

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D
30V	11mΩ@10V	9A
	16mΩ@4.5V	
-30V	21mΩ@-10V	-8A
	30mΩ@-4.5V	

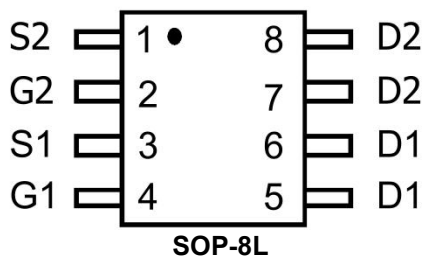
Feature

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

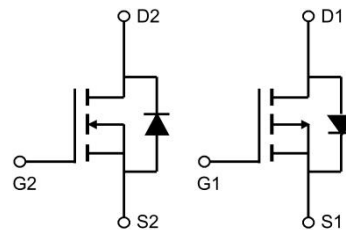
Application

- Bridge
- Inverters

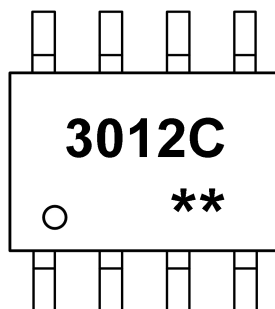
Package



Circuit diagram



Marking



3012C = 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}	± 20	± 20	V
Continuous Drain Current(t \leq 10s)	I_D	9	-8	A
Power Dissipation(t \leq 10s)	P_D	2	2	W
Thermal Resistance from Junction to Ambient(t \leq 10s)	$R_{\theta JA}$	62.5		$^{\circ}C/W$
Junction Temperature	T_J	150		$^{\circ}C$
Storage Temperature	T_{STG}	-55~ +150		$^{\circ}C$

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

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	30			V
Zero gate voltage drain current	I_{DSS}	$V_{DS} = 30V, V_{GS} = 0V$			1	μA
Gate-body leakage current	I_{GSS}	$V_{GS} = \pm 20V, V_{DS} = 0V$			± 100	nA
Gate threshold voltage ³⁾	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	1	1.5	2.5	V
Drain-source on-resistance ³⁾	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 8A$		11	15	m Ω
		$V_{GS} = 4.5V, I_D = 6A$		16	21	
Dynamic characteristics⁴⁾						
Input Capacitance	C_{iss}	$V_{DS} = 15V, V_{GS} = 0V, f = 1MHz$		1371	1845	pF
Output Capacitance	C_{oss}			163	228.2	
Reverse Transfer Capacitance	C_{rss}			131	183.4	
Switching Characteristics⁴⁾						
Turn-on delay time	$t_{d(on)}$	$V_{GEN} = 10V, V_{DD} = 15V, R_{GEN} = 1.2\Omega$		6.2	12.4	ns
Turn-on rise time	t_r			59	120	
Turn-off delay time	$t_{d(off)}$			27.6	55	
Turn-off fall time	t_f			8.4	16.8	
Total gate charge	Q_g	$V_{DS} = 15V, V_{GS} = 4.5V, I_D = 11.5A$		12.6	17.6	nC
Gate-source charge	Q_{gs}			4.2	5.9	
Gate-drain charge	Q_{gd}			5.1	7.1	
Source-Drain Diode Characteristics						
Body Diode Voltage ³⁾	V_{SD}	$I_S = 10A, V_{GS} = 0V$			1.2	V

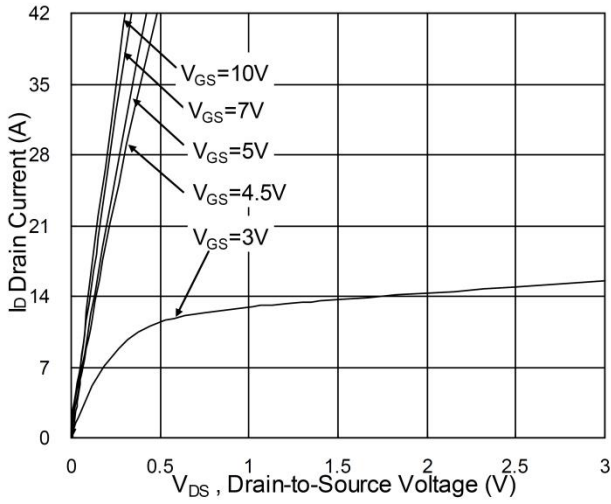
Notes:

- 1) Repetitive rating: Pulse width limited by junction temperature.
- 2) Surface mounted on FR4 board, t \leq 10s.
- 3) Pulse Test: Pulse Width \leq 80 μ s, Duty Cycle \leq 0.5%.
- 4) Guaranteed by design, not subject to producing.

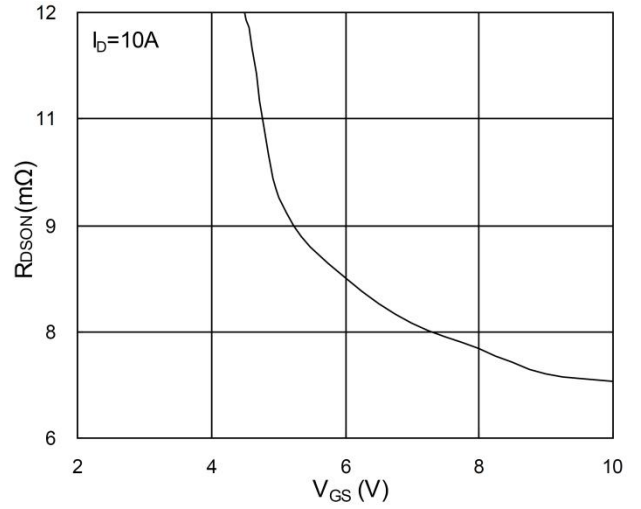
P-Channel Electrical characteristics (T_A=25 °C, unless otherwise noted)

Parameter	Symbo	Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	BV _{DSS}	VGS=0V , ID=-250uA	-30			V
Drain-Source Leakage Current	I _{DSS}	VDS=-24V , VGS=0V , TJ=25°C			1	uA
Gate-Source Leakage Current	I _{GSS}	VGS=±20V , VDS=0V			±100	nA
Gate Threshold Voltage	V _{GS(th)}	VGS=VDS , ID =-250uA	-1.0	-1.5	-2.5	V
Static Drain-Source On-Resistance	R _{DS(ON)}	VGS=-10V , ID=-6A		21	27	mΩ
		VGS=-4.5V , ID=-4A		30	40	
Dynamic characteristics						
Total Gate Charge (-4.5V)	Q _g	VDS=-20V , VGS=-4.5V , ID=-12A		9.8		nC
Gate-Source Charge	Q _{gs}			2.2		
Gate-Drain Charge	Q _{gd}			3.4		
Turn-On Delay Time	T _{d(on)}	VDD=-24V , VGS=-10V , RG=3.3Ω , ID=-1A		16.4		ns
Rise Time	T _r			20.2		
Turn-Off Delay Time	T _{d(off)}			55		
Fall Time	T _f			10		
Input Capacitance	C _{iss}	VDS=-15V , VGS=0V , f=1MHz		930		pF
Output Capacitance	C _{oss}			148		
Reverse Transfer Capacitance	C _{rss}			115		
Source-Drain Diode characteristics						
Diode Forward Voltage	V _{SD}	VGS=0V , IS=-1A , TJ=25°C			-1.2	V

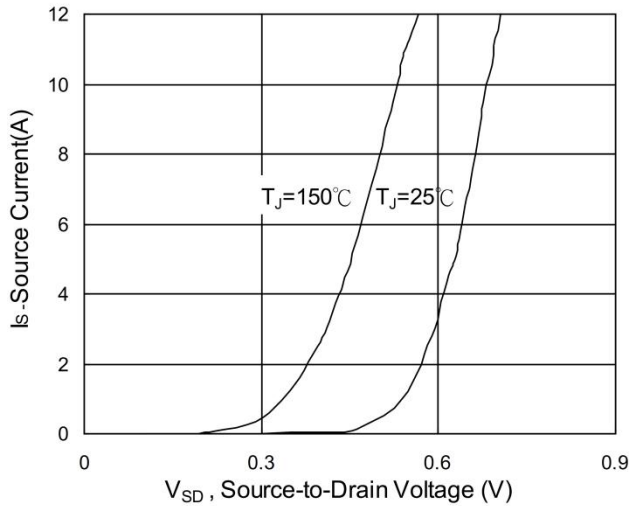
N-Channel Typical Characteristics



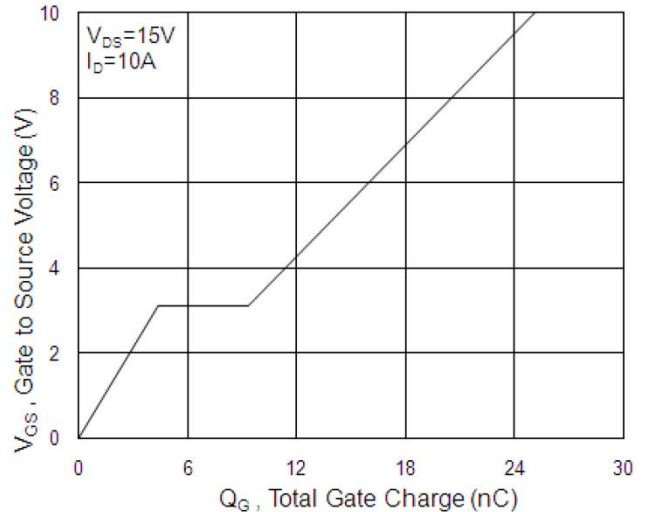
Typical Output Characteristics



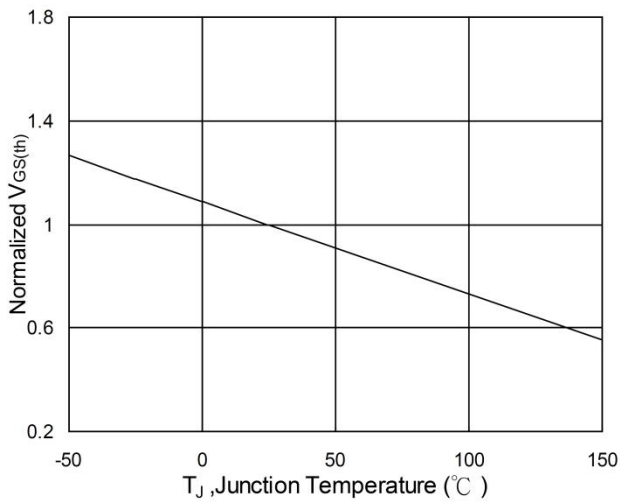
On-Resistance vs. Gate-Source



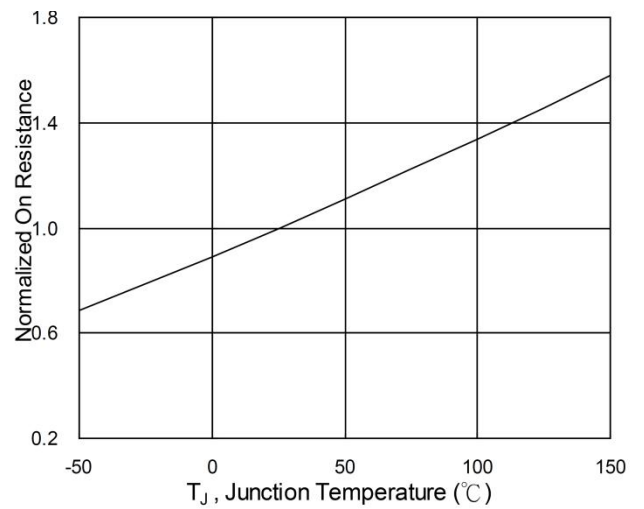
Forward Characteristics of reverse



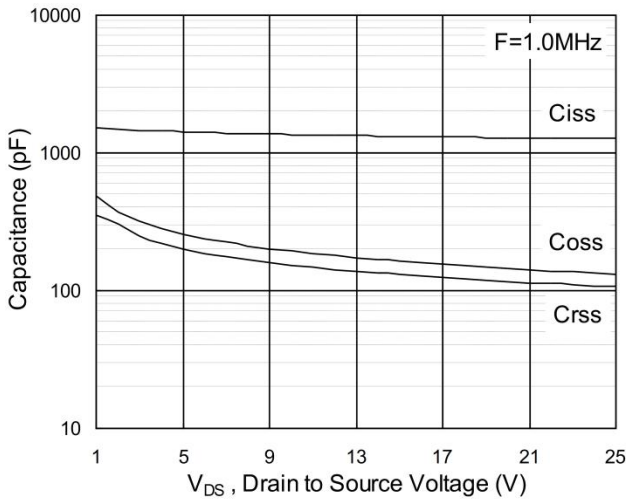
Gate-Charge Characteristics



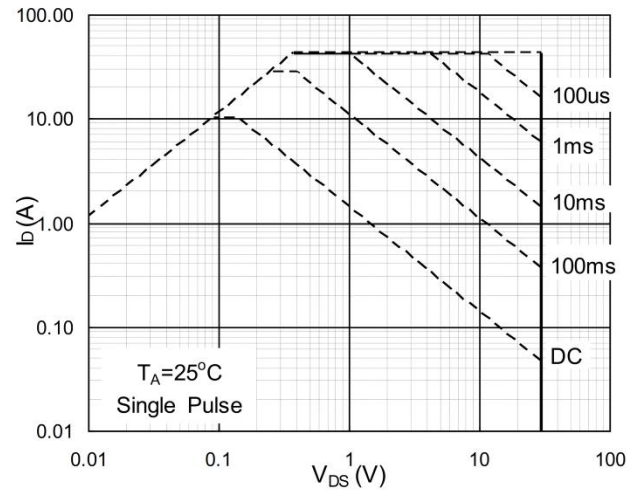
Normalized $V_{GS(th)}$ vs. T_J



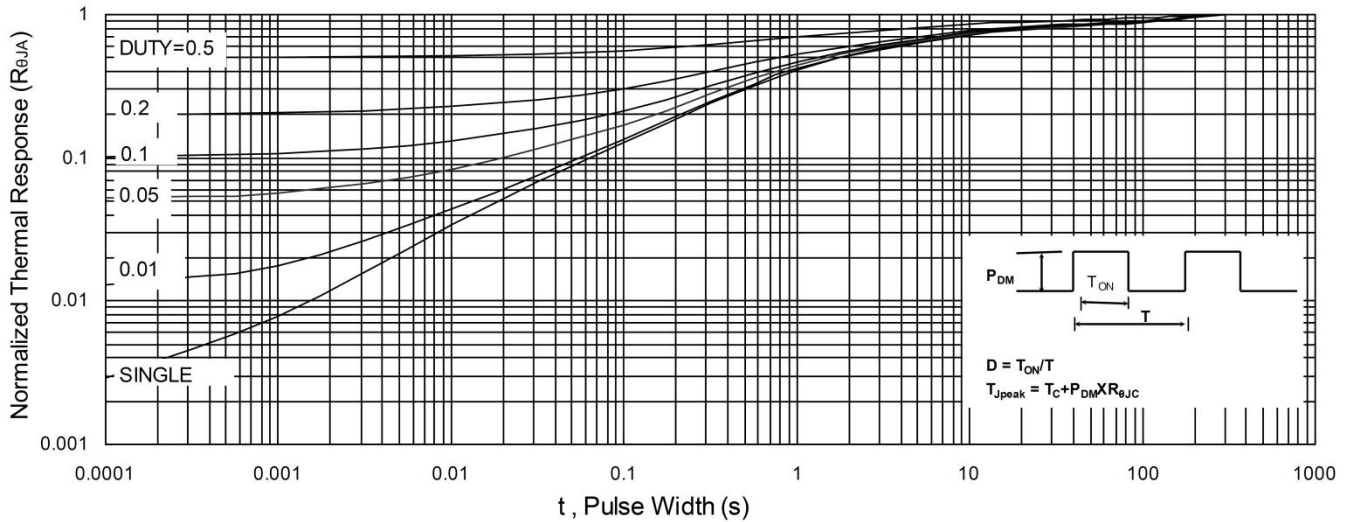
Normalized $R_{DS(on)}$ vs. T_J



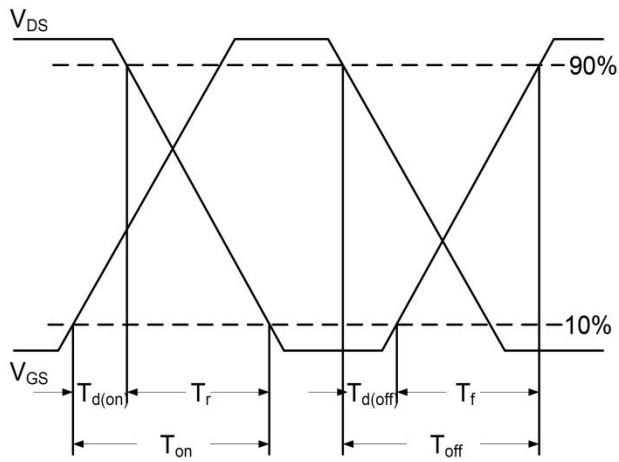
Capacitance



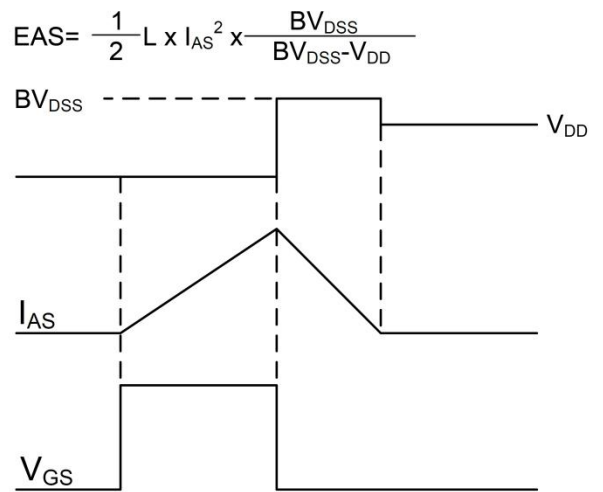
Safe Operating Area



Normalized Maximum Transient Thermal Impedance

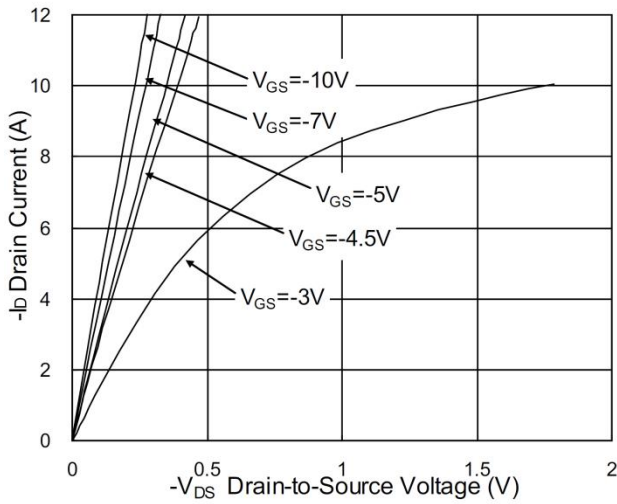


Switching Time Waveform

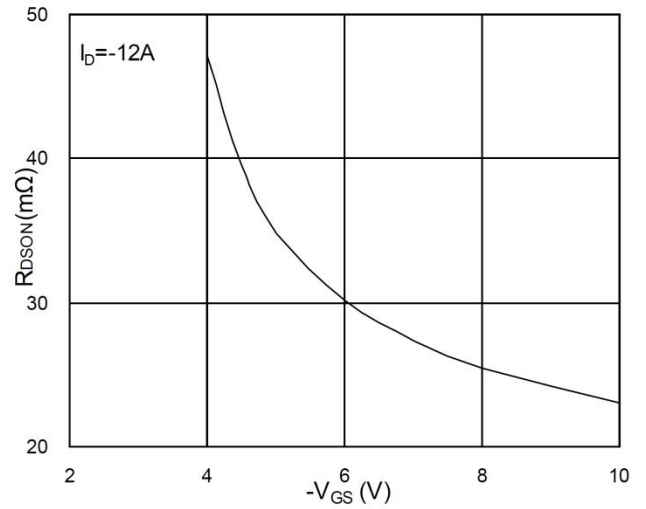


Unclamped Inductive Switching Waveform

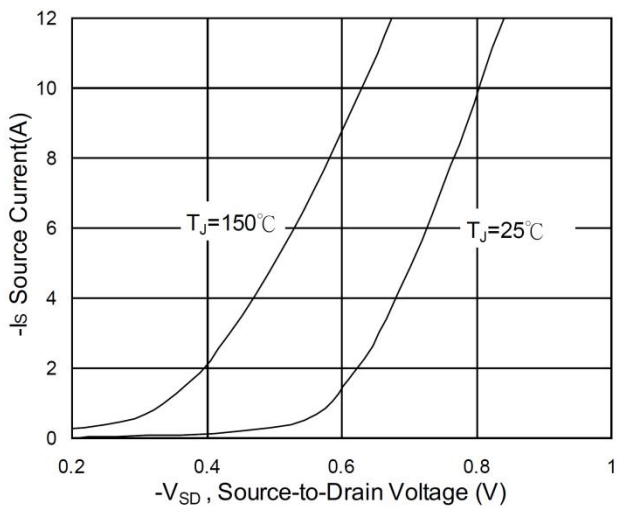
P-Channel Typical Characteristics



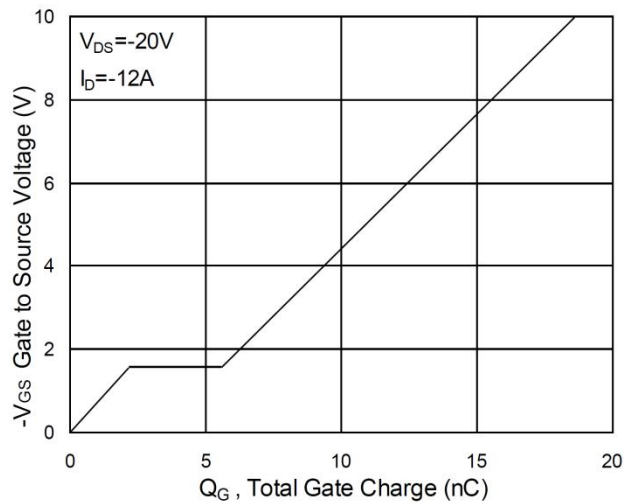
Output Characteristics



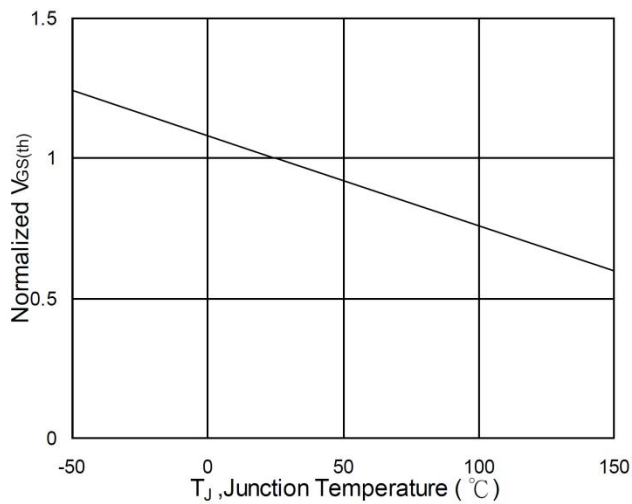
On-Resistance v.s Gate-Source



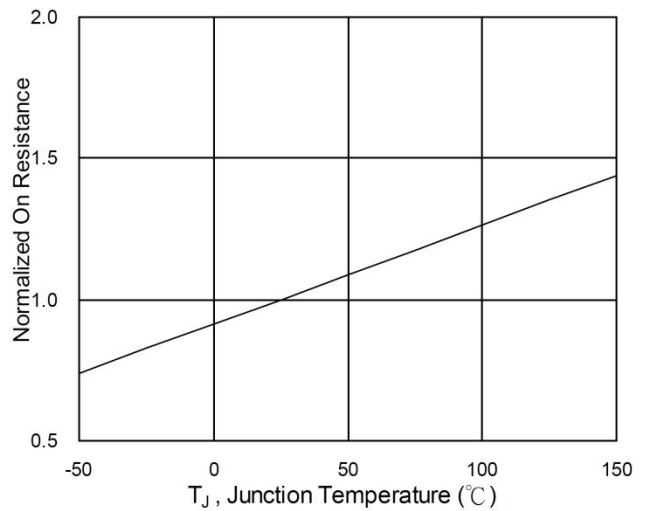
Forward Characteristics of Reverse



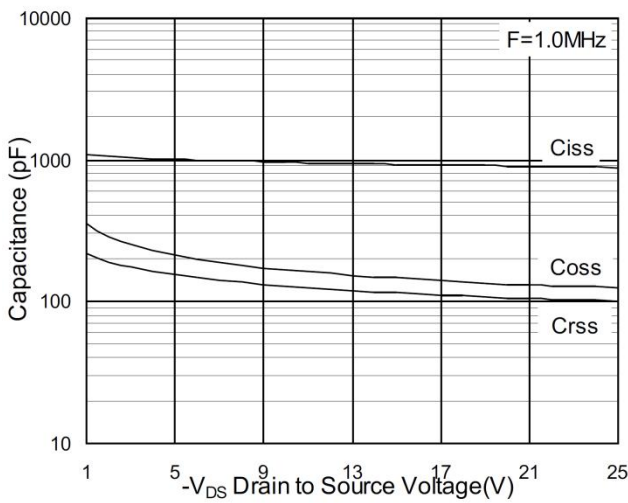
Gate-Charge Characteristics



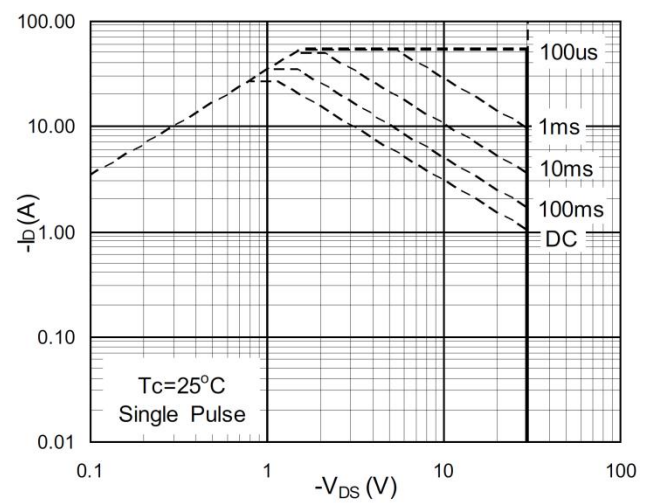
Normalized VGS(th) v.s TJ



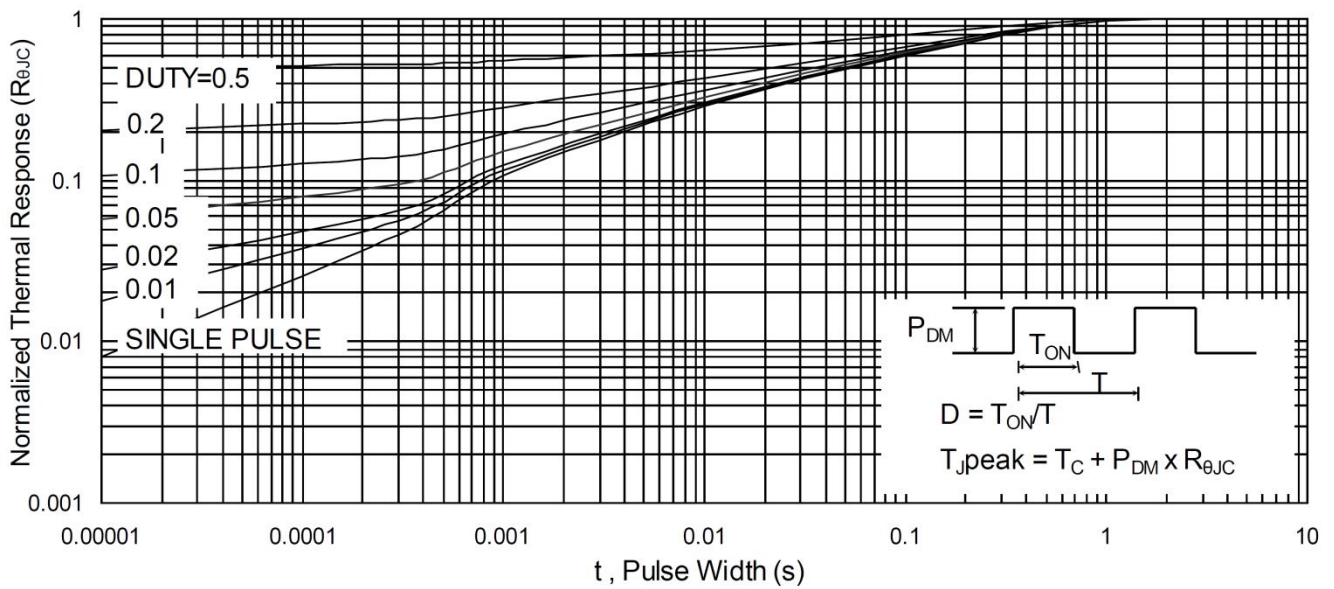
Normalized RDS(on) v.s TJ



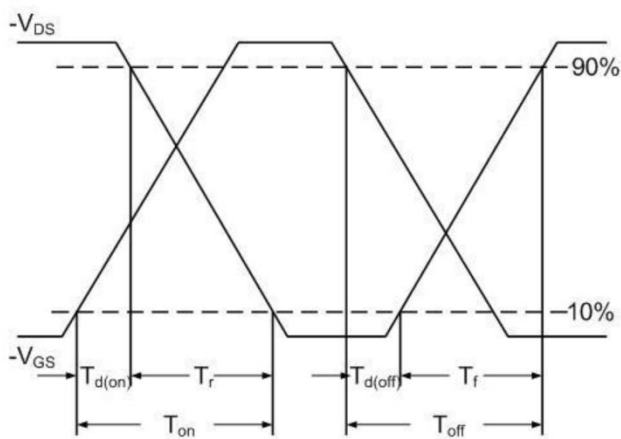
Capacitance vs Vds



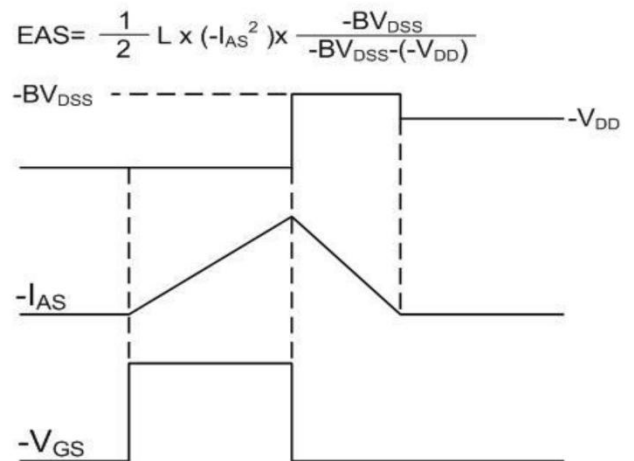
Safe Operating Area



Normalized Maximum Transient Thermal Impedance



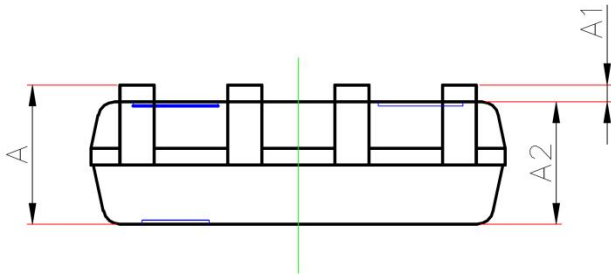
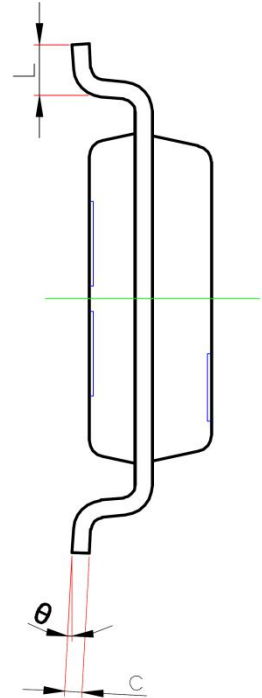
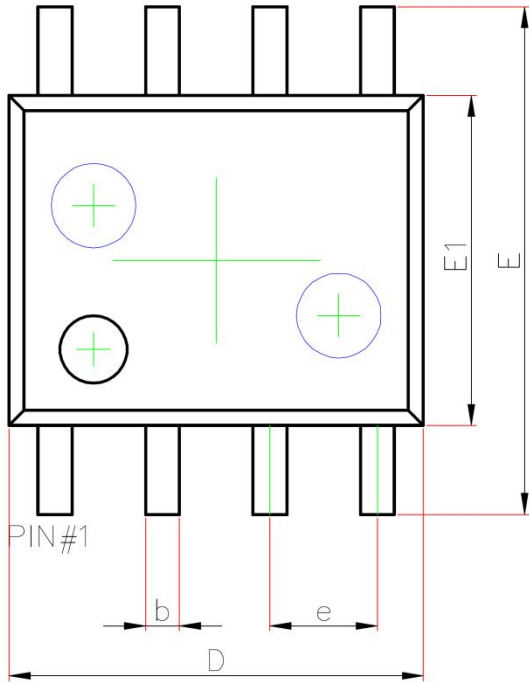
Switching Time Waveform



Unclamped Inductive Switching Waveform



SOP-8L 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
θ	0°	8°

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