

### Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	$I_D$
30V	18mΩ@10V	7A
	24mΩ@4.5V	
-30V	19mΩ@-10V	-8A
	25mΩ@-4.5V	

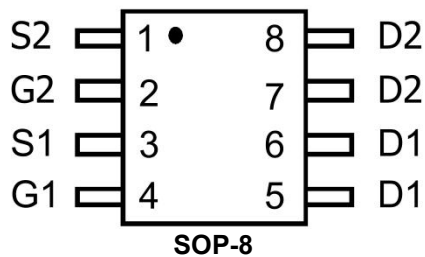
### Feature

- TrenchFET Power MOSFET
- Excellent  $R_{DS(on)}$  and Low Gate Charge
- Fast Switching Speed

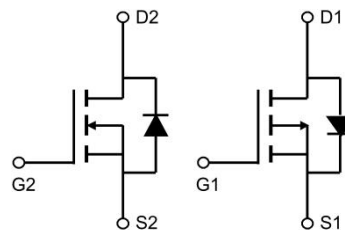
### Application

- Motor Control
- DC-DC Converters
- Power Management

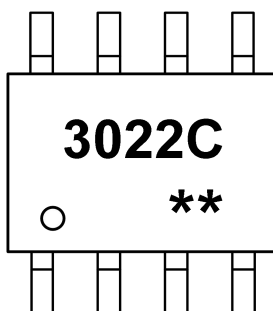
### Package



### Circuit diagram



### Marking



**3022C** = Device code  
**\*\*** = Week Code

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

Parameter	Symbol	Value		Unit
		N-Channel	P-Channel	
Drain-Source Voltage	$V_{DS}$	30	-30	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	$\pm 20$	V
Continuous Drain Current	$I_D$	7	-8	A
Power Dissipation	$P_D$	1.8	1.8	W
Thermal Resistance from Junction to Ambient	$R_{\theta JA}$	69.5		$^{\circ}C/W$
Junction Temperature	$T_J$	150		$^{\circ}C$
Storage Temperature	$T_{STG}$	-55~ +150		$^{\circ}C$

**N-Channel Electrical characteristics (T<sub>A</sub>=25 °C, unless otherwise noted)**

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
<b>Static Characteristics</b>						
Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	30			V
Zero gate voltage drain current	$I_{DSS}$	$V_{DS} = 24V, V_{GS} = 0V$			1	$\mu A$
Gate-body leakage current	$I_{GSS}$	$V_{GS} = \pm 20V, V_{DS} = 0V$			$\pm 0.1$	$\mu A$
Gate threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	1.0	1.6	2.5	V
Drain-source on-resistance	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 1A$		18	28	m $\Omega$
		$V_{GS} = 4.5V, I_D = 1A$		25	35	
<b>Dynamic characteristics</b>						
Input Capacitance	$C_{iss}$	$V_{DS}=15V, V_{GS}=0V, f=1MHz$		416		pF
Output Capacitance	$C_{oss}$			62		
Reverse Transfer Capacitance	$C_{rss}$			51		
<b>Switching Characteristics</b>						
Total gate charge	$Q_g$	$V_{DS}=20V, V_{GS}=4.5V, I_D=6A$		5		nC
Gate-source charge	$Q_{gs}$			1.11		
Gate-drain charge	$Q_{gd}$			2.61		
Turn-on delay time	$t_{d(on)}$	$V_{DD}=12V, V_{GS}=10V, RG=3.3, I_D=6A$		7.7		ns
Turn-on rise time	$t_r$			46		
Turn-off delay time	$t_{d(off)}$			11		
Turn-off fall time	$t_f$			3.6		
<b>Diode Characteristics</b>						
Diode Forward Voltage	$V_{SD}$	$V_{GS}=0V, I_S=1A, T_J=25^{\circ}C$			1.2	V

**P-Channel Electrical characteristics (T<sub>A</sub>=25 °C, unless otherwise noted)**

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
<b>Static Characteristics</b>						
Drain-source breakdown voltage	V <sub>(BR)DSS</sub>	V <sub>GS</sub> = 0V, I <sub>D</sub> = -250μA	-30			V
Zero gate voltage drain current	I <sub>DSS</sub>	V <sub>DS</sub> = -24V, V <sub>GS</sub> = 0V			-1	μA
Gate-body leakage current	I <sub>GSS</sub>	V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V			±100	nA
Gate threshold voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250μA	-1	-1.5	-2.5	V
Drain-source on-resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> = -10V, I <sub>D</sub> = -8A		19	28	mΩ
		V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -6A		25	35	
<b>Dynamic characteristics</b>						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> = -15V, V <sub>GS</sub> = 0V, f = 1MHz		1345		pF
Output Capacitance	C <sub>oss</sub>			194		
Reverse Transfer Capacitance	C <sub>rss</sub>			158		
<b>Switching Characteristics</b>						
Turn-on delay time	t <sub>d(on)</sub>	V <sub>DD</sub> = -15V, I <sub>D</sub> = -6A, V <sub>GS</sub> = -10V, R <sub>GEN</sub> = 3.3Ω		4.6		ns
Turn-on rise time	t <sub>r</sub>			14.8		
Turn-off delay time	t <sub>d(off)</sub>			41		
Turn-off fall time	t <sub>f</sub>			19.6		
Total gate charge	Q <sub>g</sub>	V <sub>DS</sub> = -15V, V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -6A		12.6		nC
Gate-source charge	Q <sub>gs</sub>			4.8		
Gate-drain charge	Q <sub>gd</sub>			4.8		
<b>Source-Drain Diode Characteristics</b>						
Body Diode Voltage	V <sub>SD</sub>	I <sub>S</sub> = -1A, V <sub>GS</sub> = 0V			-1.2	V

**N-Channel Typical Characteristics**

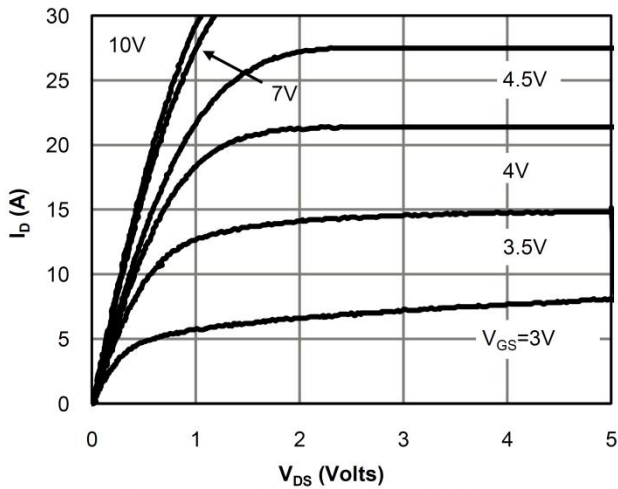


Fig 1: On-Region Characteristics (Note E)

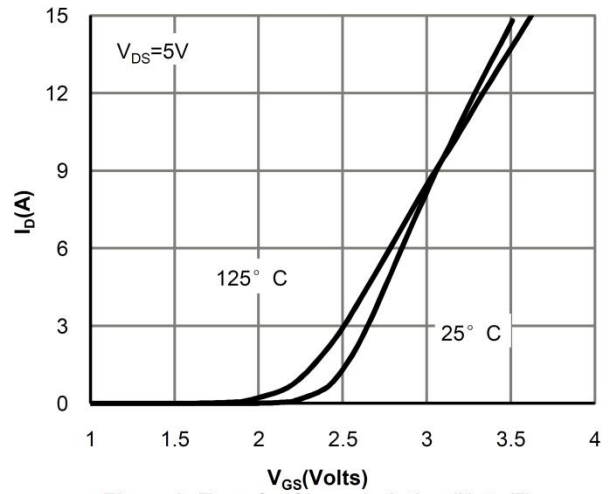


Figure 2: Transfer Characteristics (Note E)

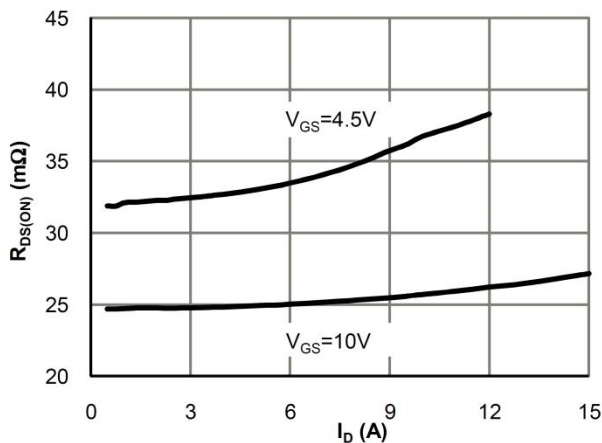


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

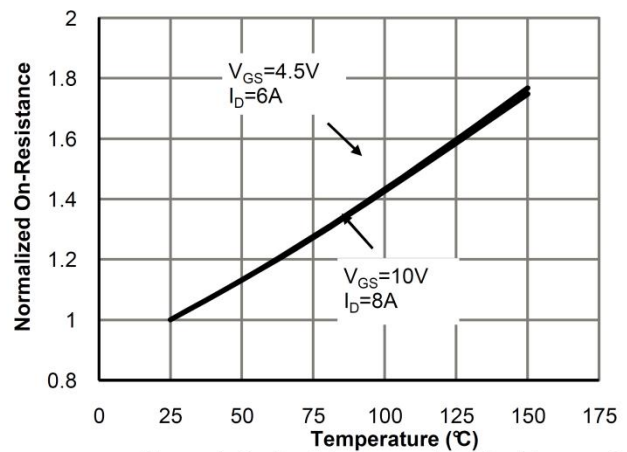


Figure 4: On-Resistance vs. Junction Temperature (Note E)

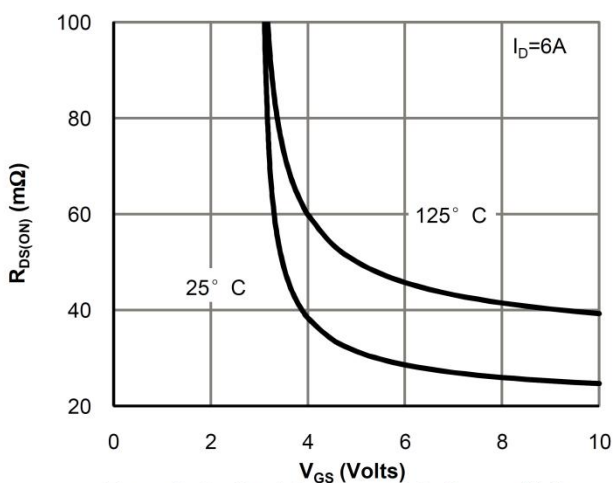


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

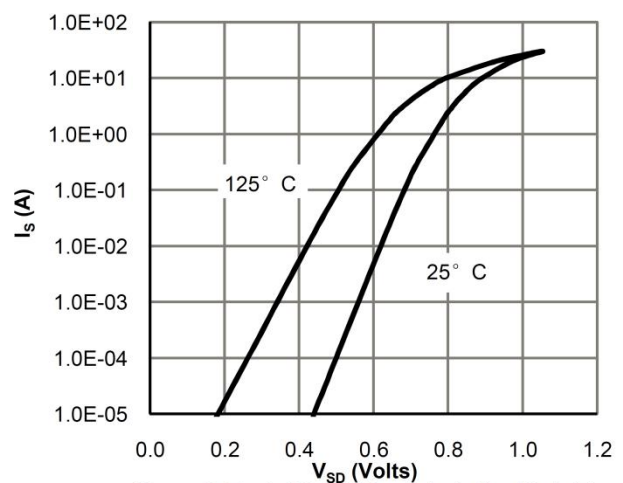


Figure 6: Body-Diode Characteristics (Note E)

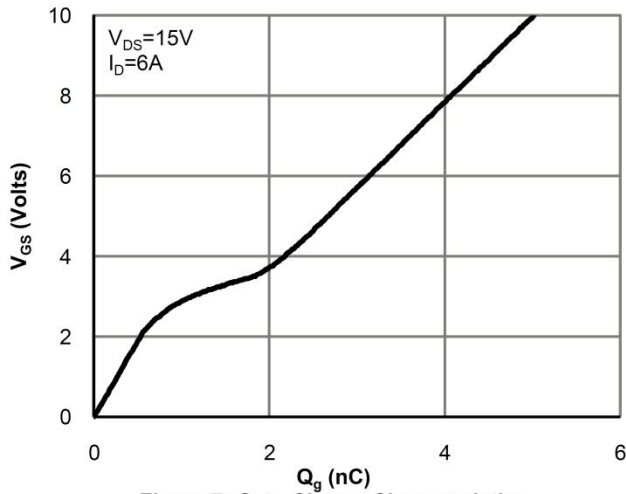


Figure 7: Gate-Charge Characteristics

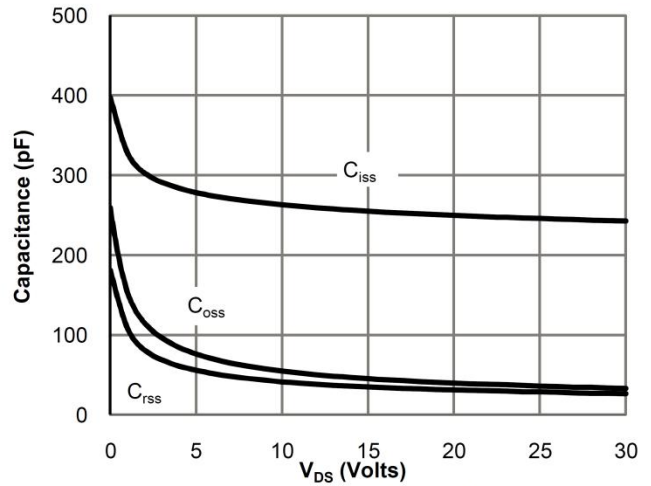


Figure 8: Capacitance Characteristics

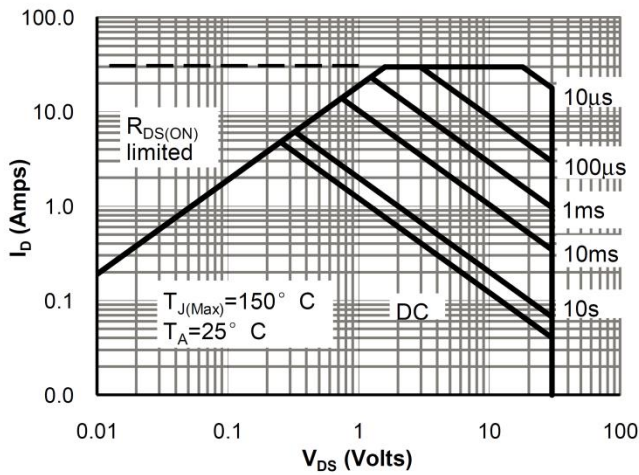


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

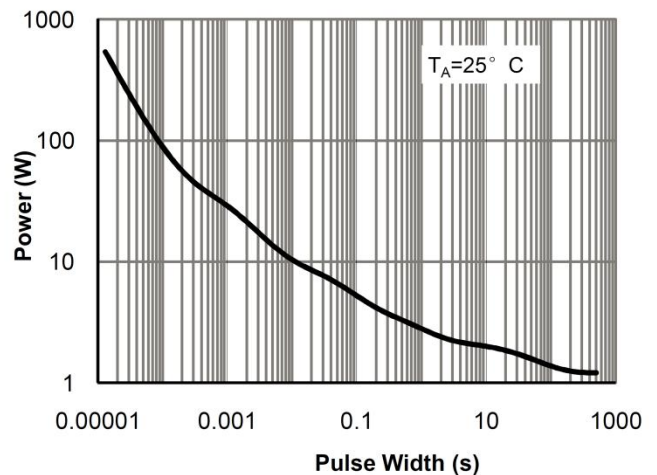


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note F)

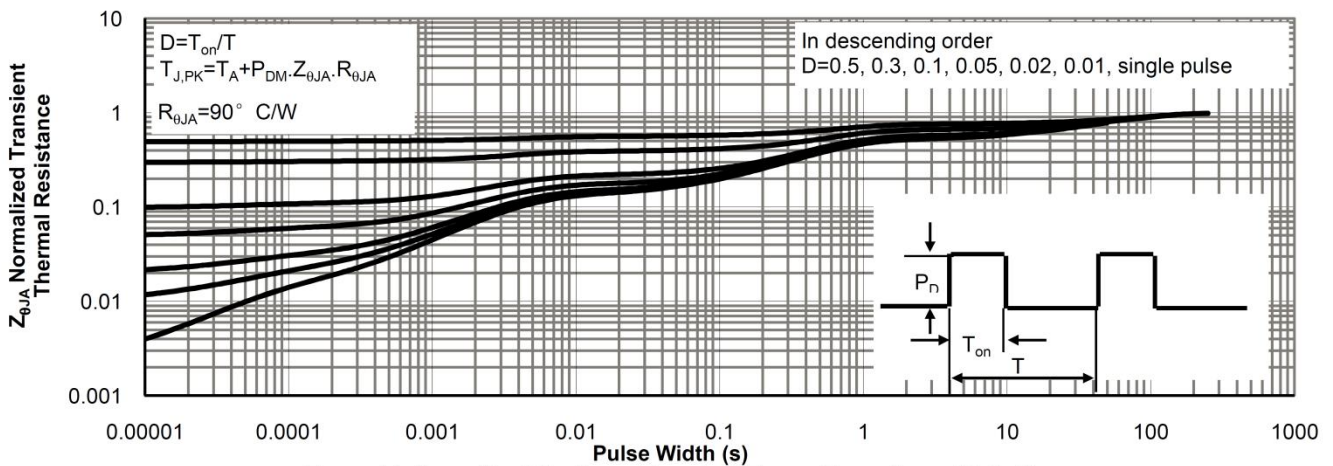
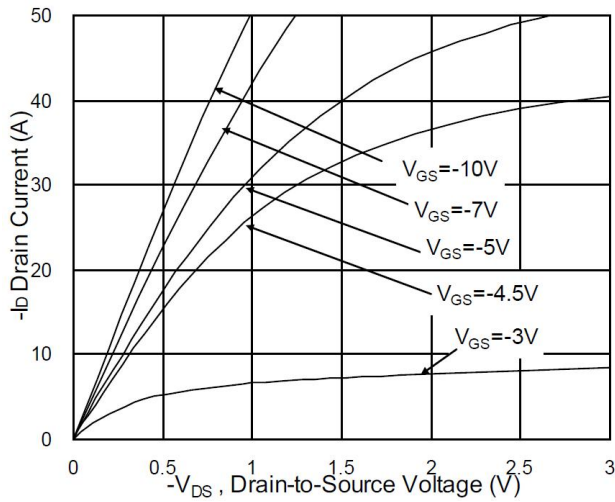
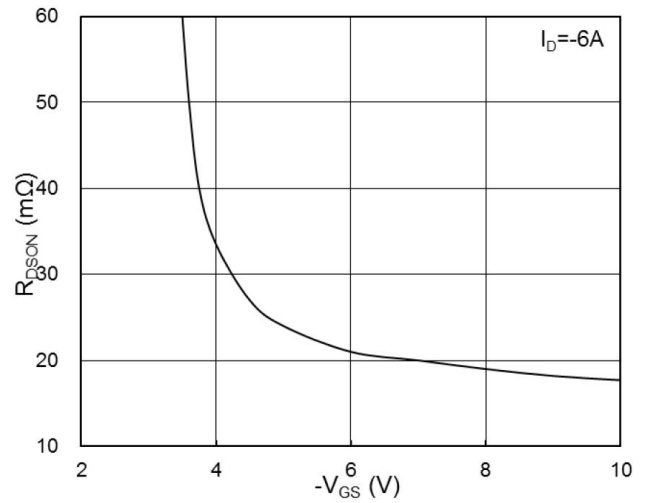


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

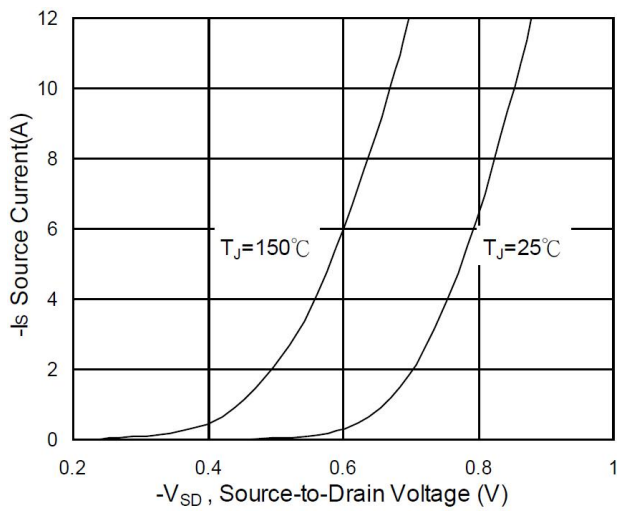
**P-Channel Typical Characteristics**



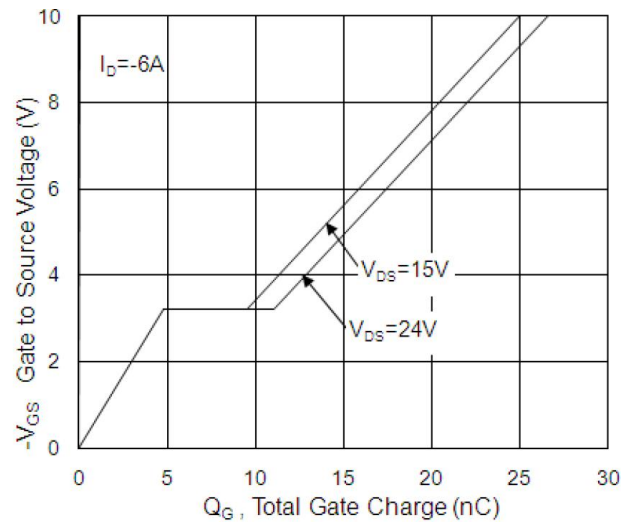
**Fig.1 Typical Output Characteristics**



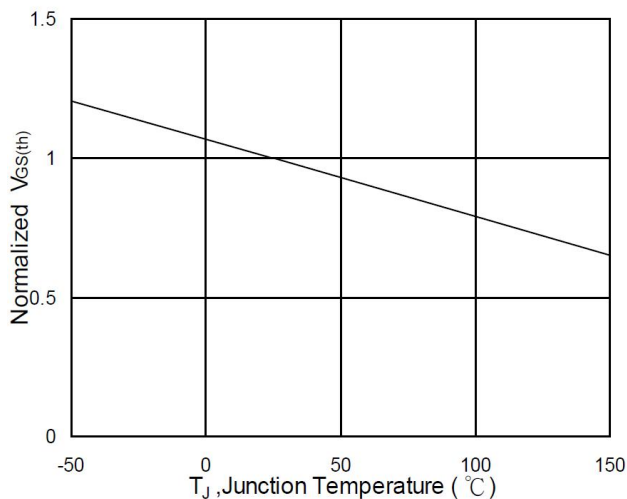
**Fig.2 On-Resistance vs G-S Voltage**



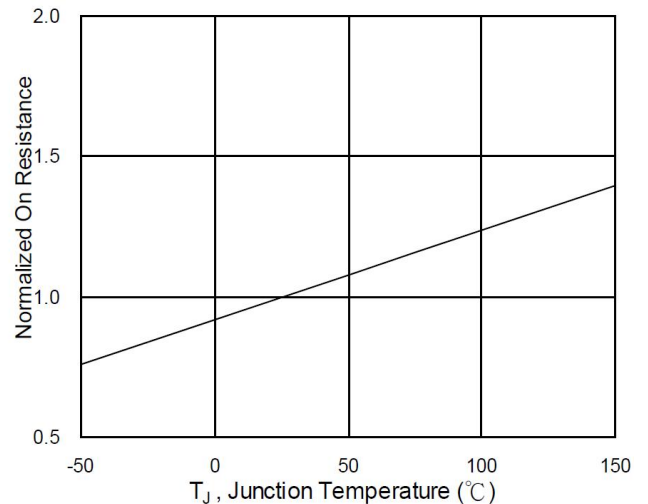
**Fig.3 Source Drain Forward Characteristics**



**Fig.4 Gate-Charge Characteristics**



**Fig.5 Normalized  $V_{GS(th)}$  vs  $T_J$**



**Fig.6 Normalized  $R_{DS(on)}$  vs  $T_J$**



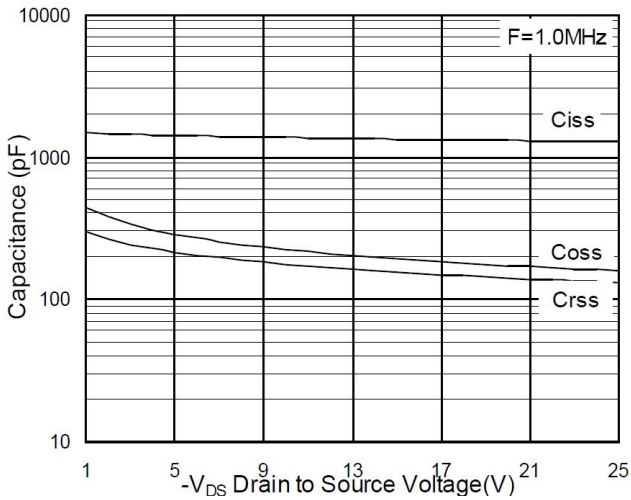


Fig.7 Capacitance

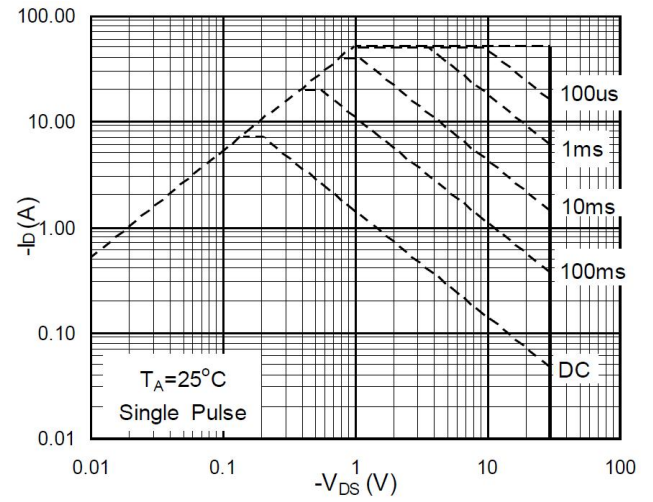


Fig.8 Safe Operating Area

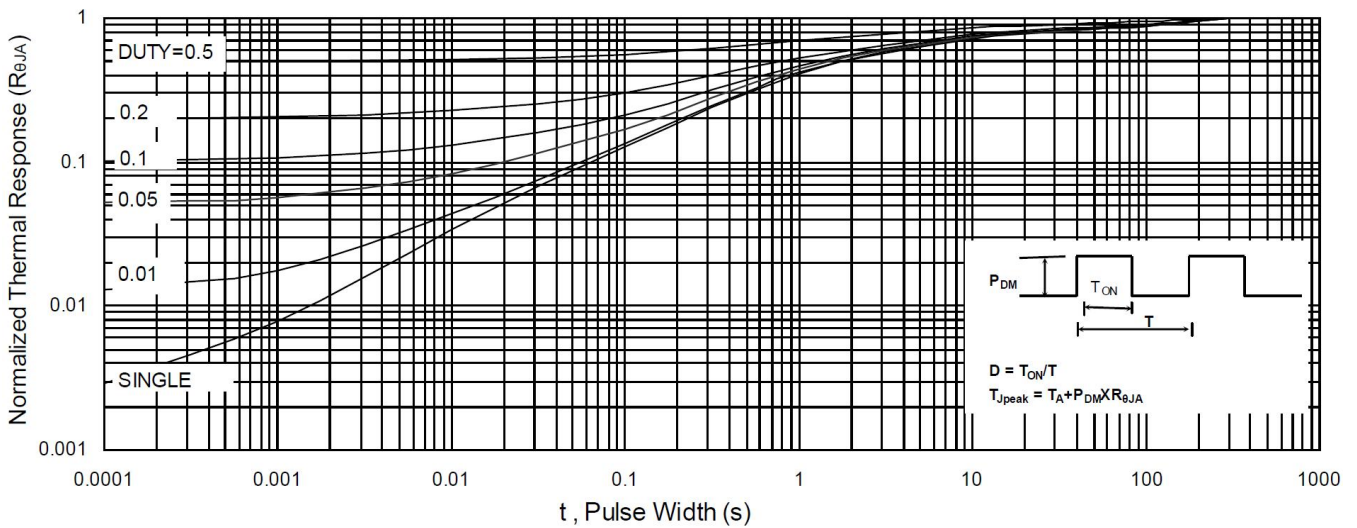


Fig.9 Normalized Maximum Transient Thermal Impedance

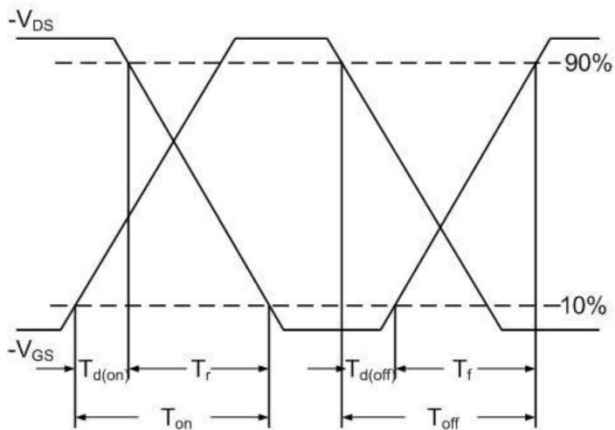


Fig.10 Switching Time Waveform

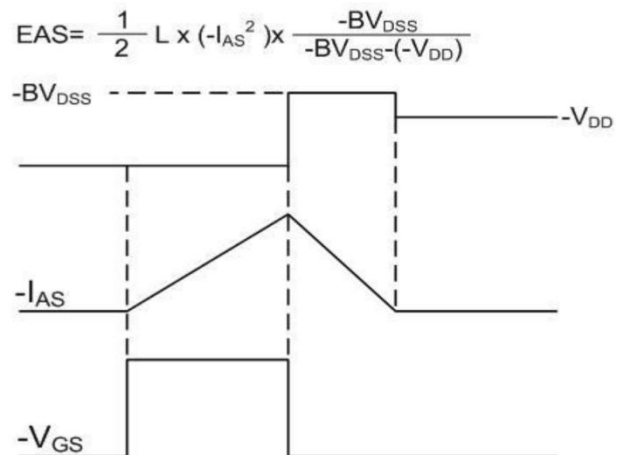
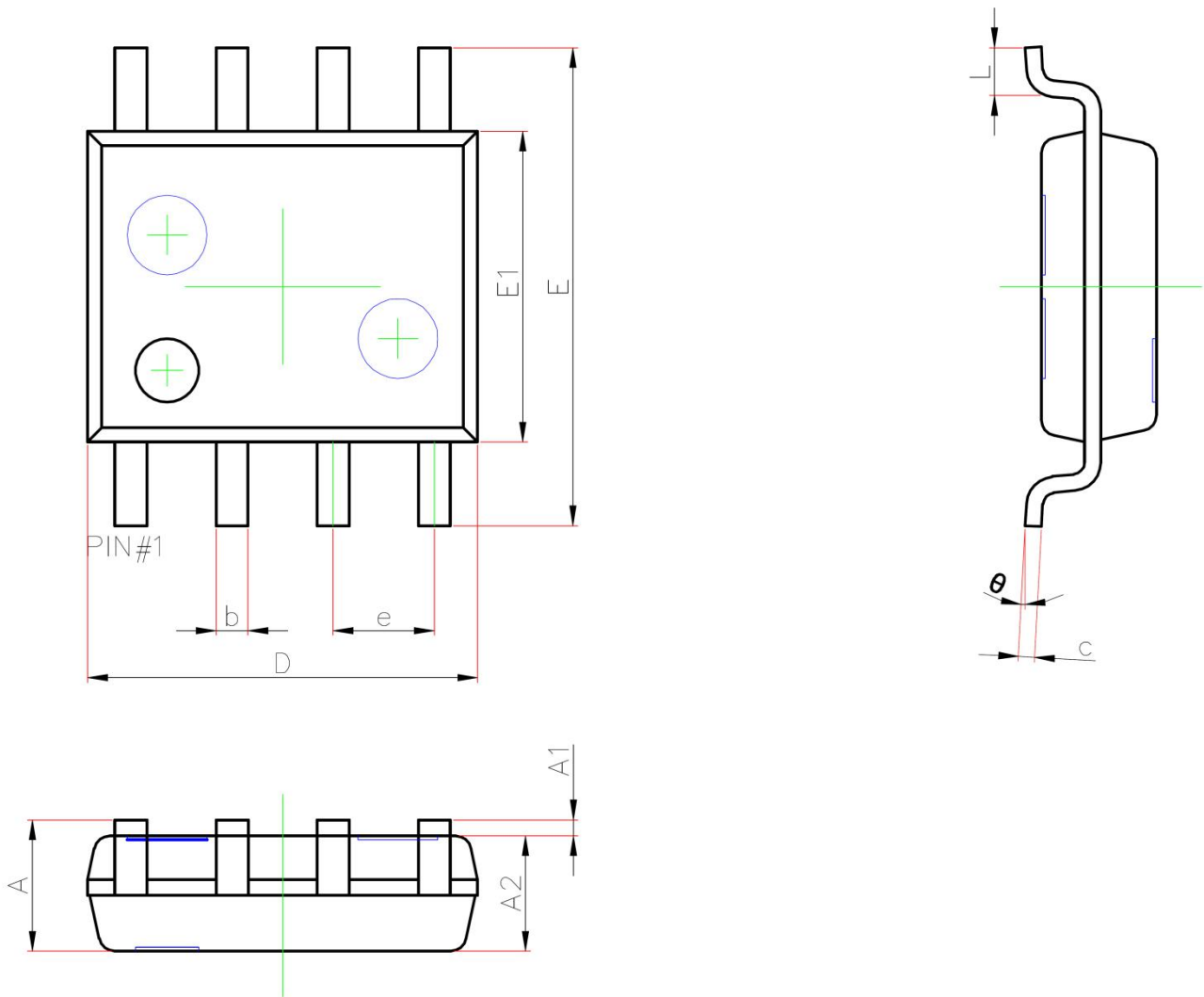


Fig.11 Unclamped Inductive Switching Waveform

**SOP-8 Package Information**



Symbol	Dimensions In Millimeters	
	Min.	Max.
A	1.35	1.75
A1	0.10	0.25
A2	1.35	1.55
b	0.33	0.51
c	0.17	0.25
D	4.80	5.00
e	1.27 REF.	
E	5.80	6.20
E1	3.80	4.00
L	0.40	1.27
$\theta$	0°	8°



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