

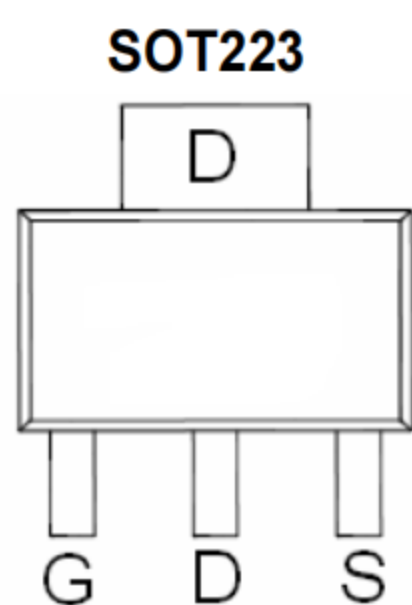
### GENERAL FEATURES

- 60V, 4A,  $R_{DS(ON)} = 85m\Omega$  @  $V_{GS} = 10V$ .  
 $R_{DS(ON)} = 100m\Omega$  @  $V_{GS} = 4.5V$ .
- High dense cell design for extremely low  $R_{DS(ON)}$ .
- Rugged and reliable.
- Lead free product is acquired.
- SOT-223 package.

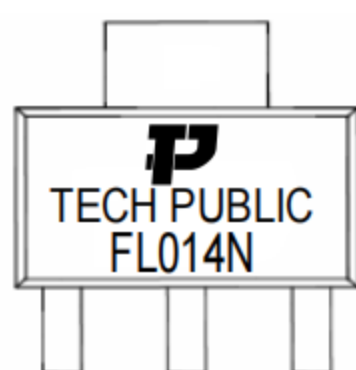
### Application

- Load/Power Switching
- Interfacing Switching
- Logic Level Shift

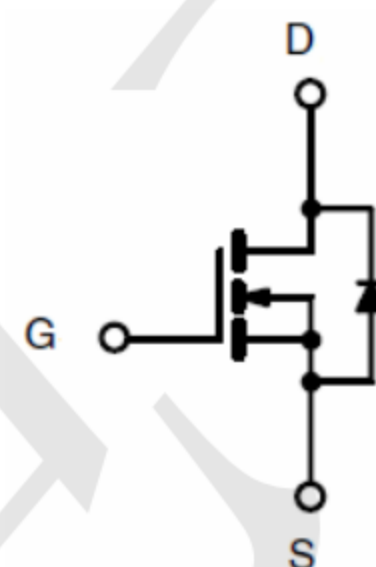
### Package and Pin Configuration



Marking:



### Circuit diagram



### ABSOLUTE MAXIMUM RATINGS $T_A = 25^\circ C$ unless otherwise noted

Parameter	Symbol	Limit	Units
Drain-Source Voltage	$V_{DS}$	60	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Drain Current-Continuous	$I_D$	4	A
Drain Current-Pulsed <sup>a</sup>	$I_{DM}$	20	A
Maximum Power Dissipation	$P_D$	3	W
Operating and Store Temperature Range	$T_J, T_{stg}$	-55 to 150	$^\circ C$

### Thermal Characteristics

Parameter	Symbol	Limit	Units
Thermal Resistance, Junction-to-Ambient <sup>b</sup>	$R_{\theta JA}$	42	$^\circ C/W$

### Electrical Characteristics $T_A = 25^\circ\text{C}$ unless otherwise noted

Parameter	Symbol	Test Condition	Min	Typ	Max	Units
<b>Off Characteristics</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	60			V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 60V, V_{GS} = 0V$			1	$\mu A$
Gate Body Leakage Current, Forward	$I_{GSSF}$	$V_{GS} = 20V, V_{DS} = 0V$			100	nA
Gate Body Leakage Current, Reverse	$I_{GSSR}$	$V_{GS} = -20V, V_{DS} = 0V$			-100	nA
<b>On Characteristics</b>						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS} = V_{DS}, I_D = 250\mu A$	1		3	V
Static Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 2A$			85	$m\Omega$
		$V_{GS} = 4.5V, I_D = 1.5A$			100	$m\Omega$
<b>Dynamic Characteristics<sup>d</sup></b>						
Input Capacitance	$C_{iss}$	$V_{DS} = 25V, V_{GS} = 0V, f = 1.0\text{ MHz}$		530		pF
Output Capacitance	$C_{oss}$			70		pF
Reverse Transfer Capacitance	$C_{rss}$			50		pF
<b>Switching Characteristics<sup>d</sup></b>						
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 30V, I_D = 1A, V_{GS} = 10V, R_{GEN} = 6\Omega$		9	18	ns
Turn-On Rise Time	$t_r$			4	8	ns
Turn-Off Delay Time	$t_{d(off)}$			28	56	ns
Turn-Off Fall Time	$t_f$			3	6	ns
Total Gate Charge	$Q_g$	$V_{DS} = 30V, I_D = 4.5A, V_{GS} = 10V$		13	17	nC
Gate-Source Charge	$Q_{gs}$			1		nC
Gate-Drain Charge	$Q_{gd}$			4		nC
<b>Drain-Source Diode Characteristics and Maximun Ratings</b>						
Drain-Source Diode Forward Current <sup>b</sup>	$I_S$				2.5	A
Drain-Source Diode Forward Voltage <sup>c</sup>	$V_{SD}$	$V_{GS} = 0V, I_S = 2.5A$			1.1	V

### Typical Electrical and Thermal Characteristics

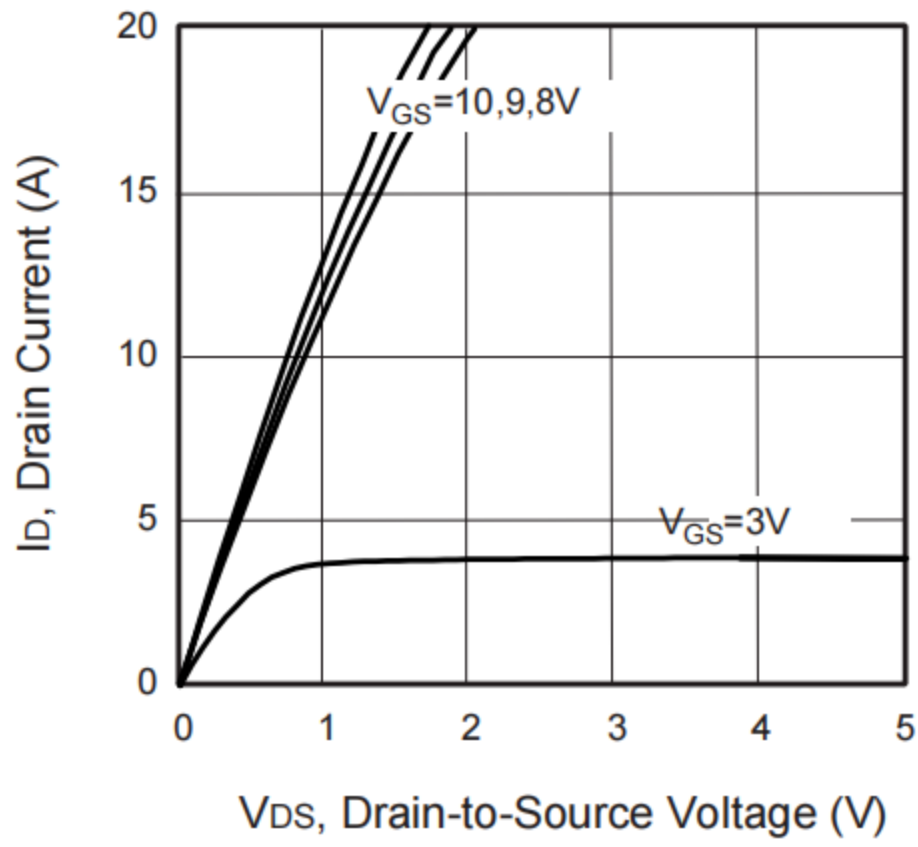


Figure 1. Output Characteristics

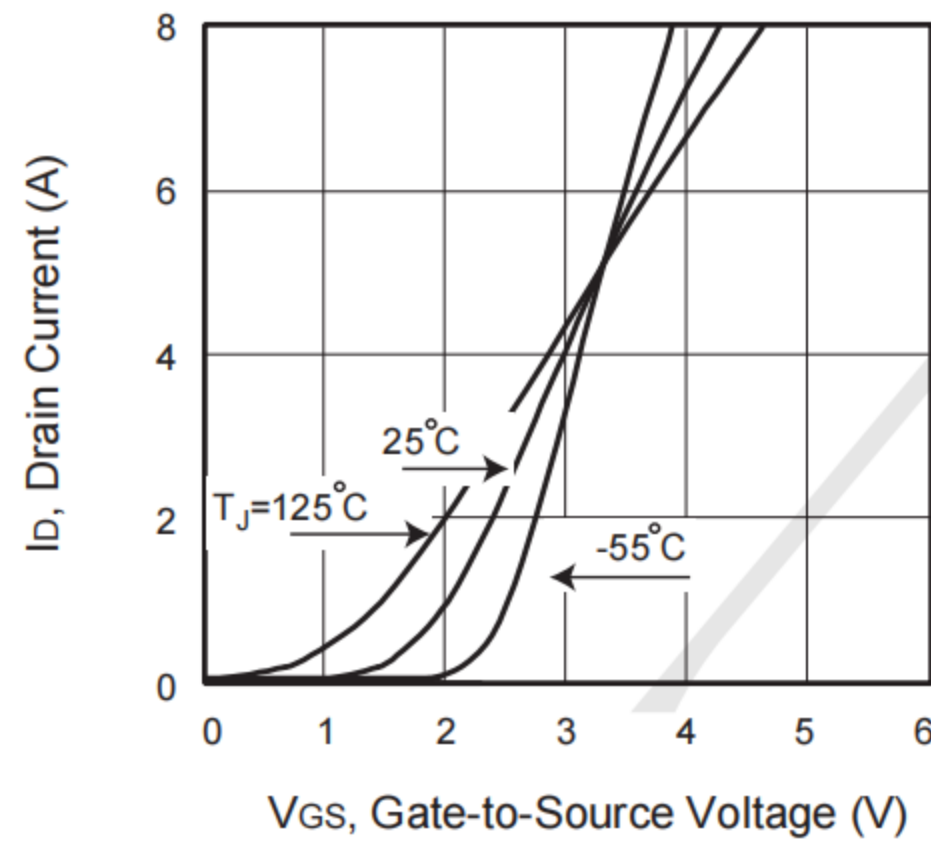


Figure 2. Transfer Characteristics

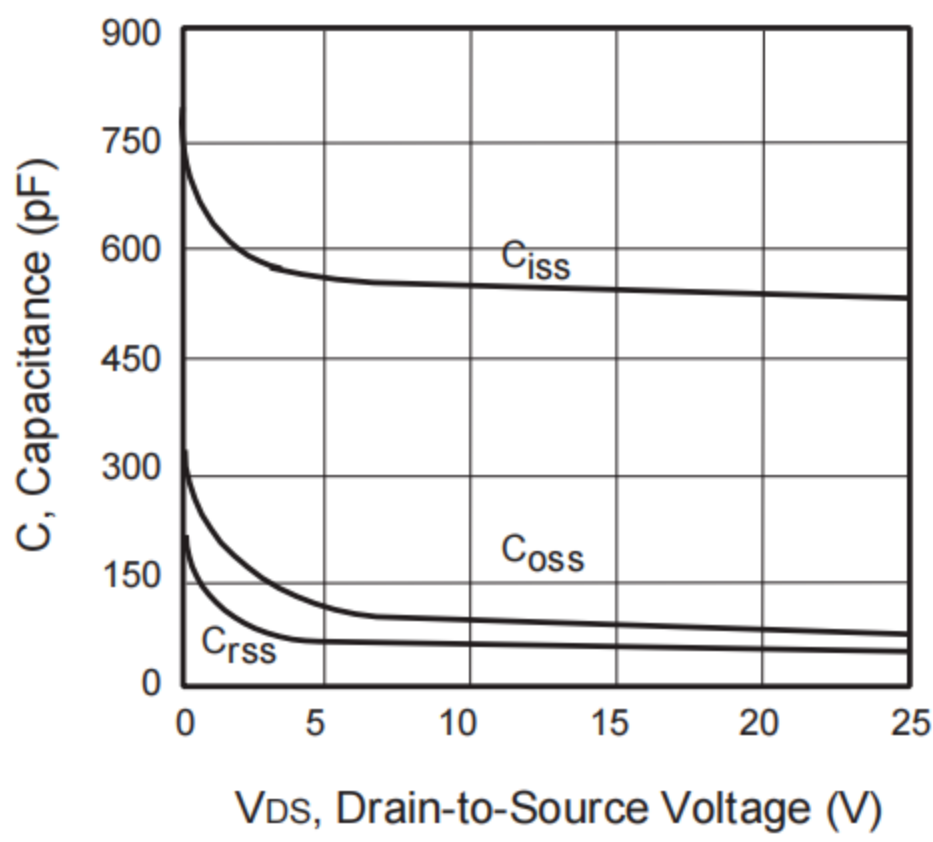


Figure 3. Capacitance

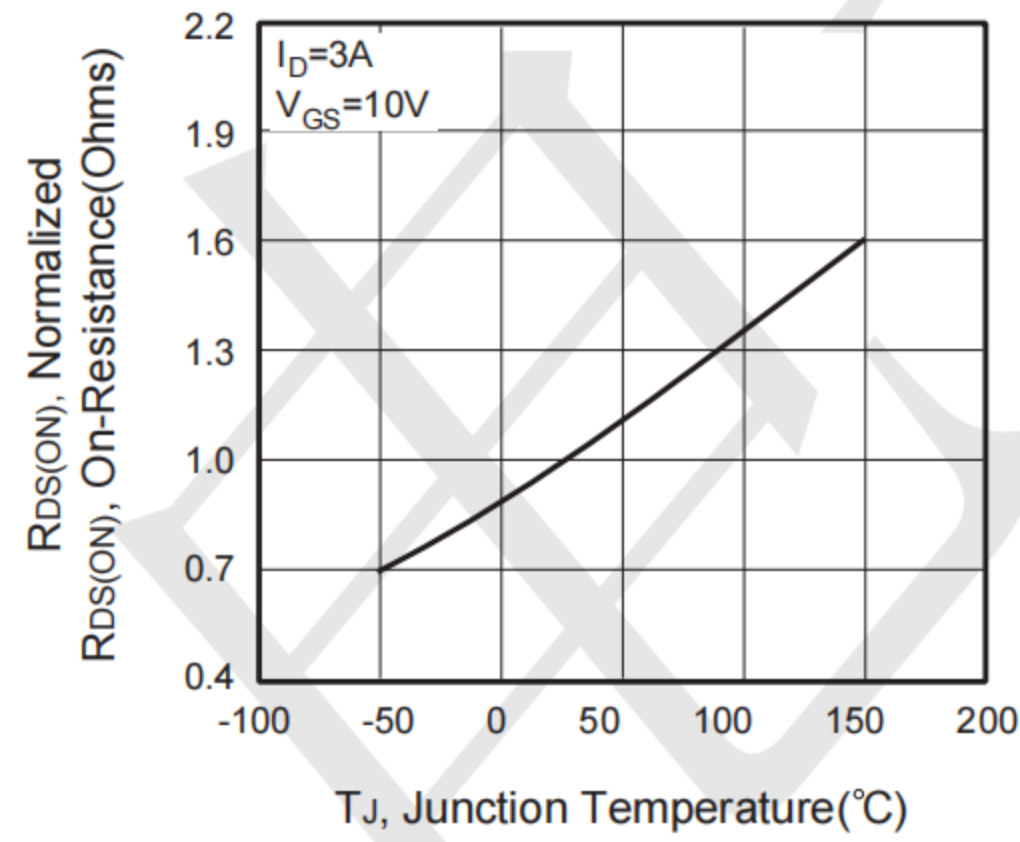


Figure 4. On-Resistance Variation with Temperature

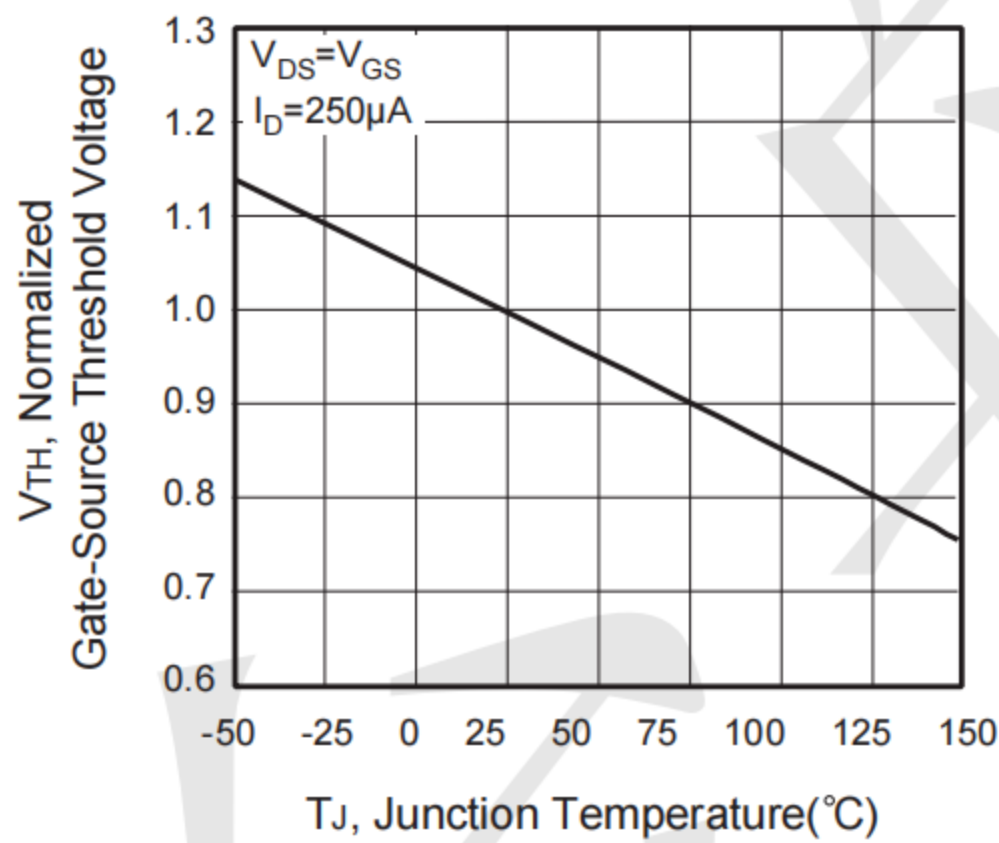


Figure 5. Gate Threshold Variation with Temperature

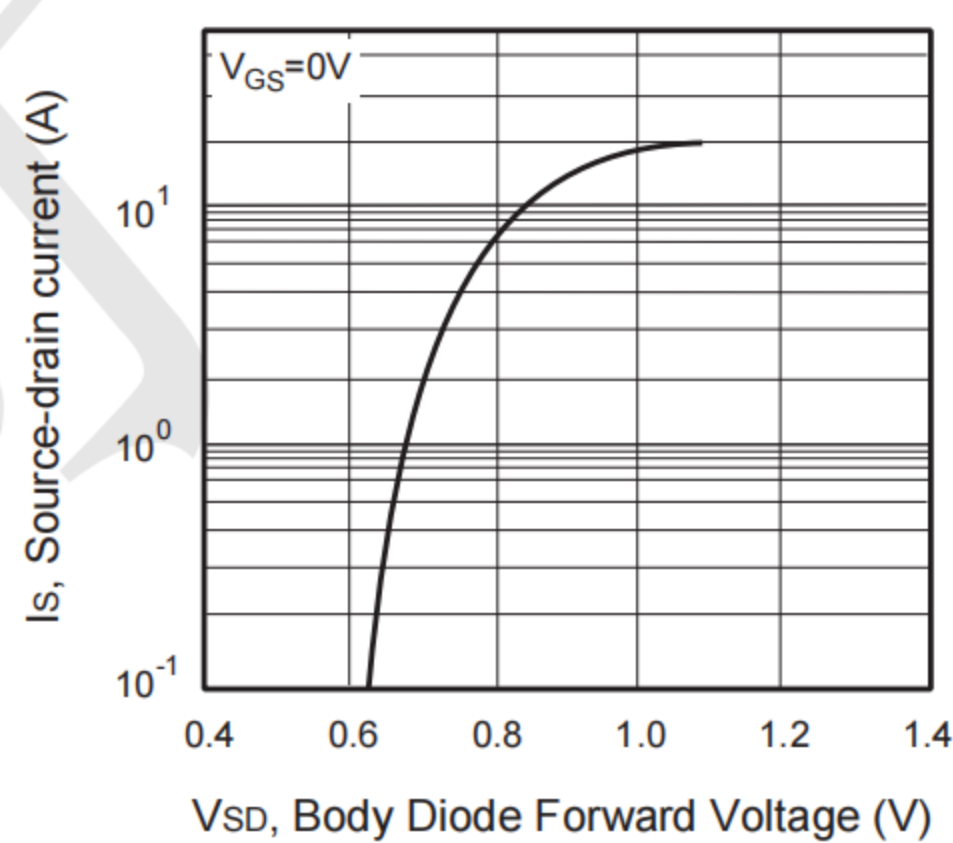


Figure 6. Body Diode Forward Voltage Variation with Source Current

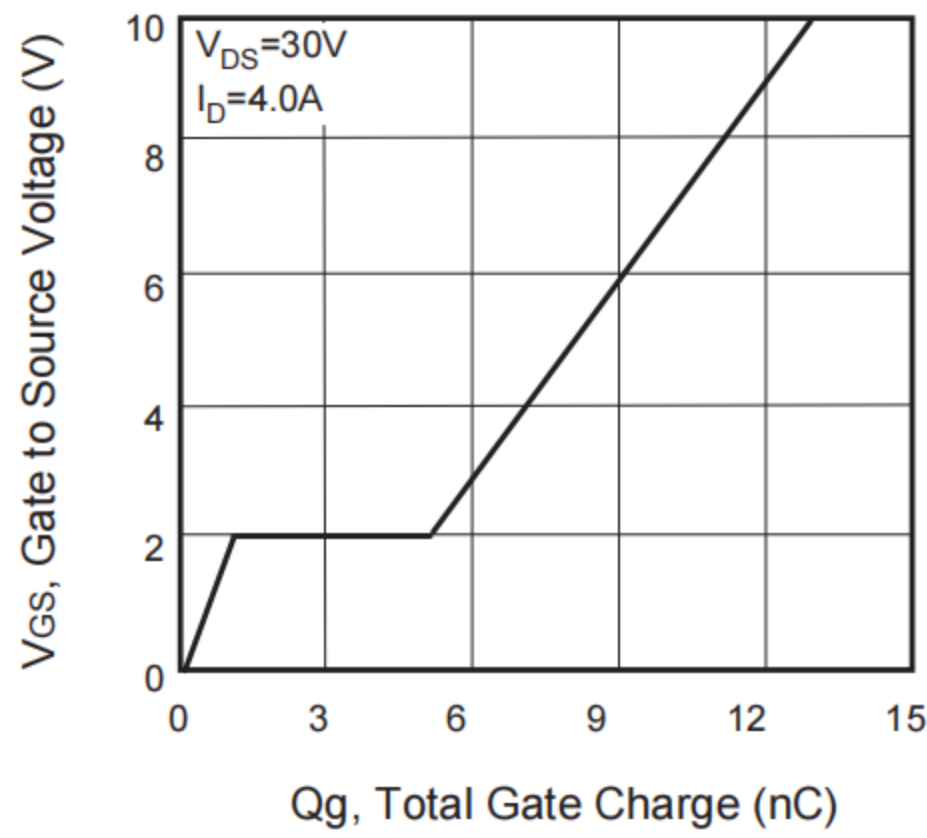


Figure 7. Gate Charge

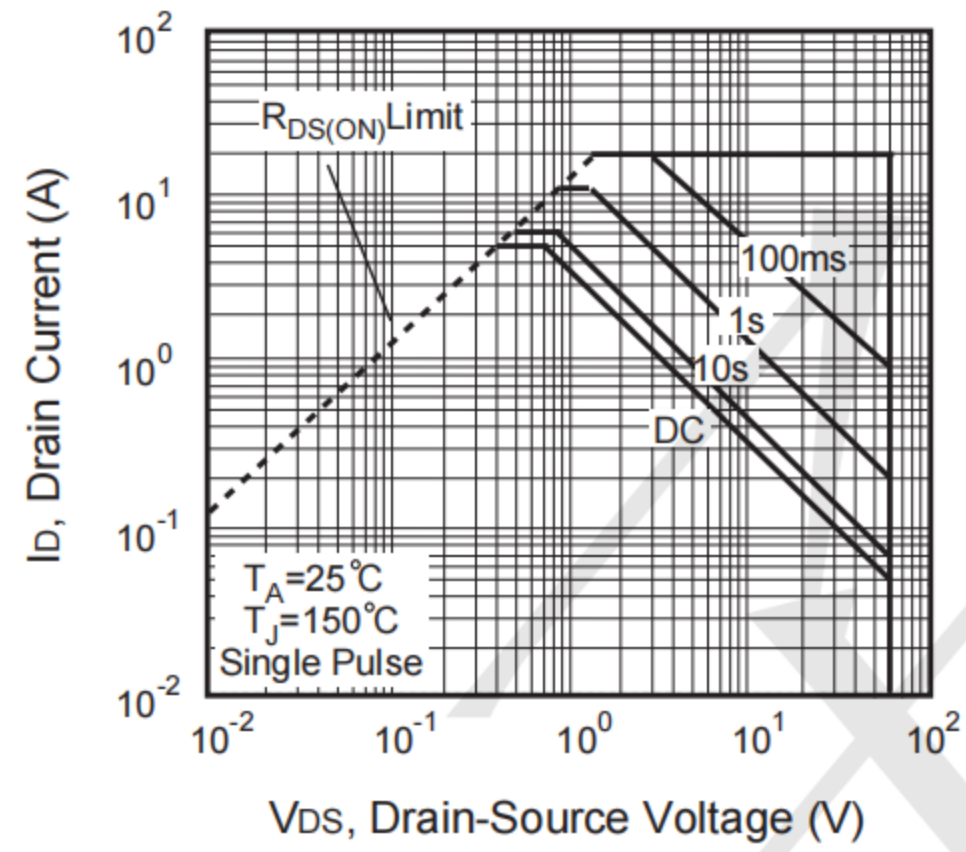


Figure 8. Maximum Safe Operating Area

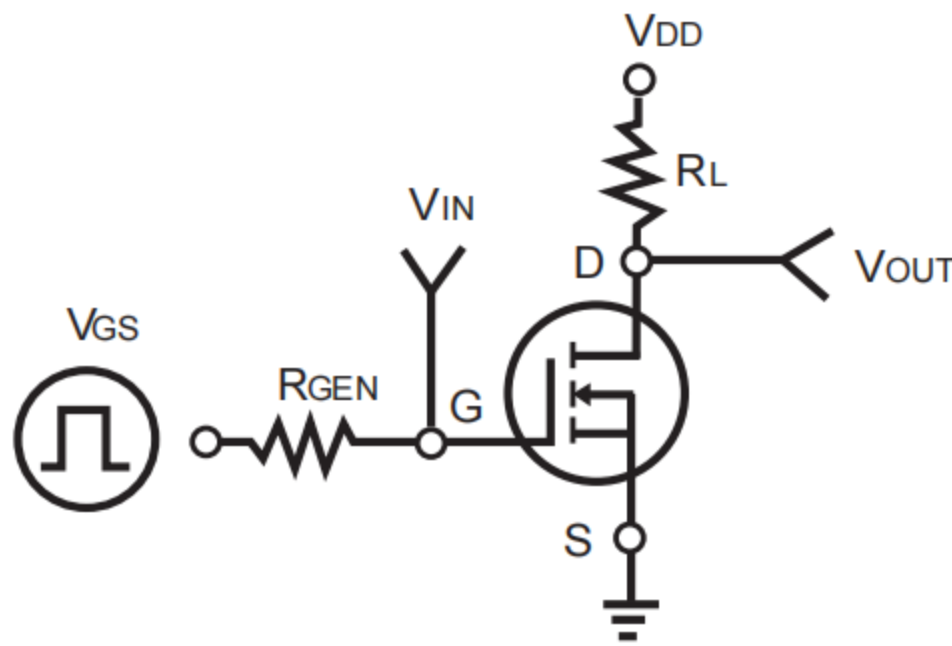


Figure 9. Switching Test Circuit

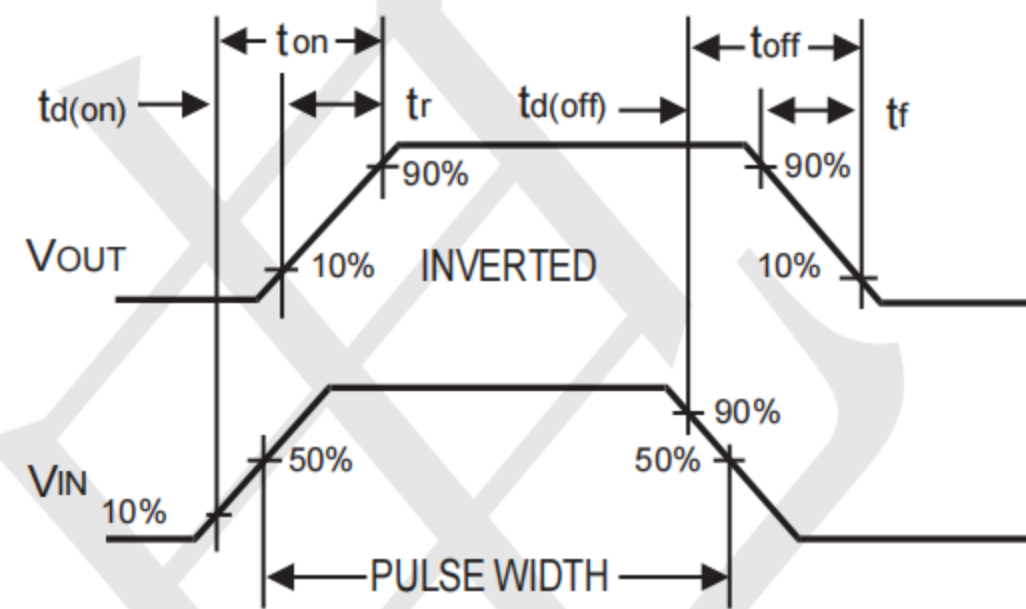


Figure 10. Switching Waveforms

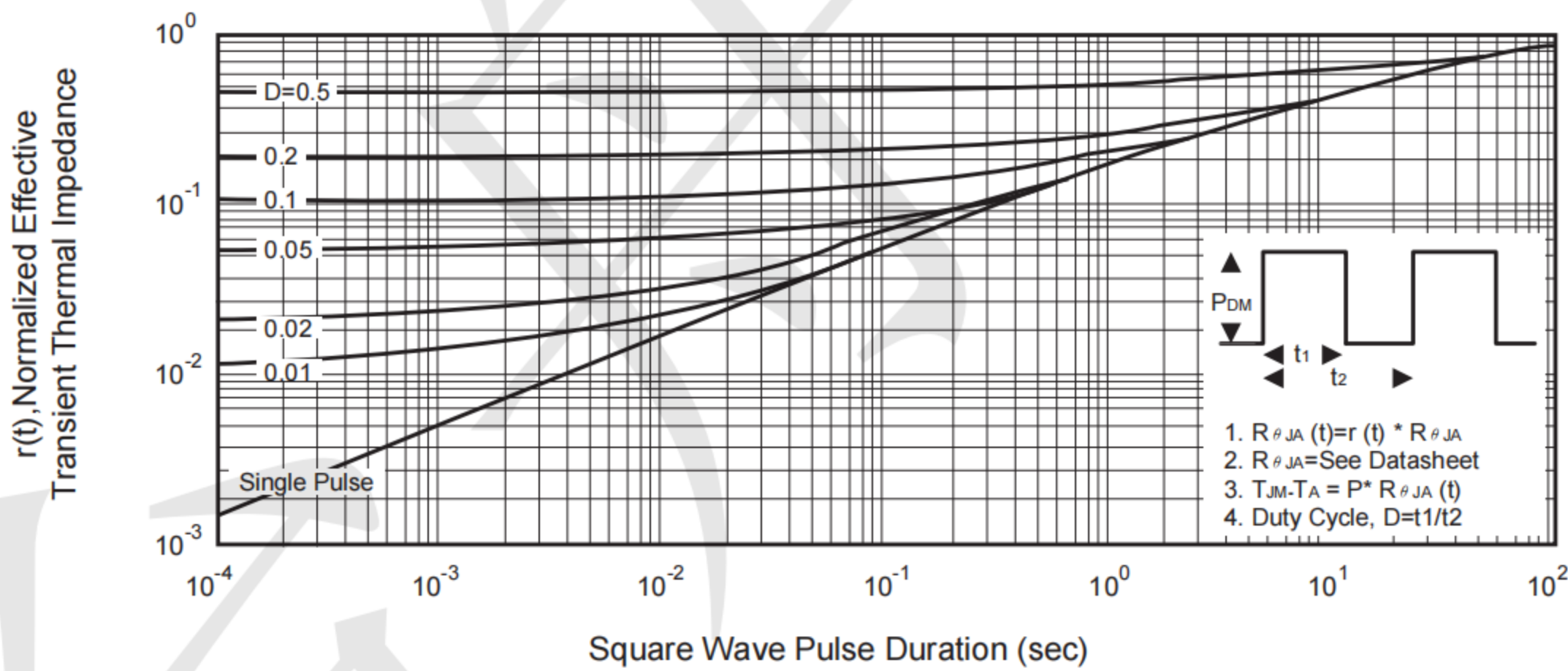
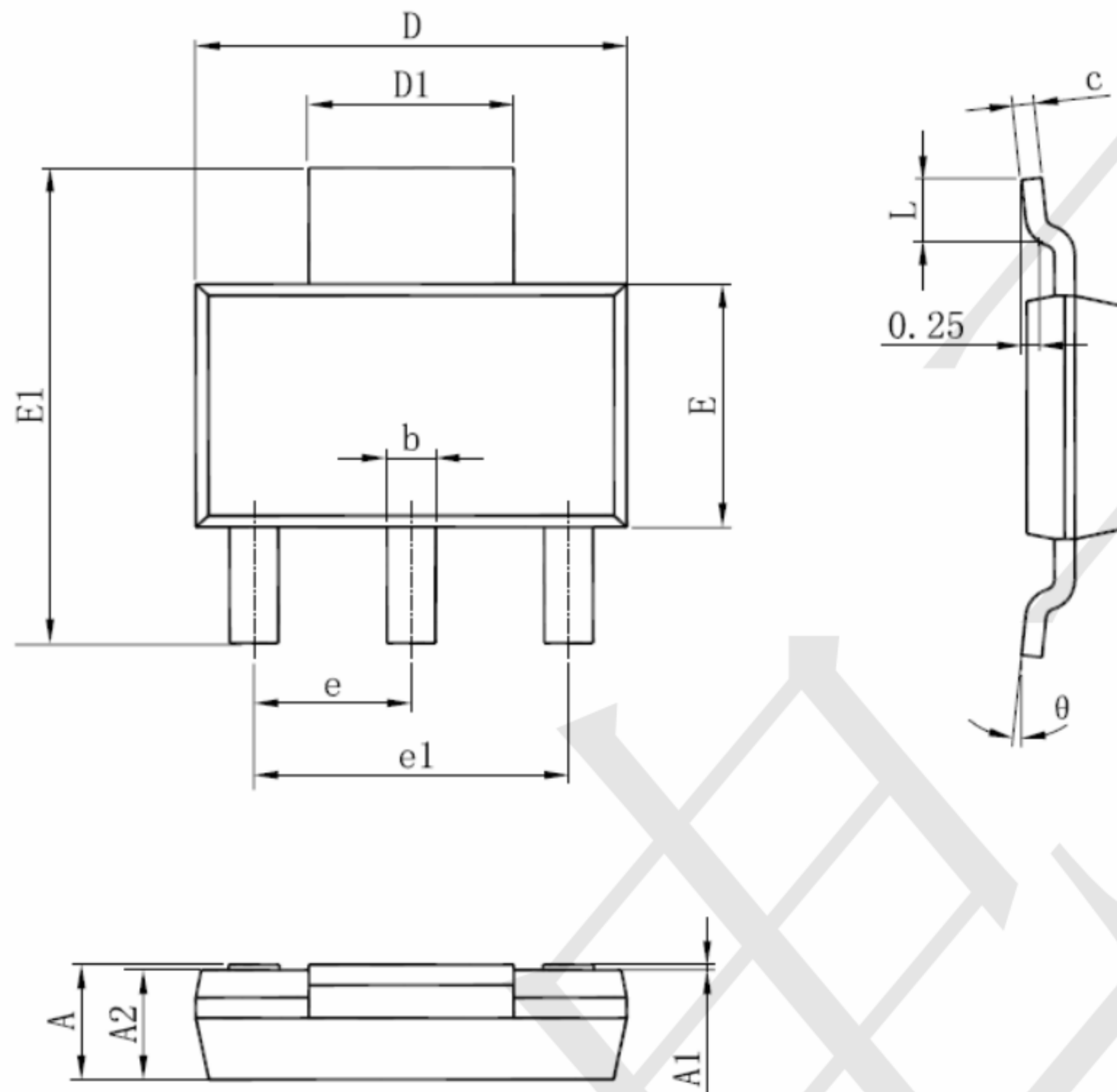


Figure 11. Normalized Thermal Transient Impedance Curve



**SOT-223 Package Information**



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.520	1.800	0.060	0.071
A1	0.000	0.100	0.000	0.004
A2	1.500	1.700	0.059	0.067
b	0.660	0.820	0.026	0.032
c	0.250	0.350	0.010	0.014
D	6.200	6.400	0.244	0.252
D1	2.900	3.100	0.114	0.122
E	3.300	3.700	0.130	0.146
E1	6.830	7.070	0.269	0.278
e	2.300(BSC)		0.091(BSC)	
e1	4.500	4.700	0.177	0.185
L	0.900	1.150	0.035	0.045
θ	0°	10°	0°	10°

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