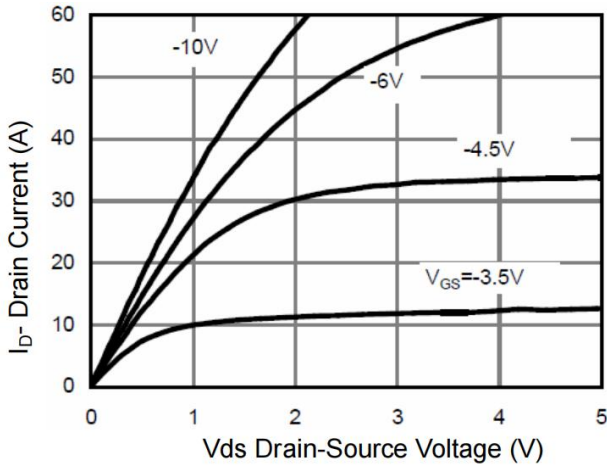


Figure 1 Output Characteristics

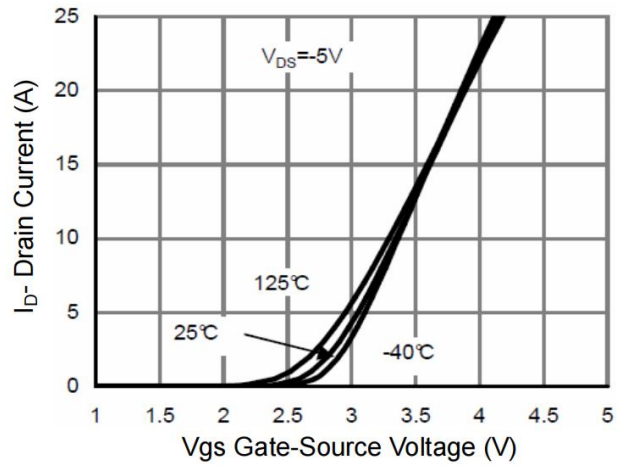


Figure 2 Transfer Characteristics

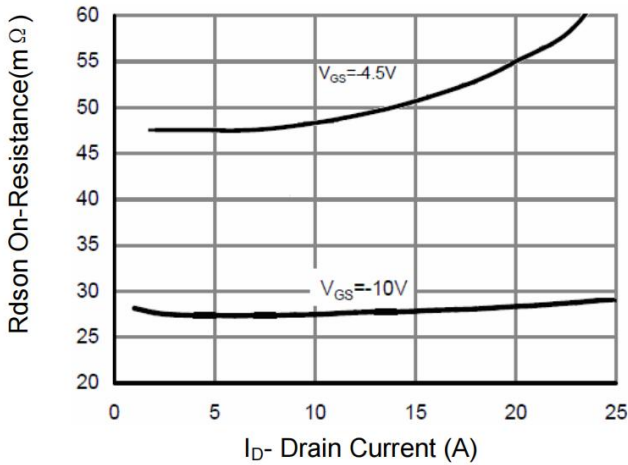


Figure 3 Rdson- Drain Current

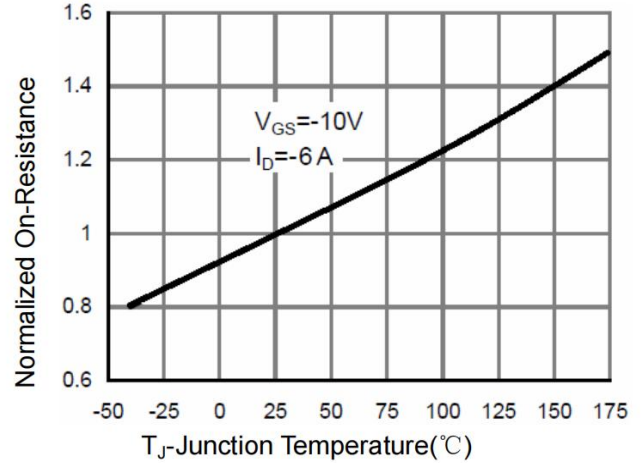


Figure 4 Rdson-Junction Temperature

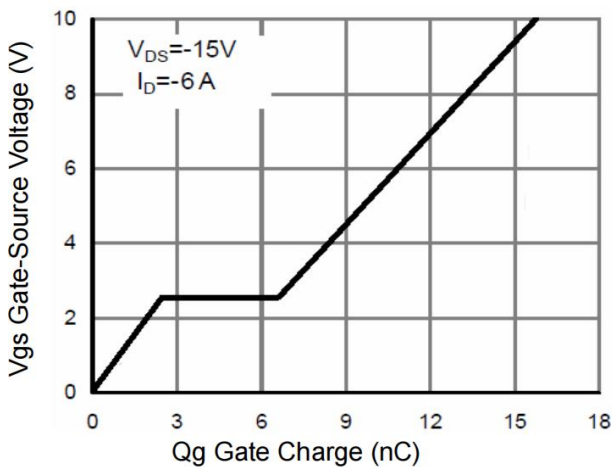


Figure 5 Gate Charge

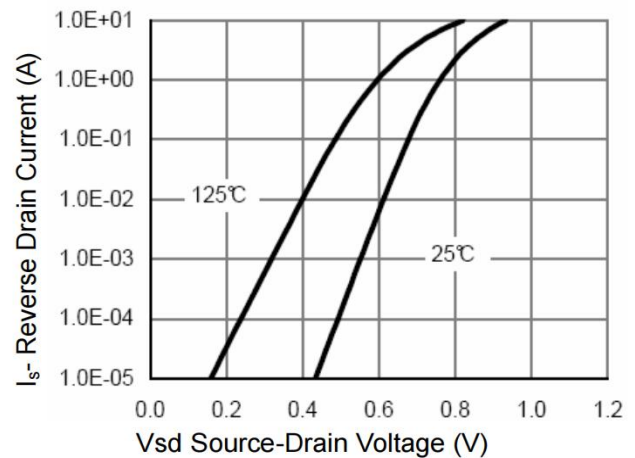


Figure 6 Source- Drain Diode Forward

P- Channel Typical Characteristics

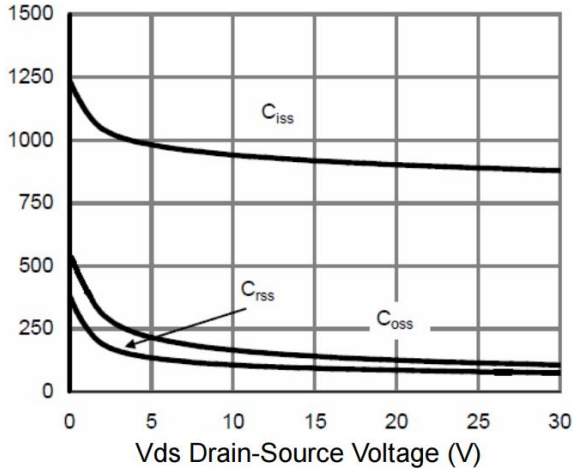


Figure 7 Capacitance vs Vds

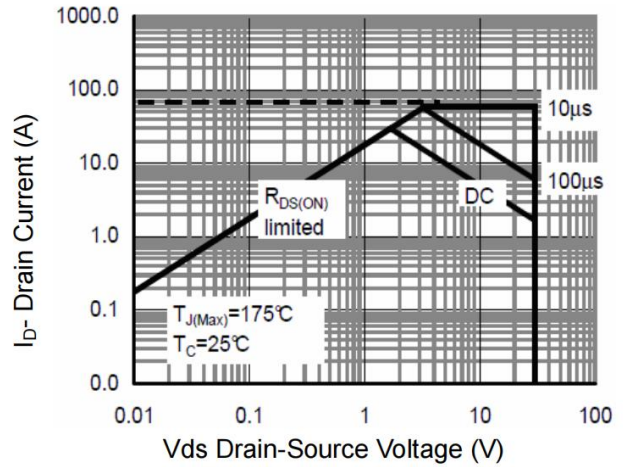


Figure 8 Safe Operation Area

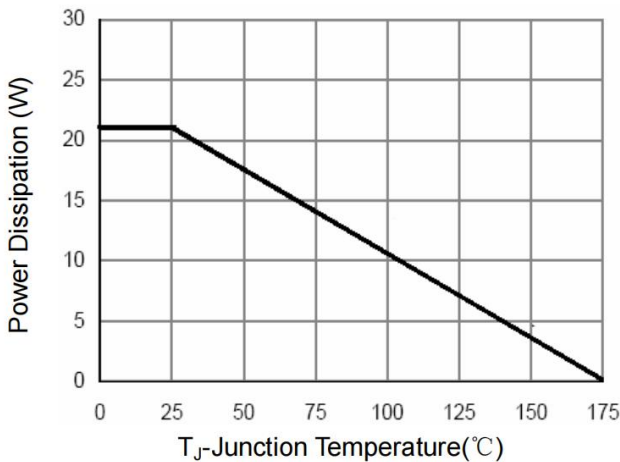


Figure 9 Power De-rating

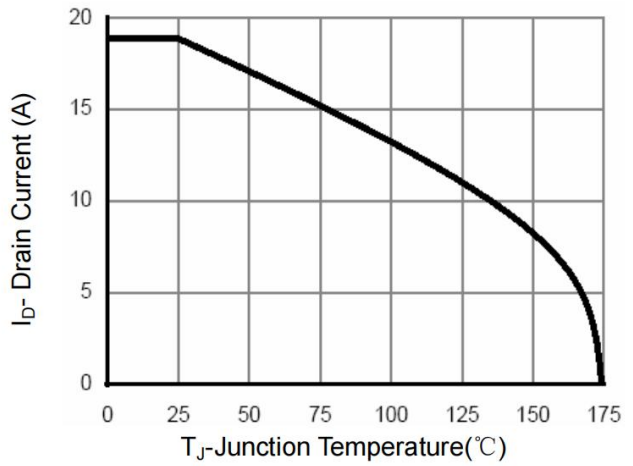


Figure 10 Current De-rating

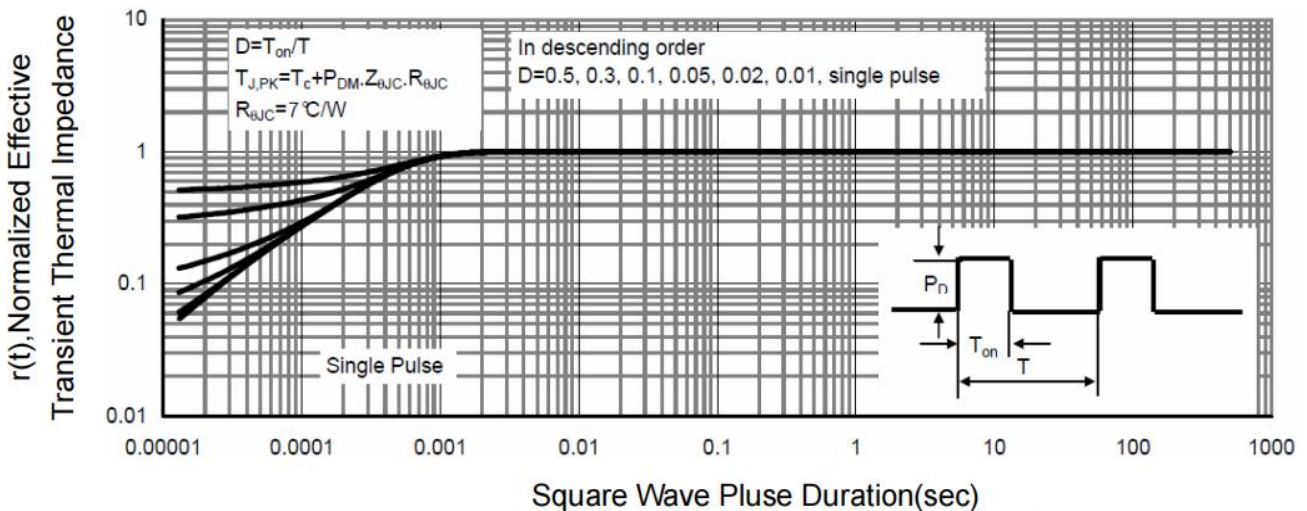
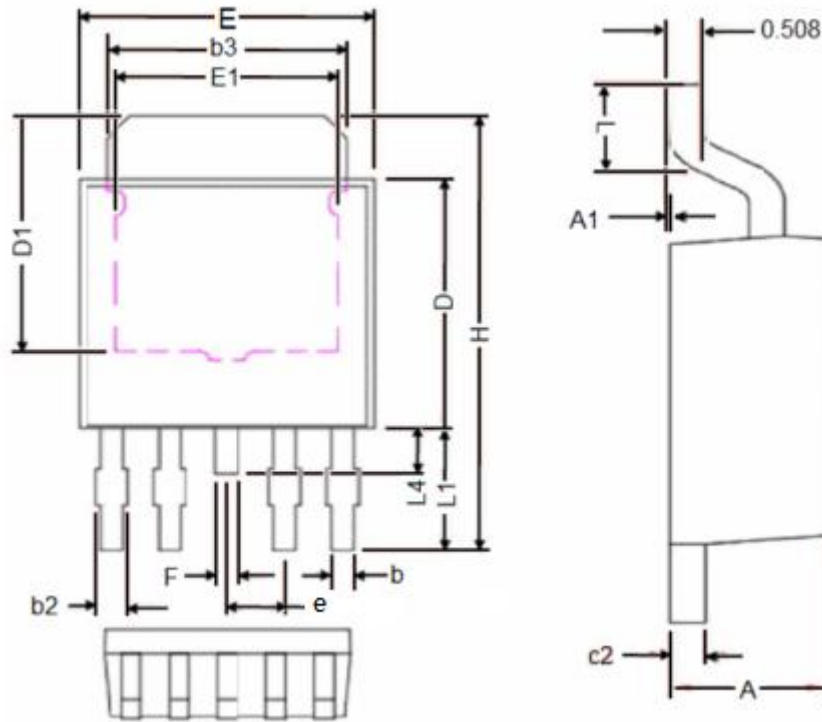


Figure 11 Normalized Maximum Transient Thermal Impedance

TO-252-4L Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.086	0.094
A1	0.000	0.150	0.000	0.006
b	0.450	0.600	0.017	0.024
b2	0.500	0.800	0.019	0.031
b3	5.200	5.500	0.204	0.217
c2	0.450	0.550	0.017	0.022
D	5.400	5.800	0.212	0.228
D1	4.570	-	0.179	-
E	6.400	6.800	0.251	0.268
E1	3.810	-	0.150	-
e	1.270(REF)		0.050(REF)	
F	0.400	0.600	0.015	0.024
H	9.400	10.200	0.370	0.402
L	1.400	1.770	0.016	0.050
L1	2.400	3.000	0.094	0.118
L4	0.800	1.200	0.031	0.047