

### Product Summary

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	$I_D$	$V_{(BR)DSS}$	$R_{DS(on)MAX}$	$I_D$
30V	15mΩ@10V	12A	-30V	27mΩ@-10V	-10.5A
	21mΩ@4.5V			40mΩ@-4.5V	

### Feature

- Trench FET Power MOSFET
- Excellent Rds(on) and Low Gate Charge

### Application

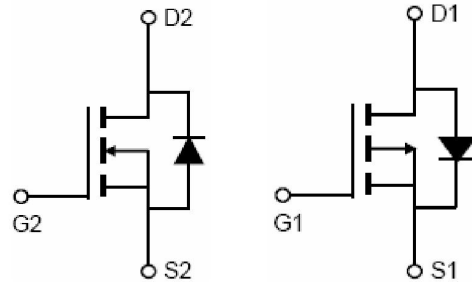
- Bridge
- Inverters

### Package

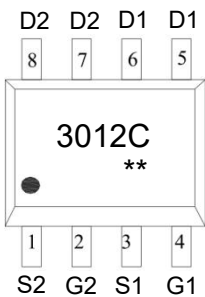


SOP-8

### Circuit diagram



### Marking



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

Parameter	Symbol	N-Channel	P-Channel	Unit
Drain-Source Voltage	V <sub>DS</sub>	30	-30	V
Gate-Source Voltage	V <sub>GS</sub>	±20	±20	V
Continuous Drain Current (t≤10s)	I <sub>D</sub>	12	-10.5	A
Pulsed Drain Current	I <sub>DM</sub>	42	-42	A
Power Dissipation(t≤10s)	P <sub>D</sub>	2	2	W
Thermal Resistance,Junction-to-Ambient (t≤10s)	R <sub>θJA</sub>	62.5		°C/W
Junction Temperature	T <sub>J</sub>	150		°C
Storage Temperature	T <sub>STG</sub>	-55 ~ +150	-55 ~ +150	°C

### N-CH 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> =30V, 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 <sup>1)</sup>	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	1.0	1.5	2.5	V
Drain-source on-resistance <sup>1)</sup>	R <sub>DS(on)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =8A		11	15	mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =6A		16	21	mΩ
<b>Dynamic characteristics<sup>2)</sup></b>						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =15V, V <sub>GS</sub> =0V, f =1MHz		1371		pF
Output Capacitance	C <sub>oss</sub>			163		
Reverse Transfer Capacitance	C <sub>rss</sub>			131		
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =15V, V <sub>GS</sub> =4.5V, I <sub>D</sub> =11.5A		12.6		nC
Gate-Source Charge	Q <sub>gs</sub>			4.2		
Gate-Drain Charge	Q <sub>gd</sub>			5.1		
Turn-on delay time	t <sub>d(on)</sub>	V <sub>DD</sub> =15V, V <sub>GS</sub> =10V R <sub>GEN</sub> =1.2Ω		6.2		nS
Turn-on rise time	t <sub>r</sub>			59		
Turn-off delay time	t <sub>d(off)</sub>			27.6		
Turn-off fall time	t <sub>f</sub>			8.4		
<b>Source-Drain Diode characteristics</b>						
Diode Forward voltage <sup>2)</sup>	V <sub>SD</sub>	V <sub>GS</sub> =0V, I <sub>S</sub> =10A			1.2	V

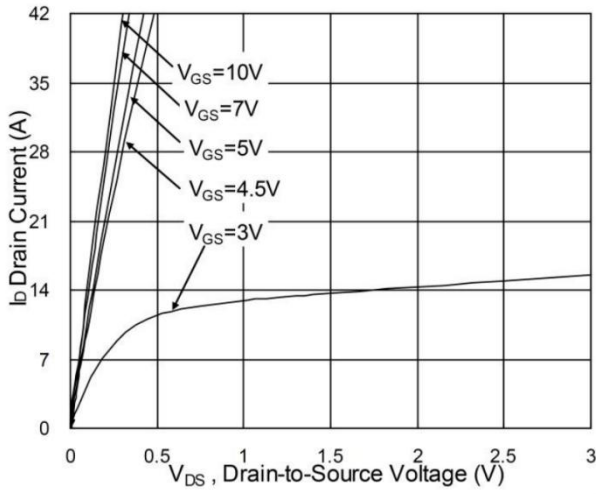
### P-CH Electrical characteristics (T<sub>A</sub>=25 °C, unless otherwise noted)

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, T <sub>J</sub> = 25°C			-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	-1.0	-1.5	-2.5	V
Drain-source on-resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> = -10V, I <sub>D</sub> = -6A		21	27	mΩ
		V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -4A		30	40	mΩ
<b>Dynamic characteristics<sup>2)</sup></b>						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> = -15V, V <sub>GS</sub> = 0V, f = 1MHz		930		pF
Output Capacitance	C <sub>oss</sub>			148		
Reverse Transfer Capacitance	C <sub>rss</sub>			115		
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> = -20V, V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -12A		9.8		nC
Gate-Source Charge	Q <sub>gs</sub>			2.2		
Gate-Drain Charge	Q <sub>gd</sub>			3.4		
Turn-on delay time	t <sub>d(on)</sub>	V <sub>DD</sub> = -24V, V <sub>GS</sub> = -10V, I <sub>D</sub> = -1A, R <sub>GEN</sub> = 3.3Ω		16.4		nS
Turn-on rise time	t <sub>r</sub>			20.2		
Turn-off delay time	t <sub>d(off)</sub>			55		
Turn-off fall time	t <sub>f</sub>			10		
<b>Source-Drain Diode characteristics</b>						
Diode Forward voltage	V <sub>SD</sub>	V <sub>GS</sub> = 0V, I <sub>S</sub> = -1A, T <sub>J</sub> = 25°C			-1.2	V

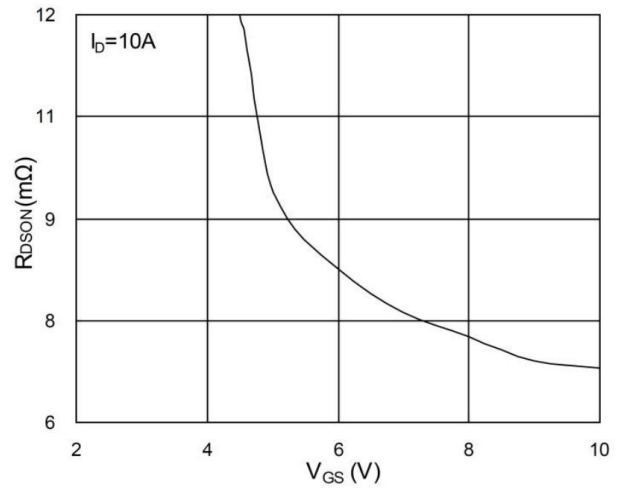
Notes:

- 1) Pulse Test: Pulse Width < 80μs, Duty Cycle ≤ 0.5%.
- 2) Guaranteed by design, not subject to production testing.

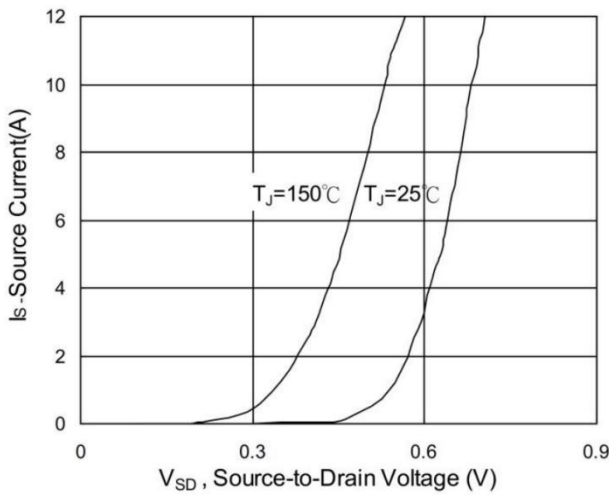
## N- Channel Typical Characteristics



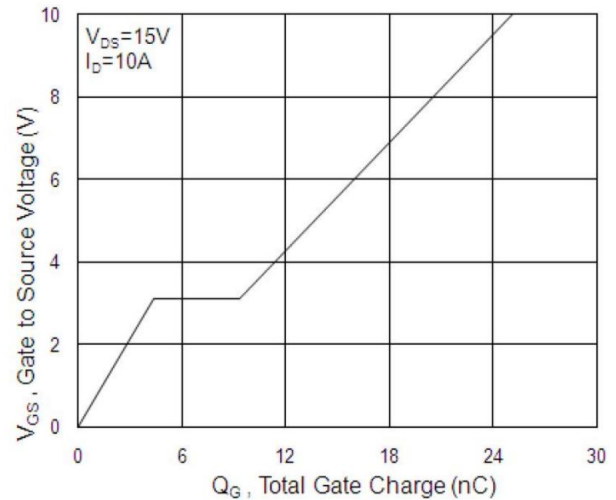
**Typical Output Characteristics**



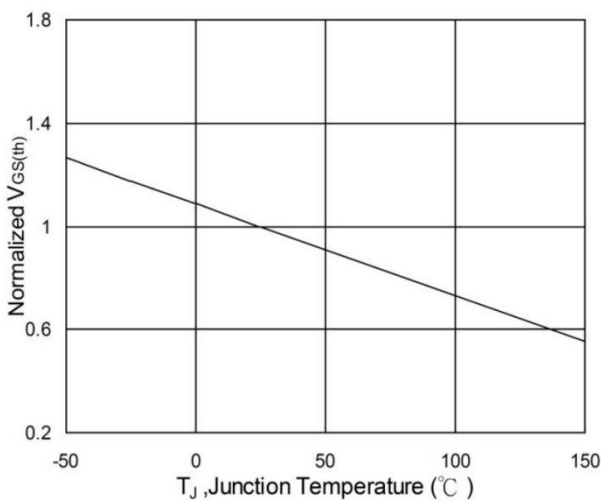
**On-Resistance vs. Gate-Source**



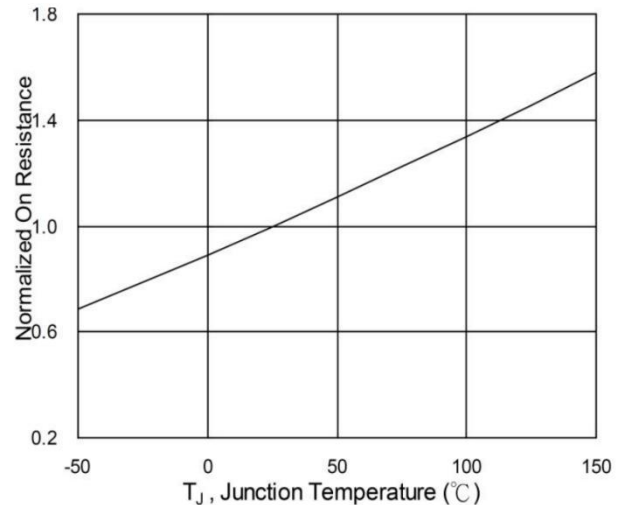
**Forward Characteristics of reverse**



**Gate-Charge Characteristics**

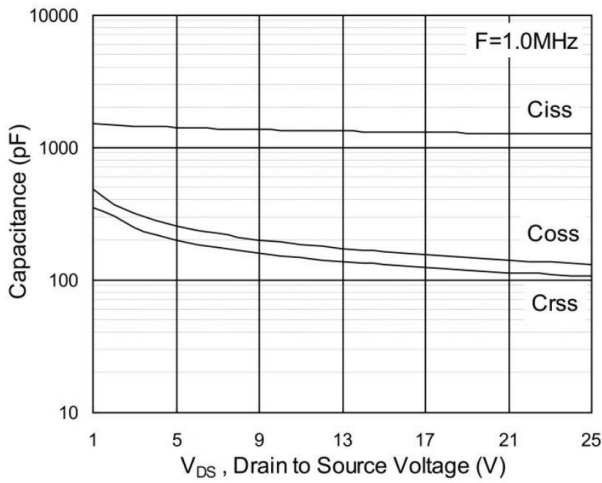


**Normalized  $V_{GS(th)}$  vs.  $T_J$**

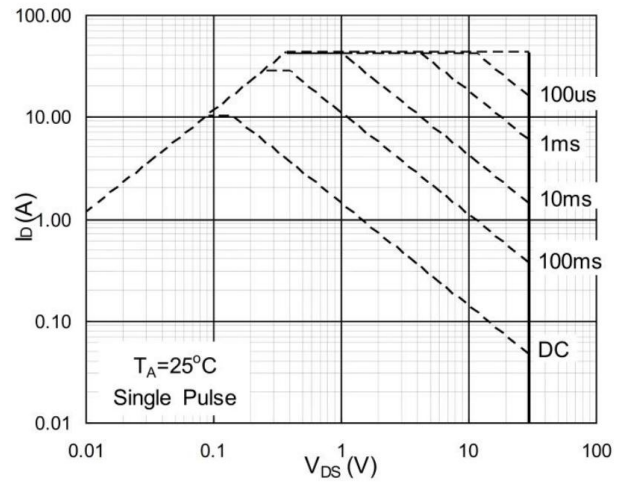


**Normalized  $R_{DS(on)}$  vs.  $T_J$**

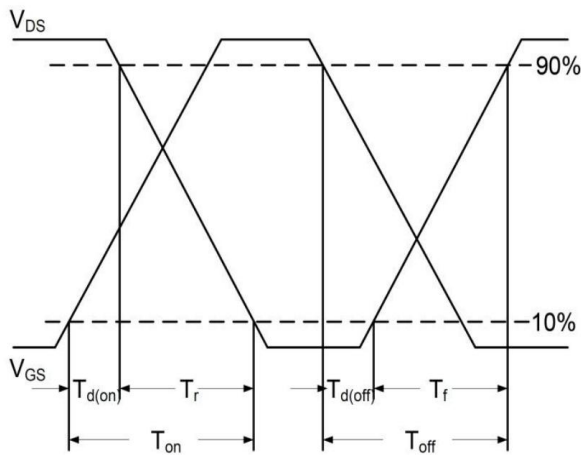
## N- Channel Typical Characteristics



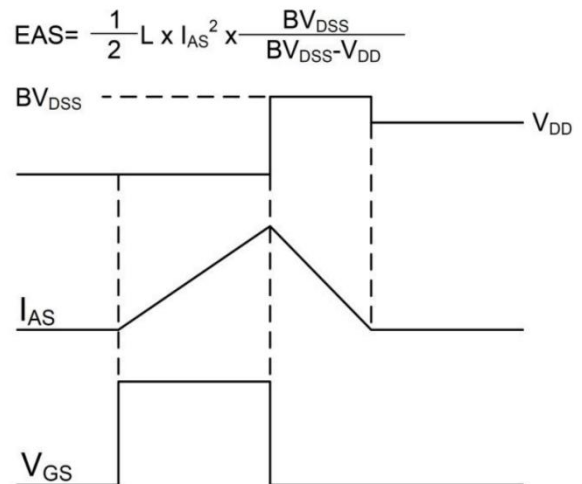
Capacitance



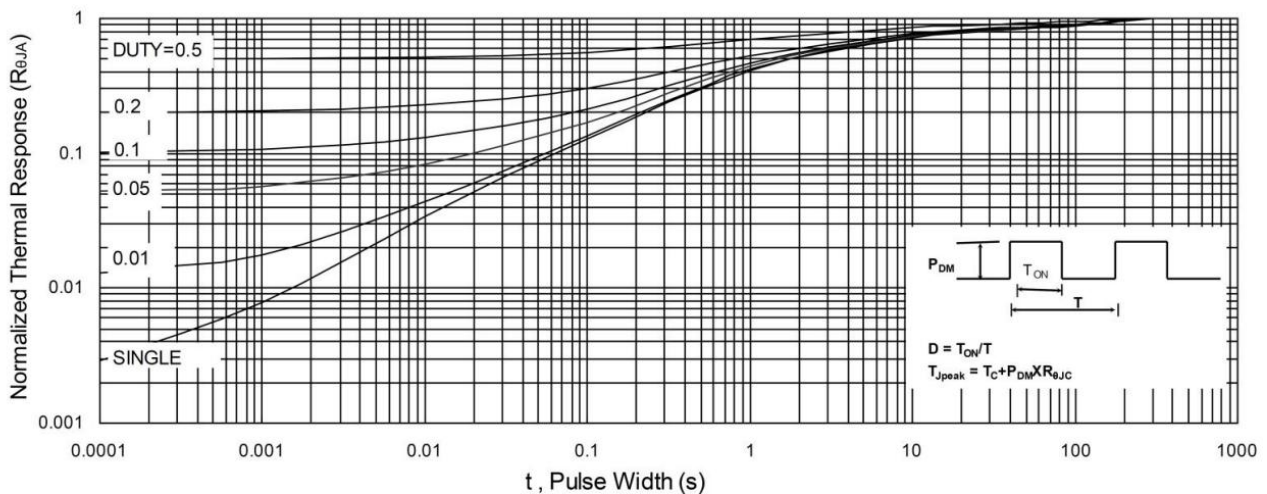
Safe Operating Area



Switching Time Waveform

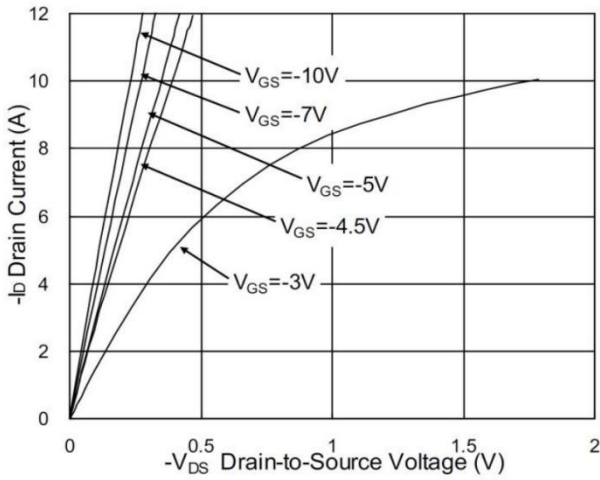


Unclamped Inductive Switching Waveform

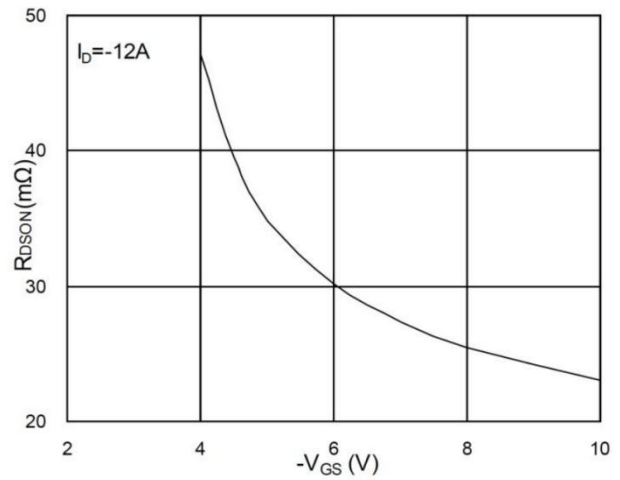


Normalized Maximum Transient Thermal Impedance

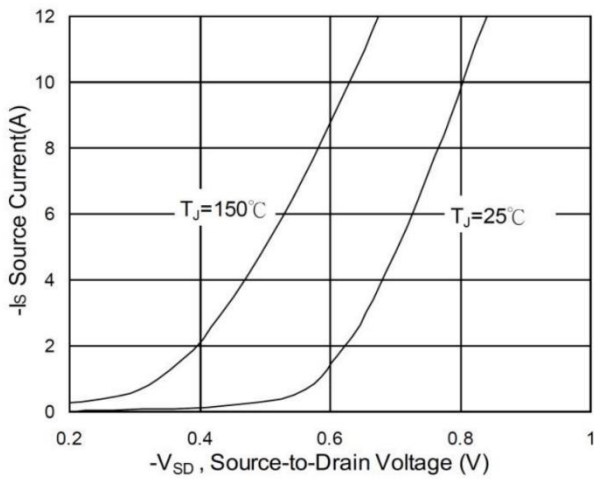
## P- Channel Typical Characteristics



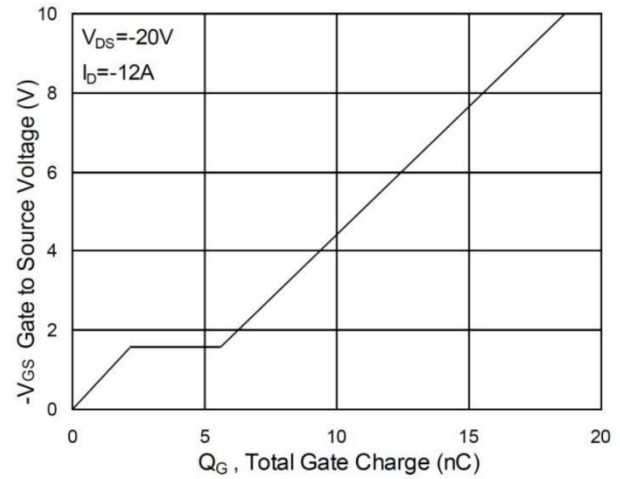
**Output Characteristics**



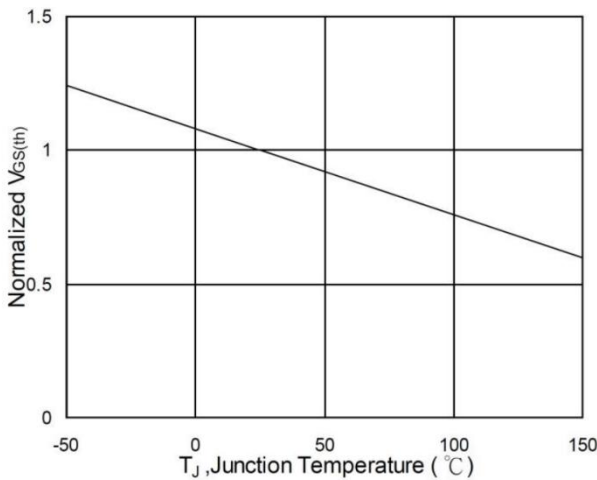
**On-Resistance v.s Gate-Source**



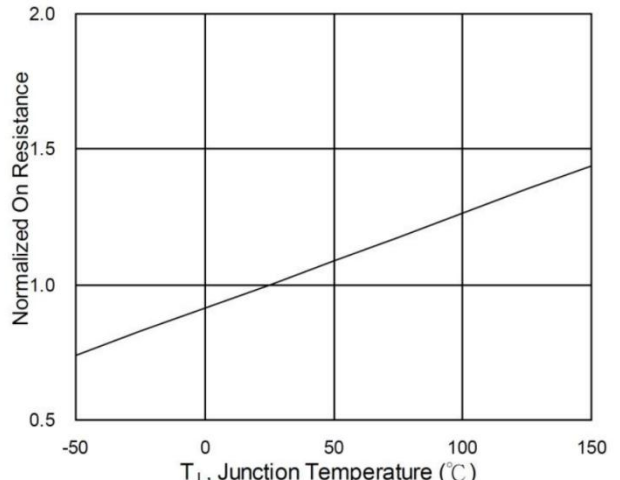
**Forward Characteristics of Reverse**



**Gate-Charge Characteristics**



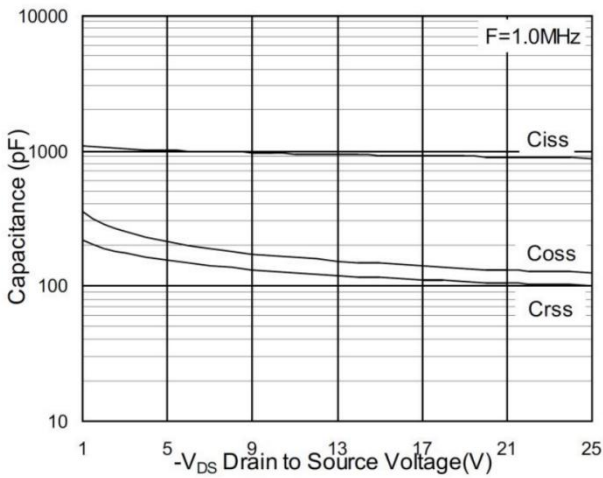
**Normalized VGS(th) v.s TJ**



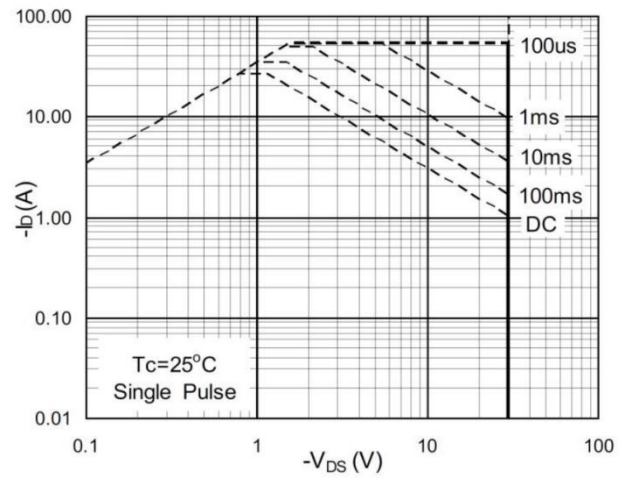
**Normalized RDS(on) v.s TJ**



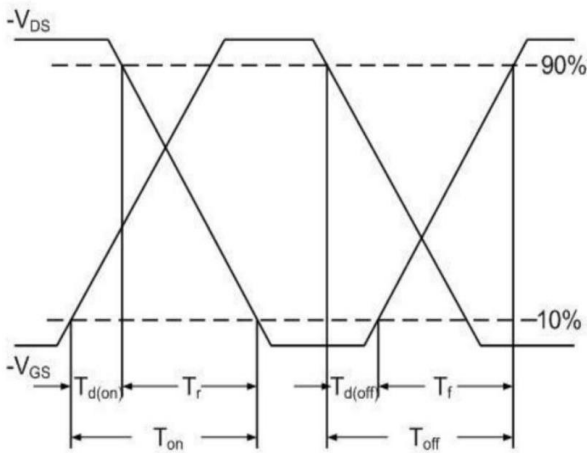
## P- Channel Typical Characteristics



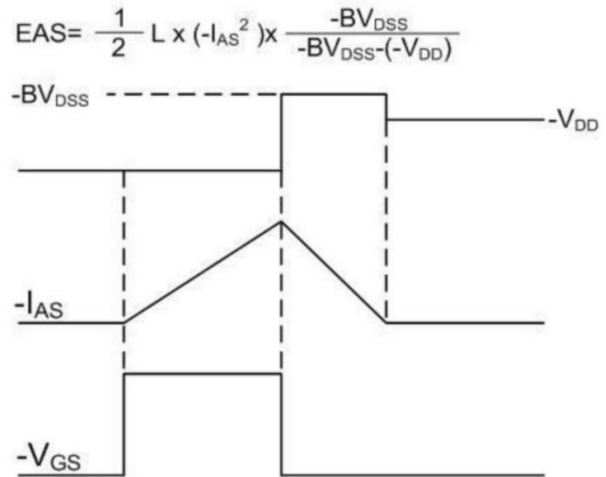
Capacitance vs Vds



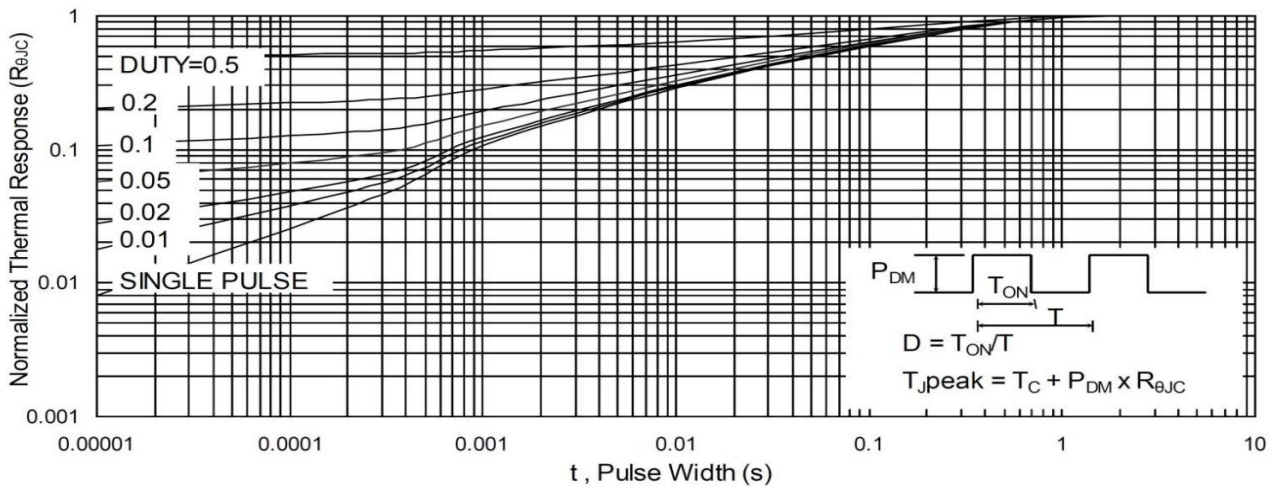
Safe Operating Area



Switching Time Waveform

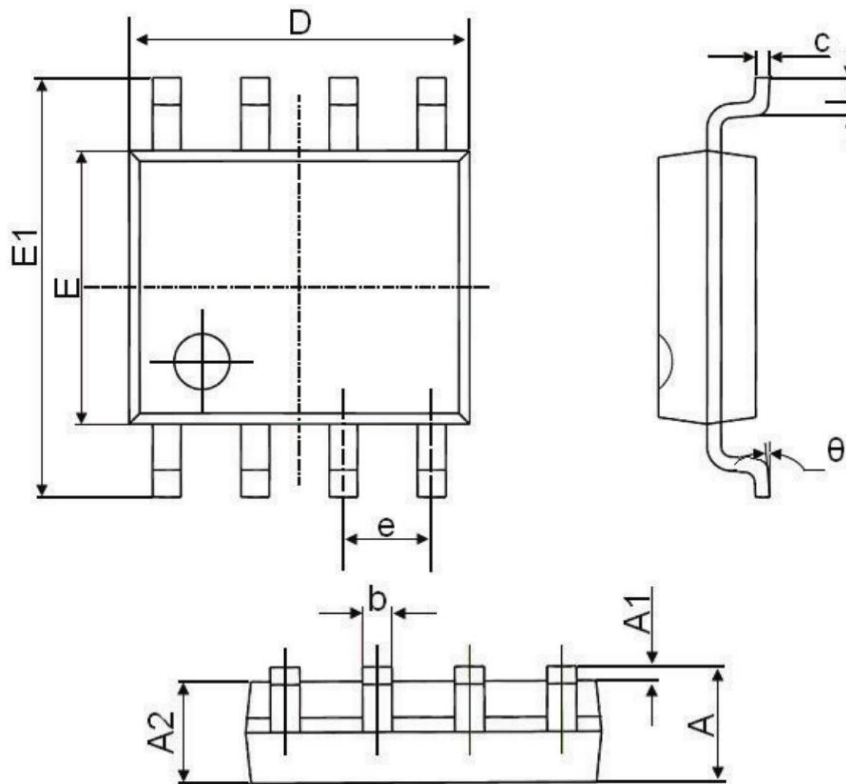


Unclamped Inductive Switching Waveform



Normalized Maximum Transient Thermal Impedance

### SOP-8 Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270 BSC		0.050 BSC	
L	0.400	1.270	0.016	0.050
theta	0°	8°	0°	8°