Complementary MOSFET

ELM34600AA-N

■General Description

ELM34600AA-N uses advanced trench technology to provide excellent Rds(on) and low gate charge.

■Features

N-channel	P-channel
• Vds=30V	Vds=-30V
• Id=7A	Id=-5A
• Rds(on) < 27.5mΩ(Vgs=10V)	Rds(on) < 45mΩ(Vgs=-10V)
• Rds(on) < 40.0mΩ(Vgs=4.5V)	Rds(on) < 80mΩ(Vgs=-4.5V)

■Maximum Absolute Ratings

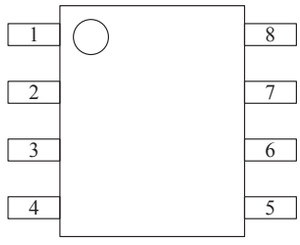
Parameter		Symbol	N-ch (Max.)	P-ch (Max.)	Unit	Note
Drain-source voltage		Vds	30	-30	V	
Gate-source voltage		Vgs	±20	±20	V	
Continuous drain current	Ta=25°C	Id	7	-5	A	
	Ta=70°C		6	-4		
Pulsed drain current		Idm	20	-20	A	3
Power dissipation	Ta=25°C	Pd	2.0	2.0	W	
	Ta=70°C		1.3	1.3		
Junction and storage temperature range		Tj,Tstg	-55 to 150	-55 to 150	°C	

■Thermal Characteristics

Parameter		Symbol	Device	Typ.	Max.	Unit	Note
Maximum junction-to-ambient		Rθja	N-ch		62.5	°C/W	
Maximum junction-to-ambient		Rθja	P-ch		62.5	°C/W	

■Pin configuration

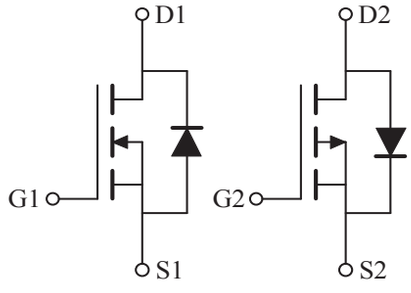
SOP-8(TOP VIEW)



Pin No.	Pin name
1	SOURCE1
2	GATE1
3	SOURCE2
4	GATE2
5	DRAIN2
6	DRAIN2
7	DRAIN1
8	DRAIN1

■Circuit

• N-ch • P-ch



■Electrical Characteristics (N-ch)

Ta=25°C

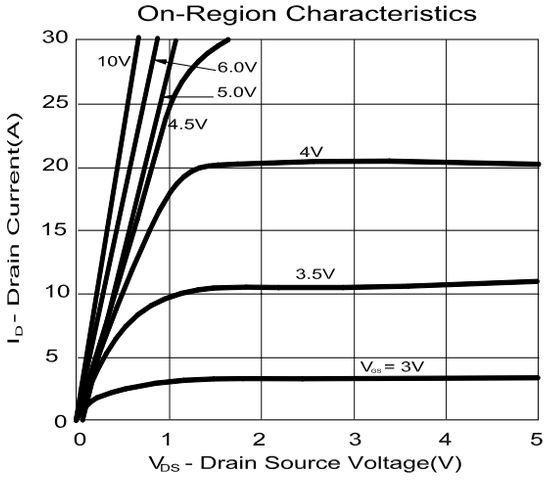
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit	Note
STATIC PARAMETERS							
Drain-source breakdown voltage	BVdss	Id=250μA, Vgs=0V	30			V	
Zero gate voltage drain current	Idss	Vds=24V, Vgs=0V			1	μA	
		Vds=20V, Vgs=0V, Tj=55°C			10		
Gate-body leakage current	Igss	Vds=0V, Vgs=±20V			±100	nA	
Gate threshold voltage	Vgs(th)	Vds=Vgs, Id=250μA	1.0	1.5	2.5	V	
On state drain current	Id(on)	Vgs=10V, Vds=5V	20			A	1
Static drain-source on-resistance	Rds(on)	Vgs=10V, Id=7A		20.5	27.5	mΩ	1
		Vgs=4.5V, Id=6A		30.0	40.0		
Forward transconductance	Gfs	Vds=5V, Id=7A		16		S	1
Diode forward voltage	Vsd	If=1A, Vgs=0V			1	V	1
Max.body-diode continuous current	Is				1.3	A	
Pulsed current	Ism				2.6	A	3
DYNAMIC PARAMETERS							
Input capacitance	Ciss	Vgs=0V, Vds=15V, f=1MHz		680		pF	
Output capacitance	Coss			105		pF	
Reverse transfer capacitance	Crss			75		pF	
SWITCHING PARAMETERS							
Total gate charge	Qg	Vgs=10V, Vds=15V, Id=7A		14.0		nC	2
Gate-source charge	Qgs			1.9		nC	2
Gate-drain charge	Qgd			3.3		nC	2
Turn-on delay time	td(on)	Vgs=10V, Vds=10V, Id≈1A Rgen=3Ω		4.6	7.0	ns	2
Turn-on rise time	tr			4.0	6.0	ns	2
Turn-off delay time	td(off)			20.0	30.0	ns	2
Turn-off fall time	tf			5.0	8.0	ns	2

NOTE :

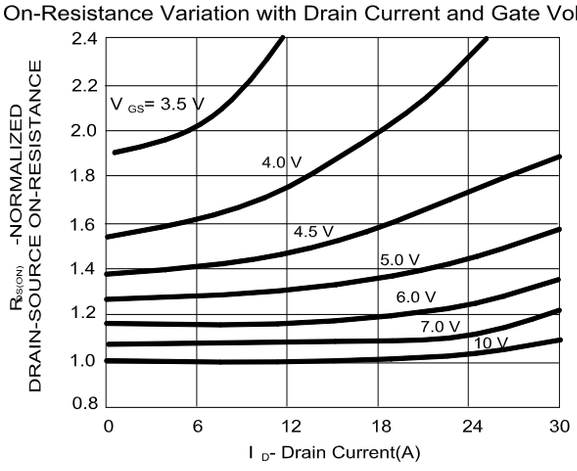
1. Pulse test : Pulsed width≤300μsec and Duty cycle≤2%.
2. Independent of operating temperature.
3. Pulsed width limited by maximum junction temperature.
4. Duty cycle ≤ 1%.

■Typical Electrical and Thermal Characteristics (N-ch)

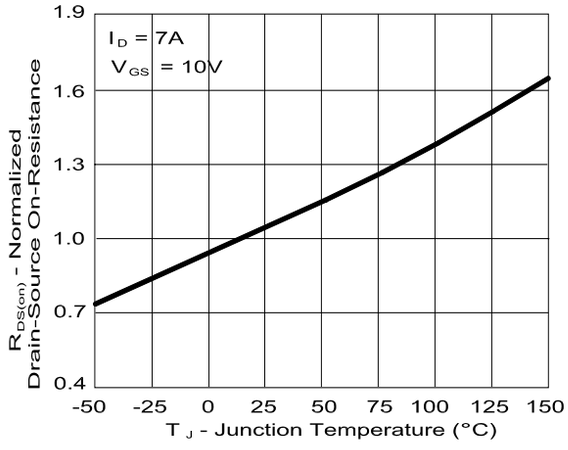
On-Region Characteristics



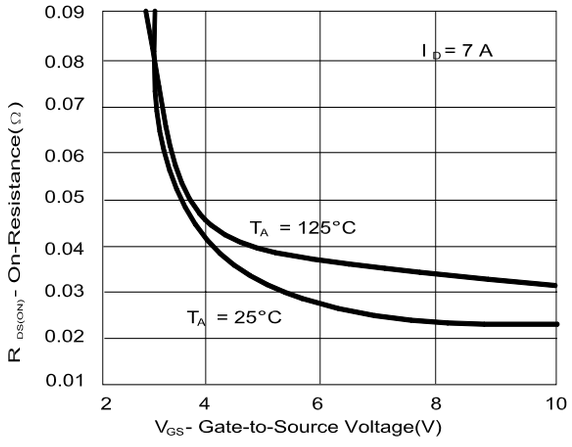
On-Resistance Variation with Drain Current and Gate Voltage



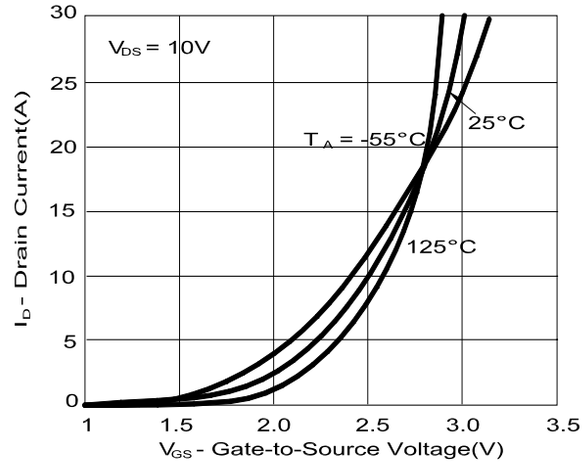
On-Resistance Variation with Temperature



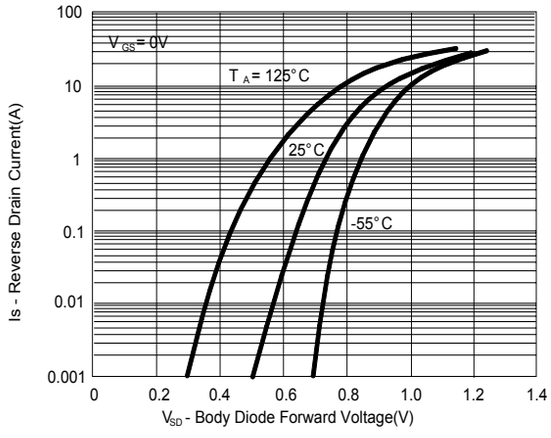
On-Resistance Variation with Gate-to-Source Voltage



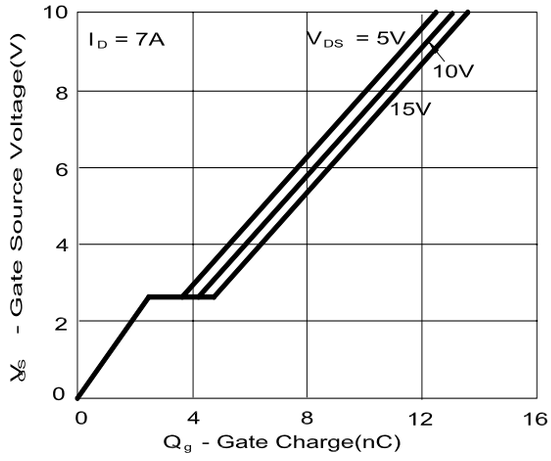
Transfer Characteristics



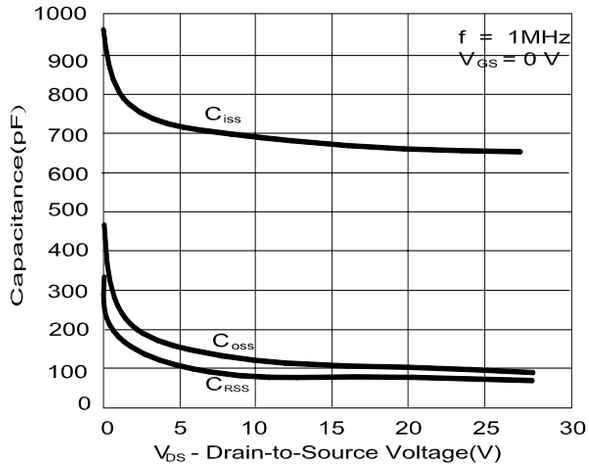
Body Diode Forward Voltage Variation with Source Current and Temperature



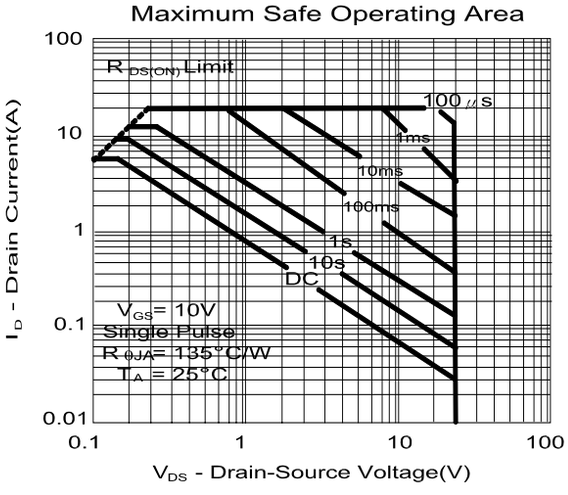
Gate Charge Characteristics



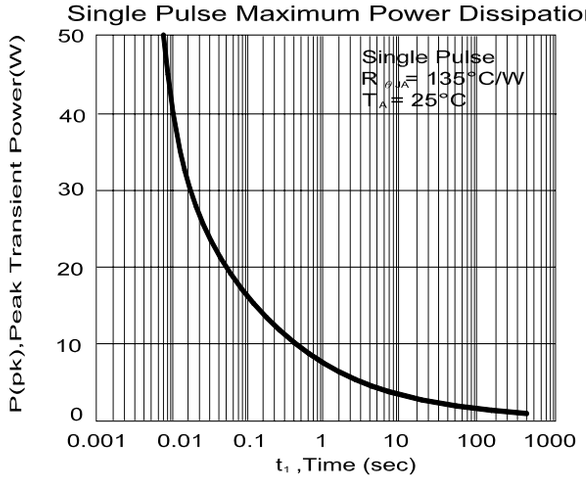
Capacitance Characteristics



Maximum Safe Operating Area



Single Pulse Maximum Power Dissipation



■Electrical Characteristics (P-ch)

Ta=25°C

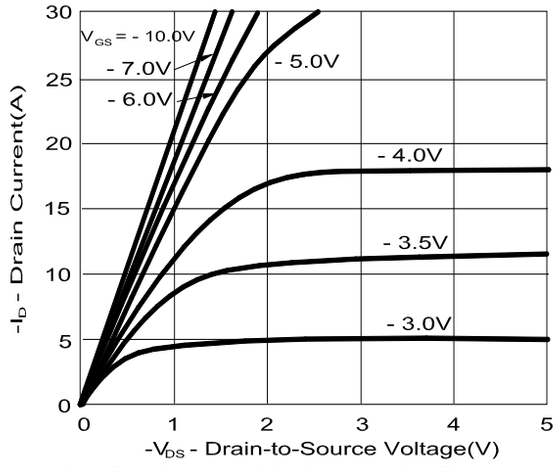
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit	Note
STATIC PARAMETERS							
Drain-source breakdown voltage	BVdss	Id=-250μA, Vgs=0V	-30			V	
Zero gate voltage drain current	Idss	Vds=-24V, Vgs=0V			-1	μA	
		Vds=-20V, Vgs=0V, Tj=55°C			-10		
Gate-body leakage current	Igss	Vds=0V, Vgs=±20V			±100	nA	
Gate threshold voltage	Vgs(th)	Vds=Vgs, Id=-250μA	-1.0	-1.5	-2.5	V	
On state drain current	Id(on)	Vgs=-10V, Vds=-5V	-20			A	1
Static drain-source on-resistance	Rds(on)	Vgs=-10V, Id=-5A		37.5	45.0	mΩ	1
		Vgs=-4.5V, Id=-4A		62.0	80.0		
Forward transconductance	Gfs	Vds=-5V, Id=-5A		13		S	1
Diode forward voltage	Vsd	If=-1A, Vgs=0V			-1	V	1
Max.body-diode continuous current	Is				-1.3	A	
Pulsed current	Ism				-2.6	A	3
DYNAMIC PARAMETERS							
Input capacitance	Ciss	Vgs=0V, Vds=-15V, f=1MHz		780		pF	
Output capacitance	Coss			145		pF	
Reverse transfer capacitance	Crss			79		pF	
SWITCHING PARAMETERS							
Total gate charge	Qg	Vgs=-10V, Vds=-15V Id=-5A		15.1		nC	2
Gate-source charge	Qgs			2.1		nC	2
Gate-drain charge	Qgd			4.0		nC	2
Turn-on delay time	td(on)	Vgs=-10V, Vds=-10V Id≈-1A, Rgen=3Ω		7.7	11.5	ns	2
Turn-on rise time	tr			5.7	8.5	ns	2
Turn-off delay time	td(off)			20.0	30.0	ns	2
Turn-off fall time	tf			9.5	14.0	ns	2

NOTE :

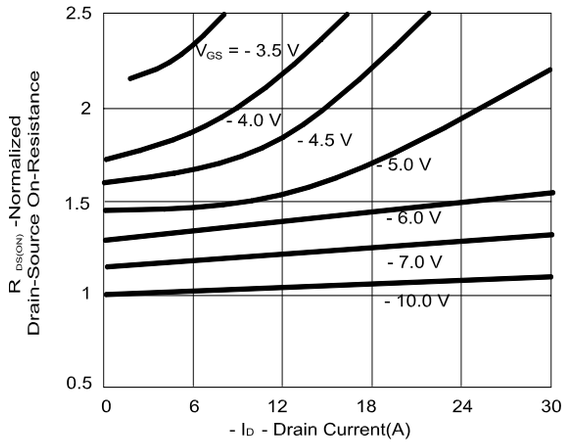
1. Pulse test : Pulsed width≤300μsec and Duty cycle≤2%.
2. Independent of operating temperature.
3. Pulsed width limited by maximum junction temperature.

■Typical Electrical and Thermal Characteristics (P-ch)

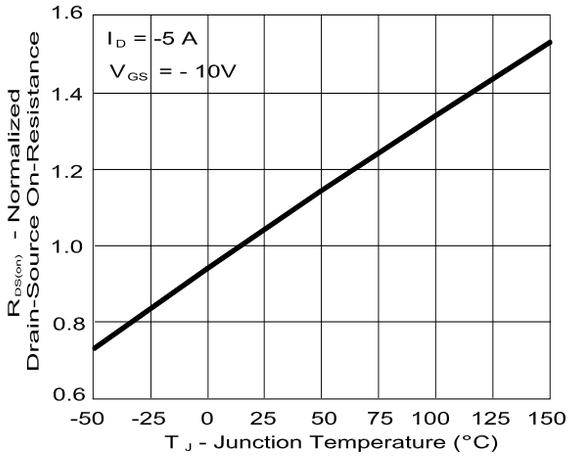
On-Region Characteristics



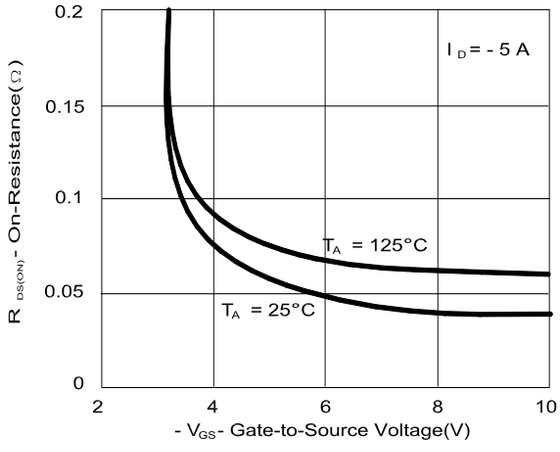
On-Resistance Variation with Drain Current and Gate Voltage



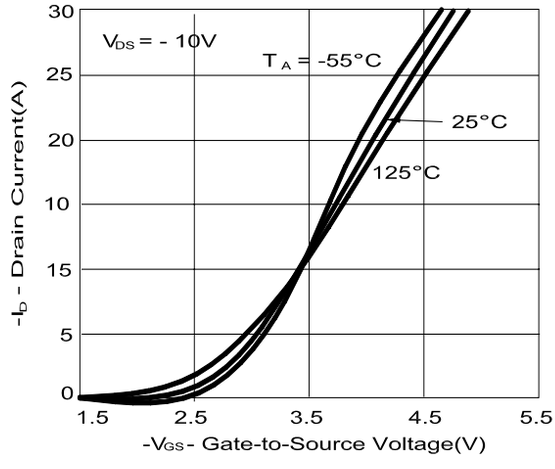
On-Resistance Variation with Temperature



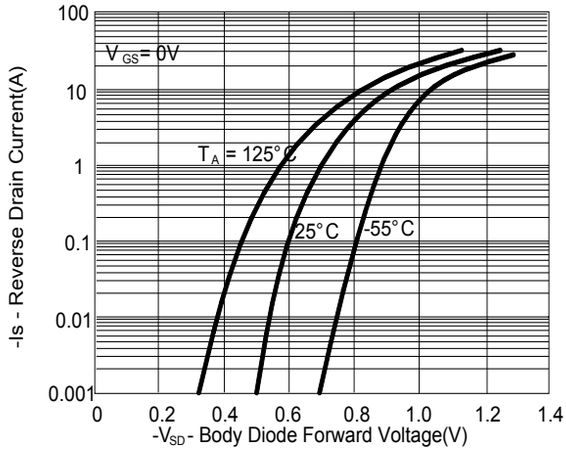
On-Resistance Variation with Gate-to-Source Voltage



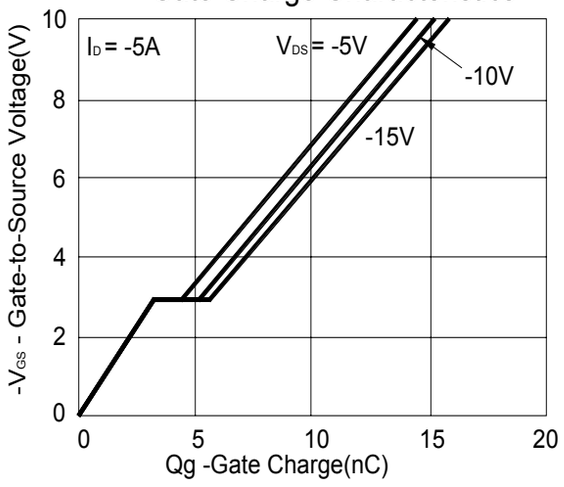
Transfer Characteristics



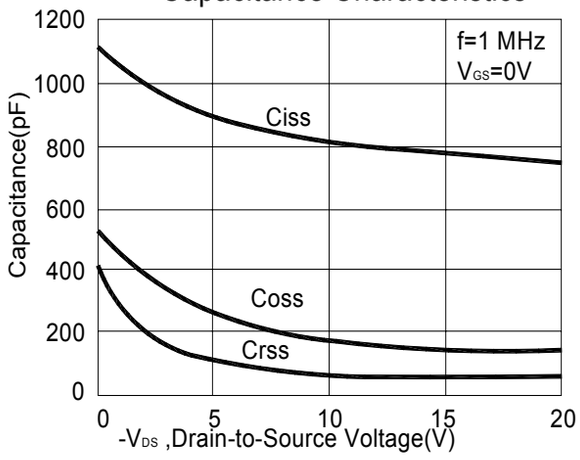
Body Diode Forward Voltage Variation with Source Current and Temperature



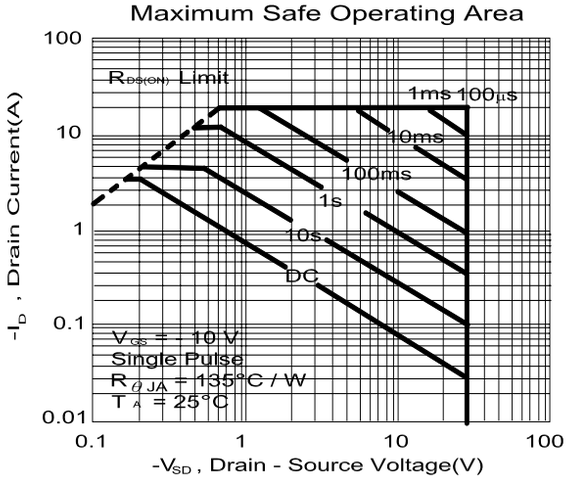
Gate Charge Characteristics



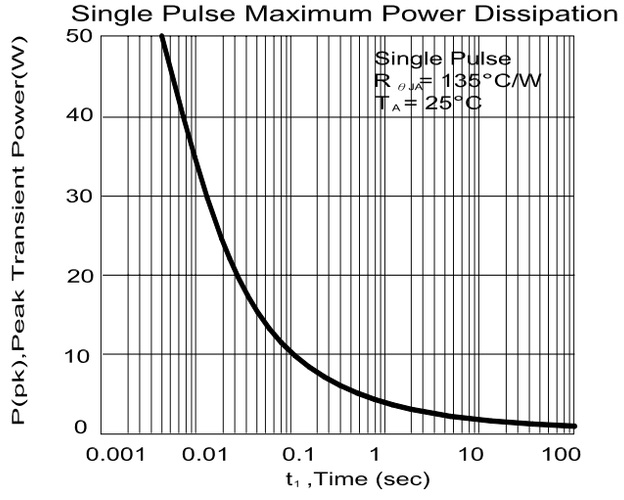
Capacitance Characteristics



Maximum Safe Operating Area



Single Pulse Maximum Power Dissipation



Transient Thermal Response Curve