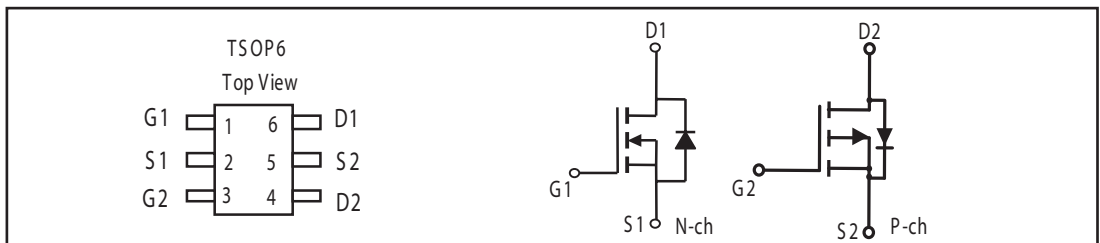




Dual Enhancement Mode Field Effect Transistor (N and P Channel)

PRODUCT SUMMARY (N-Channel)		
V _{DSS}	I _D	R _{DS(ON)} (mΩ) Max
20V	2.5A	80 @ V _{GS} = 4.5V
		110 @ V _{GS} = 2.5V

PRODUCT SUMMARY (P-Channel)		
V _{DSS}	I _D	R _{DS(ON)} (mΩ) Max
-20V	-2A	130 @ V _{GS} = -4.5V
		190 @ V _{GS} = -2.5V



ABSOLUTE MAXIMUM RATINGS (T_A=25°C unless otherwise noted)

Parameter	Symbol	N-Channel	P-Channel	Unit
Drain-Source Voltage	V _{DS}	20	-20	V
Gate-Source Voltage	V _{GS}	±10	±10	V
Drain Current-Continuous ^a @ T _C =25°C -Pulsed ^b	I _D	2.5	-2	A
	I _{DM}	8	-7	A
Drain-Source Diode Forward Current ^a	I _S	1.25	-1.25	A
Maximum Power Dissipation ^a	P _D	1.0		W
Operating Junction and Storage Temperature Range	T _J , T _{STG}	-55 to 150		°C

THERMAL CHARACTERISTICS

Thermal Resistance, Junction-to-Ambient ^a	R _{θJA}	125	°C/W
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N-Channel ELECTRICAL CHARACTERISTICS ($T_A = 25\text{ }^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ ^c	Max	Unit
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	20			V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=16V, V_{GS}=0V$			1	μA
Gate-Body Leakage	I_{GSS}	$V_{GS}=\pm 10V, V_{DS}=0V$			± 100	nA
ON CHARACTERISTICS^b						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	0.5	0.8	1.5	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=4.5V, I_D=2.5A$		65	80	m-ohm
		$V_{GS}=2.5V, I_D=2A$		90	110	m-ohm
On-State Drain Current	$I_{D(ON)}$	$V_{DS}=5V, V_{GS}=4.5V$	6			A
Forward Transconductance	g_{FS}	$V_{DS}=5V, I_D=2.5A$		7		S
DYNAMIC CHARACTERISTICS^c						
Input Capacitance	C_{ISS}	$V_{DS}=10V, V_{GS}=0V$ $f=1.0MHz$		223		pF
Output Capacitance	C_{OSS}			68		pF
Reverse Transfer Capacitance	C_{RSS}			53		pF
SWITCHING CHARACTERISTICS^c						
Turn-On Delay Time	$t_{D(ON)}$	$V_{DD}=10V,$ $I_D=1A,$ $V_{GS}=4.5V,$ $R_{GEN}=6\text{ ohm}$		10.5		ns
Rise Time	t_r			9.8		ns
Turn-Off Delay Time	$t_{D(OFF)}$			15.2		ns
Fall Time	t_f			11.8		ns
Total Gate Charge	Q_g	$V_{DS}=10V, I_D=2.5A,$ $V_{GS}=4.5V$		3.9		nC
Gate-Source Charge	Q_{GS}			1.3		nC
Gate-Drain Charge	Q_{GD}			0.8		nC

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P-Channel ELECTRICAL CHARACTERISTICS ($T_A=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ ^c	Max	Unit
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=-250\mu A$	-20			V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=-16V, V_{GS}=0V$			1	μA
Gate-Body Leakage	I_{GSS}	$V_{GS}=\pm 10V, V_{DS}=0V$			± 100	nA
ON CHARACTERISTICS^b						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	-0.5	-0.8	-1.5	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=-4.5V, I_D=-2.0A$		115	130	m-ohm
		$V_{GS}=-2.5V, I_D=-1.0A$		175	190	m-ohm
On-State Drain Current	$I_{D(ON)}$	$V_{DS}=-5V, V_{GS}=-4.5V$	-5			A
Forward Transconductance	g_{FS}	$V_{DS}=-5V, I_D=-2.0A$		6		S
DYNAMIC CHARACTERISTICS^c						
Input Capacitance	C_{ISS}	$V_{DS}=-20V, V_{GS}=0V$ $f=1.0MHz$		293		pF
Output Capacitance	C_{OSS}			65		pF
Reverse Transfer Capacitance	C_{RSS}			50		pF
SWITCHING CHARACTERISTICS^c						
Turn-On Delay Time	$t_{D(ON)}$	$V_{DD}=-10V,$ $I_D=-1A,$ $V_{GS}=-4.5V,$ $R_{GEN}=6\text{ ohm}$		12.6		ns
Rise Time	t_r			13.7		ns
Turn-Off Delay Time	$t_{D(OFF)}$			81.5		ns
Fall Time	t_f			42.1		ns
Total Gate Charge	Q_g	$V_{DS}=-10V, I_D=-2A,$ $V_{GS}=-4.5V$		3.4		nC
Gate-Source Charge	Q_{GS}			0.8		nC
Gate-Drain Charge	Q_{GD}			1		nC

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ELECTRICAL CHARACTERISTICS ($T_A=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ ^c	Max	Unit	
DRAIN-SOURCE DIODE CHARACTERISTICS^b							
Diode Forward Voltage	V_{SD}	$V_{GS} = 0\text{V}, I_S = 1.25\text{A}$	N-Ch		0.84	1.2	V
		$V_{GS} = 0\text{V}, I_S = -1.25\text{A}$	P-Ch		-0.85	-1.2	

Notes

- a. Surface Mounted on FR4 Board, $t \leq 10\text{sec}$.
 - b. Pulse Test: Pulse Width $\leq 300 \mu\text{s}$, Duty Cycle $\leq 2\%$.
 - c. Guaranteed by design, not subject to production testing.
- N-Channel

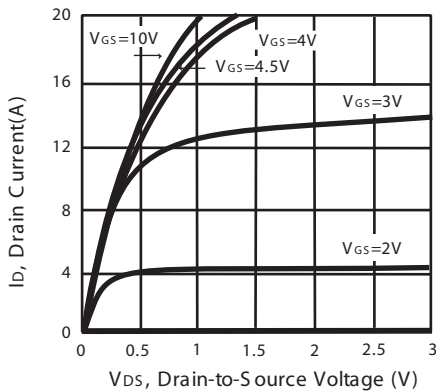


Figure 1. Output Characteristics

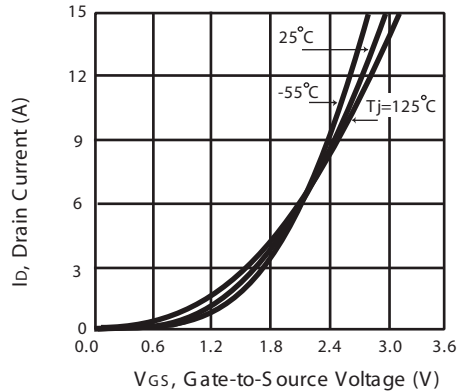


Figure 2. Transfer Characteristics

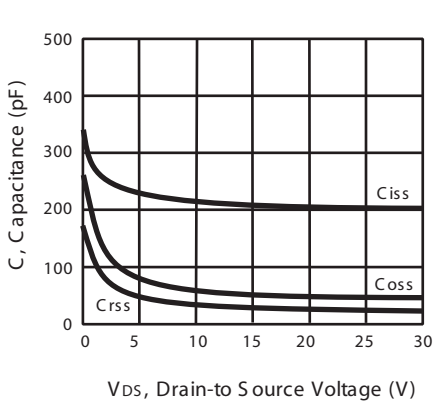


Figure 3. Capacitance

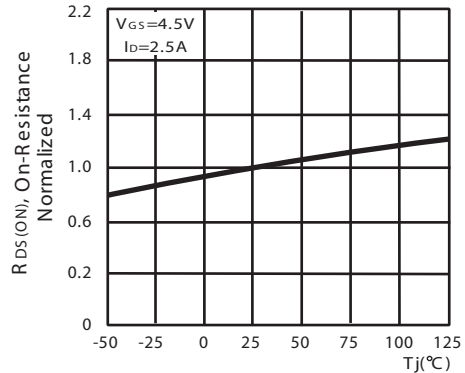
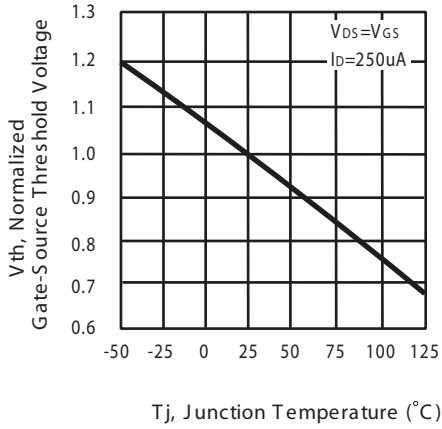


Figure 4. On-Resistance Variation with Temperature

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N-Channel



with Temperature

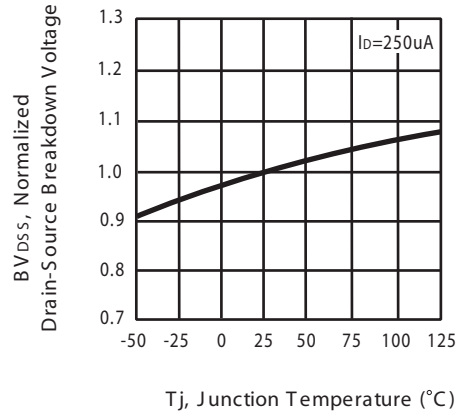


Figure 6. Breakdown Voltage Variation with Temperature

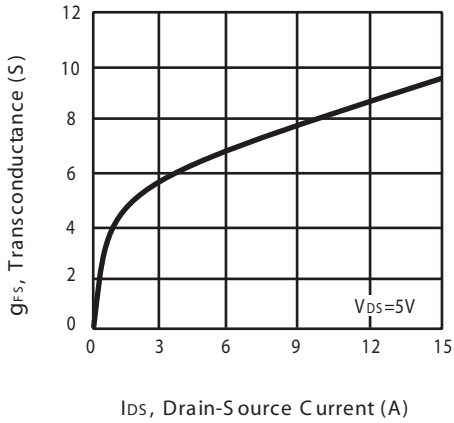


Figure 7. Transconductance Variation with Drain Current

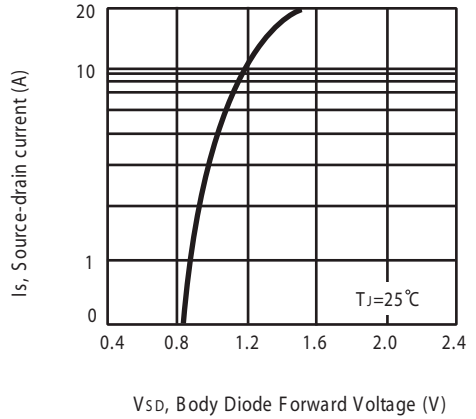


Figure 8. Body Diode Forward Voltage Variation with Source Current

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P-Channel

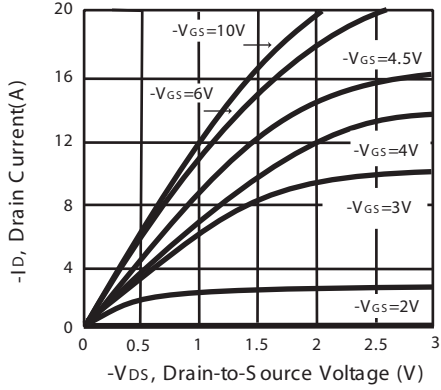


Figure 1. Output Characteristics

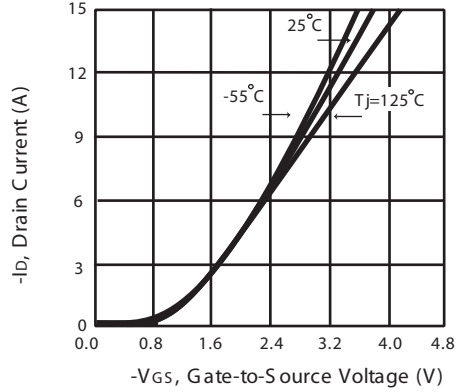


Figure 2. Transfer Characteristics

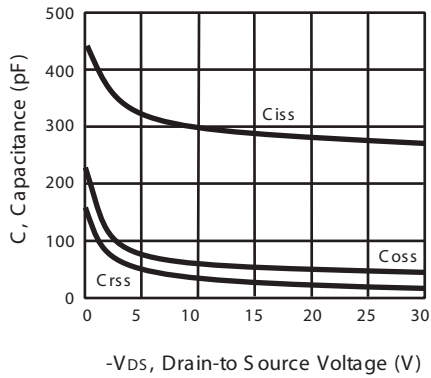


Figure 3. Capacitance

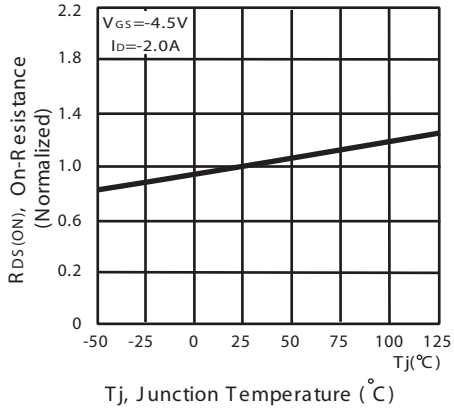
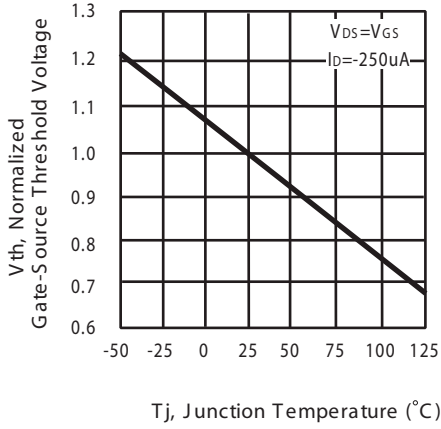


Figure 4. On-Resistance Variation with Temperature

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P-Channel



with Temperature

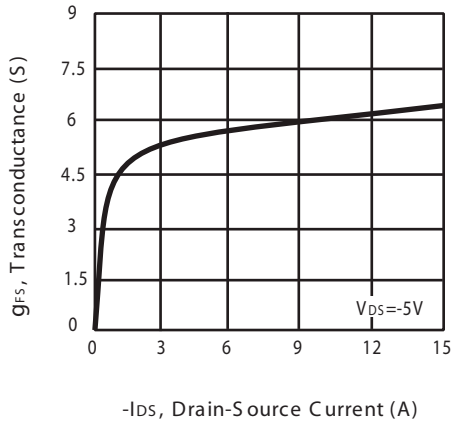


Figure 7. Transconductance Variation with Drain Current

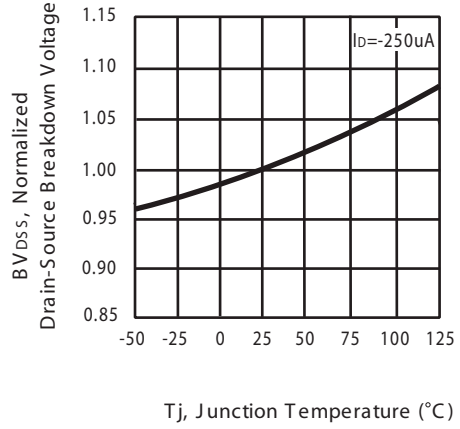


Figure 6. Breakdown Voltage Variation with Temperature

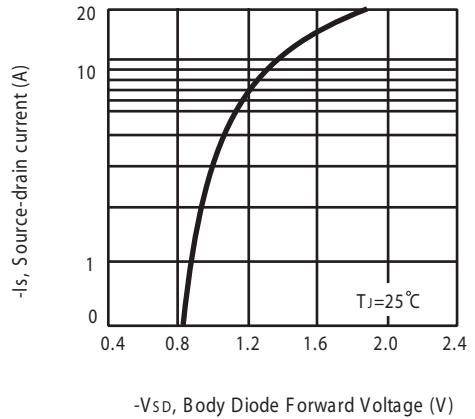


Figure 8. Body Diode Forward Voltage Variation with Source Current

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N-Channel

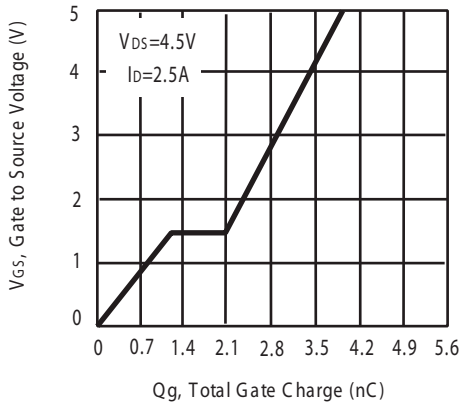


Figure 9. Gate Charge

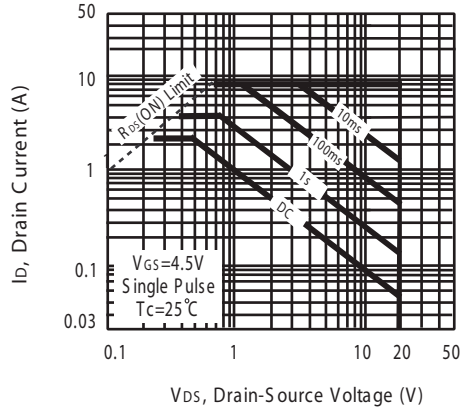


Figure 10. Maximum Safe Operating Area

P-Channel

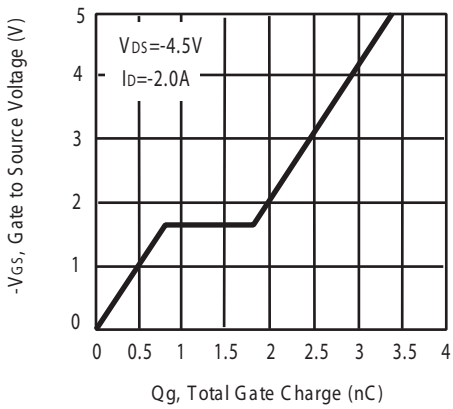


Figure 9. Gate Charge

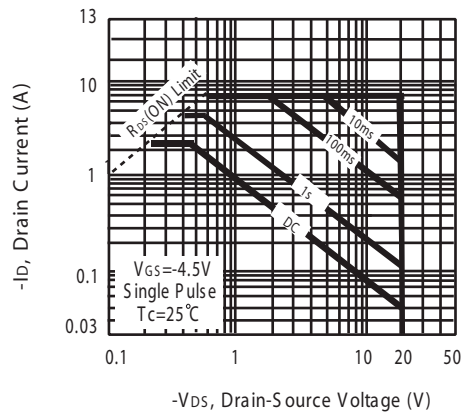


Figure 10. Maximum Safe Operating Area

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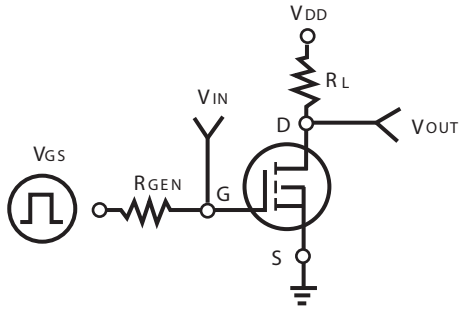


Figure 11. Switching Test Circuit

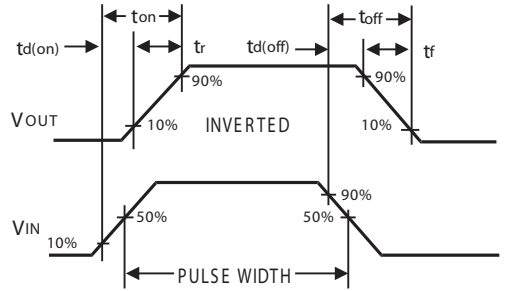
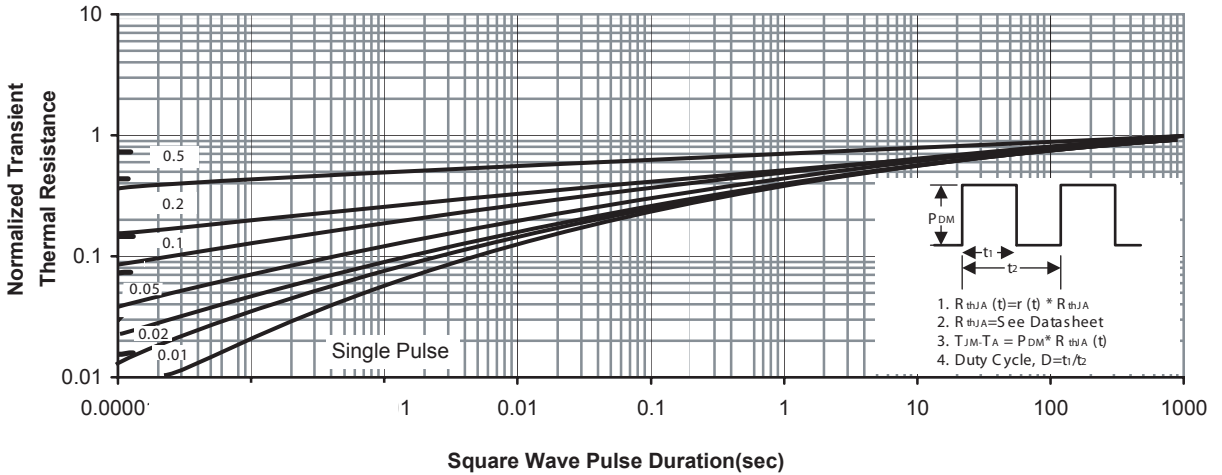
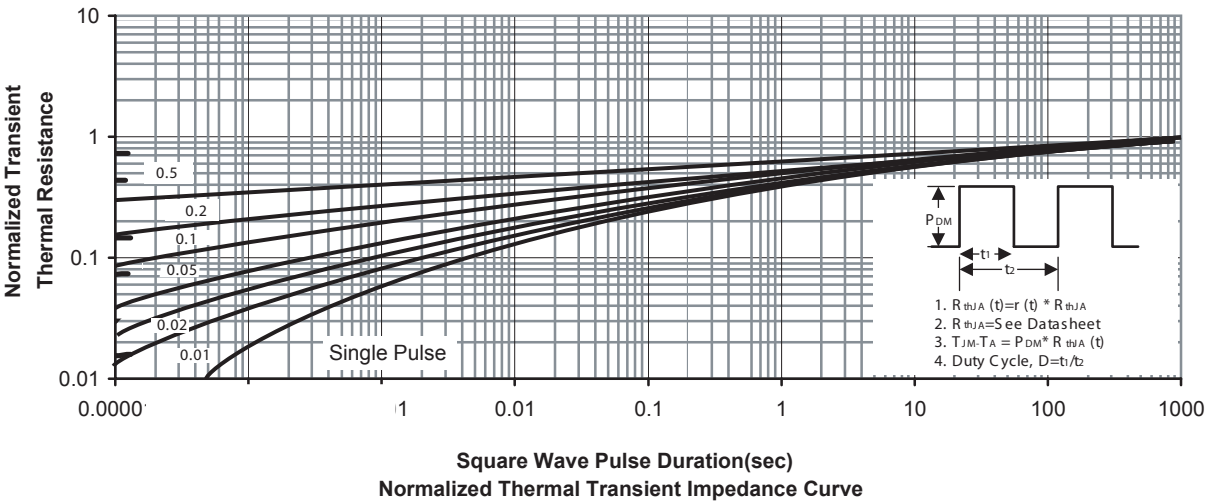


Figure 12. Switching Waveforms

N-Channel



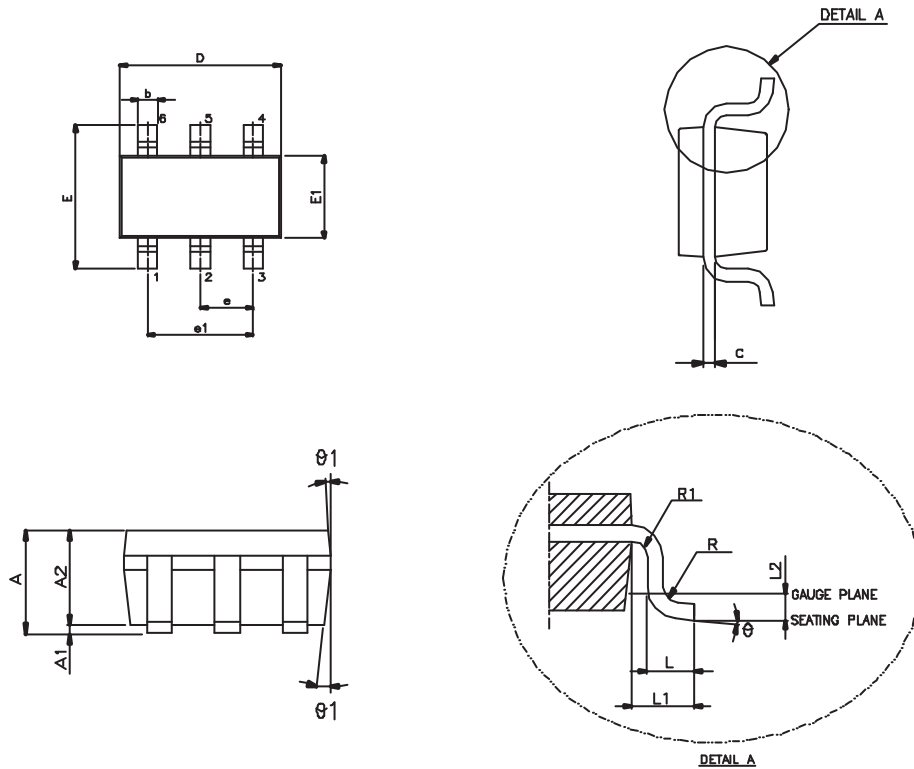
P-Channel



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PACKAGE OUTLINE DIMENSIONS

TSOP6



SYMBOL	MIN.	NOM.	MAX.
A	—	—	1.45
A1	—	—	0.15
A2	0.90	1.15	1.30
b	0.30	—	0.50
c	0.08	—	0.22
D	2.90 BSC.		
E	2.80 BSC.		
E1	1.60 BSC.		
e	0.95 BSC.		
e1	1.90 BSC.		
L	0.30	0.45	0.60
L1	0.60 REF.		
L2	0.25 BSC.		
R	0.10	—	—
R1	0.10	—	0.25
θ	0°	4°	8°
$\theta 1$	5°	10°	15°

