

## Features

- N-Channel  
30V/30A,  
 $R_{DS(ON)} = 10m\Omega$  (Typ.) @  $V_{GS}=10V$   
 $R_{DS(ON)} = 13m\Omega$  (Typ.) @  $V_{GS}=4.5V$
- P-Channel  
-30V/-20A,  
 $R_{DS(ON)} = 23m\Omega$  (Typ.) @  $V_{GS}=-10V$   
 $R_{DS(ON)} = 35m\Omega$  (Typ.) @  $V_{GS}=-4.5V$
- Very low on-resistance
- Fast Switching

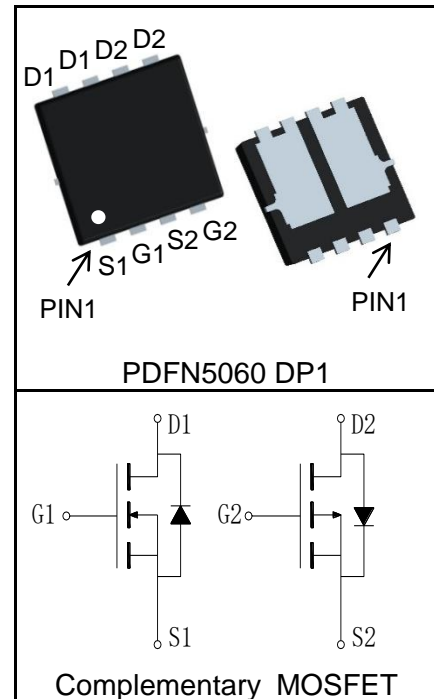
## Applications

- Motor Drive Applications



Halogen-Free

## Pin Description



## Absolute Maximum Ratings

Symbol	Parameter		N-Channel	P-Channel	Unit
<b>Common Ratings</b> ( $T_A=25^\circ\text{C}$ Unless Otherwise Noted)					
$V_{DSS}$	Drain-Source Voltage		30	-30	V
$V_{GSS}$	Gate-Source Voltage		$\pm 20$	$\pm 20$	
$T_J$	Maximum Junction Temperature		150	150	$^\circ\text{C}$
$T_{STG}$	Storage Temperature Range		-55 to 150	-55 to 150	$^\circ\text{C}$
$I_S$	Diode Continuous Forward Current	$T_C=25^\circ\text{C}$	30	-20	A
<b>Mounted on Large Heat Sink</b>					
$I_{DP}^{①}$	300 $\mu\text{s}$ Pulse Drain Current Tested	$T_C=25^\circ\text{C}$	120	-80	A
$I_D^{②}$	Continuous Drain Current @ $T_C$ ( $V_{GS}=\pm 10V$ )	$T_C=25^\circ\text{C}$	30	-20	A
		$T_C=100^\circ\text{C}$	19	-13	
	Continuous Drain Current @ $T_A$ ( $V_{GS}=\pm 10V$ ) <sup>③</sup>	$T_A=25^\circ\text{C}$	10	-7	
		$T_A=70^\circ\text{C}$	8	-5	
$P_D$	Maximum Power Dissipation @ $T_C$	$T_C=25^\circ\text{C}$	21	21	W
		$T_C=100^\circ\text{C}$	8	8	
	Maximum Power Dissipation @ $T_A$ <sup>③</sup>	$T_A=25^\circ\text{C}$	3.1	3.1	
		$T_A=70^\circ\text{C}$	2	2	
$R_{\theta JC}$	Thermal Resistance-Junction to Case		6	6	$^\circ\text{C/W}$
$R_{\theta JA}^{③}$	Thermal Resistance-Junction to Ambient		40	40	$^\circ\text{C/W}$
<b>Drain-Source Avalanche Ratings</b>					
$E_{AS}^{④}$	Avalanche Energy, Single Pulsed		20	20	mJ

**Electrical Characteristics** ( $T_A=25^\circ\text{C}$  Unless Otherwise Noted)

Symbol	Parameter	Test Condition	KS3624NA			Unit	
			Min.	Typ.	Max.		
<b>Static Characteristics</b>							
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_{DS}=250\mu A$	N	30		V	
		$V_{GS}=0V, I_{DS}=-250\mu A$	P	-30			
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS}=30V, V_{GS}=0V$	N		1	$\mu A$	
		$T_J=125^\circ\text{C}$			30		
		$V_{DS}=-30V, V_{GS}=0V$	P		-1		
		$T_J=125^\circ\text{C}$			-30		
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_{DS}=250\mu A$	N	1.2	1.6	2.3	V
		$V_{DS}=V_{GS}, I_{DS}=-250\mu A$	P	-1.2	-1.6	-2.3	
$I_{GSS}$	Gate Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	N			$\pm 100$	nA
		$V_{GS}=\pm 20V, V_{DS}=0V$	P			$\pm 100$	
$R_{DS(ON)}^{(5)}$	Drain-Source On-state Resistance	$V_{GS}=10V, I_{DS}=15A$	N		10	13	m $\Omega$
		$V_{GS}=-10V, I_{DS}=-15A$	P		23	35	
		$V_{GS}=4.5V, I_{DS}=10A$	N		13	18	
		$V_{GS}=-4.5V, I_{DS}=-10A$	P		35	55	
<b>Diode Characteristics</b>							
$V_{SD}^{(5)}$	Diode Forward Voltage	$I_{SD}=15A, V_{GS}=0V$	N		0.87	1.2	V
		$I_{SD}=-15A, V_{GS}=0V$	P		-0.95	-1.2	
$t_{rr}$	Reverse Recovery Time	N-Channel $I_{SD}=15A, di_{SD}/dt=100A/\mu s$	N		21		ns
			P		28		
$Q_{rr}$	Reverse Recovery Charge	P-Channel $I_{SD}=-15A, di_{SD}/dt=100A/\mu s$	N		38		nC
			P		43		
<b>Dynamic Characteristics<sup>(6)</sup></b>							
$R_G$	Gate Resistance	$V_{GS}=0V, V_{DS}=0V, F=1\text{MHz}$	N		0.9		$\Omega$
			P		4.2		
$C_{iss}$	Input Capacitance	N-Channel $V_{GS}=0V, V_{DS}=15V,$ Frequency=1.0MHz	N		1100		$\mu F$
			P		2025		
$C_{oss}$	Output Capacitance		N		255		
			P		290		
$C_{rss}$	Reverse Transfer Capacitance	P-Channel $V_{GS}=0V, V_{DS}=-15V,$ Frequency=1.0MHz	N		85		
			P		120		

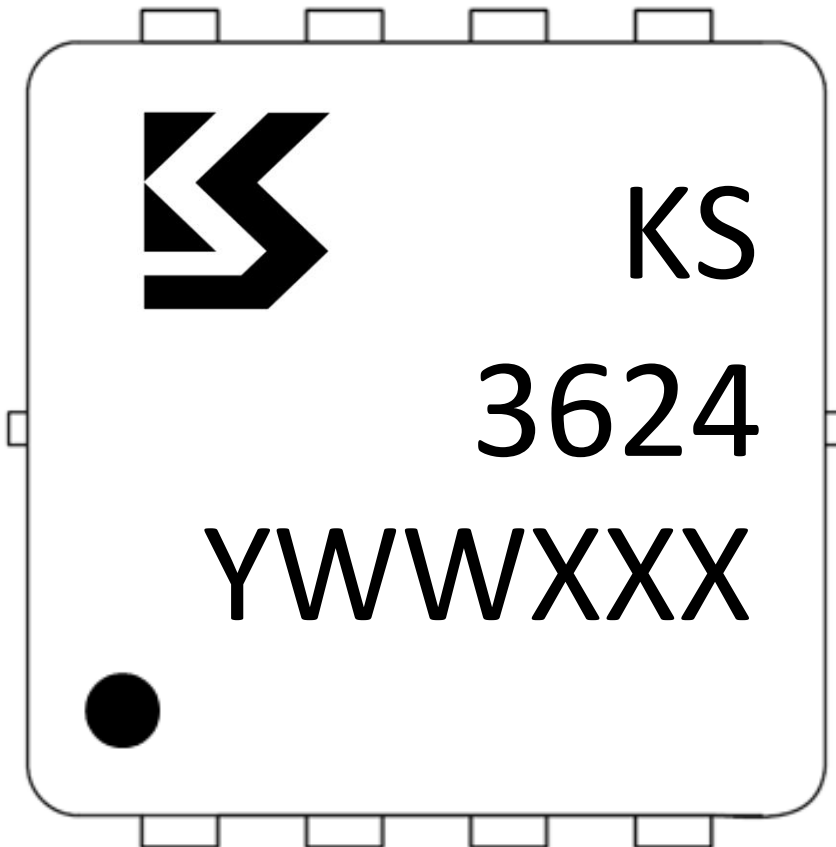
**Electrical Characteristics** ( $T_A=25^\circ\text{C}$  Unless Otherwise Noted)

Symbol	Parameter	Test Condition	KS3624NA			Unit	
			Min.	Typ.	Max.		
<b>Dynamic Characteristics</b> <sup>⑥</sup>							
$t_{d(ON)}$	Turn-on Delay Time	N-Channel $V_{DD}=15\text{V}$ , $I_{DS}=15\text{A}$ , $V_{GEN}=10\text{V}$ , $R_G=3\Omega$  P-Channel $V_{DD}=-15\text{V}$ , $I_{DS}=-15\text{A}$ , $V_{GEN}=-10\text{V}$ , $R_G=3\Omega$	N		11		ns
			P		19		
$t_r$	Turn-on Rise Time		N		15		
			P		32		
$t_{d(OFF)}$	Turn-off Delay Time		N		33		
			P		48		
$t_f$	Turn-off Fall Time		N		9		
			P		16		
<b>Gate Charge Characteristics</b> <sup>⑥</sup>							
$Q_g$	Total Gate Charge	N-Channel $V_{DS}=15\text{V}$ , $V_{GS}=10\text{V}$ , $I_{DS}=15\text{A}$  P-Channel $V_{DS}=-15\text{V}$ , $V_{GS}=-10\text{V}$ , $I_{DS}=-15\text{A}$	N		25		nC
			P		48		
$Q_{gs}$	Gate-Source Charge		N		4		
			P		11		
$Q_{gd}$	Gate-Drain Charge		N		9		
			P		18		

- Notes:
- ① Pulse width limited by safe operating area.
  - ② Calculated continuous current based on maximum allowable junction temperature.
  - ③ When mounted on 1 inch square copper board,  $t \leq 10\text{sec}$ . The value in any given application depends on the user's specific board design.
  - ④ Limited by  $T_{Jmax}$ . Starting  $T_J = 25^\circ\text{C}$ , N Channel:  $L = 0.5\text{mH}$ ,  $R_G = 25\Omega$ ,  $I_{AS} = 9\text{A}$ ,  $V_{GS} = 10\text{V}$ , P-Channel:  $L = 0.5\text{mH}$ ,  $R_G = 25\Omega$ ,  $I_{AS} = -9\text{A}$ ,  $V_{GS} = -10\text{V}$ , Part not recommended for use above this value.
  - ⑤ Pulse test; Pulse width  $\leq 300\mu\text{s}$ , duty cycle  $\leq 2\%$ .
  - ⑥ Guaranteed by design, not subject to production testing.

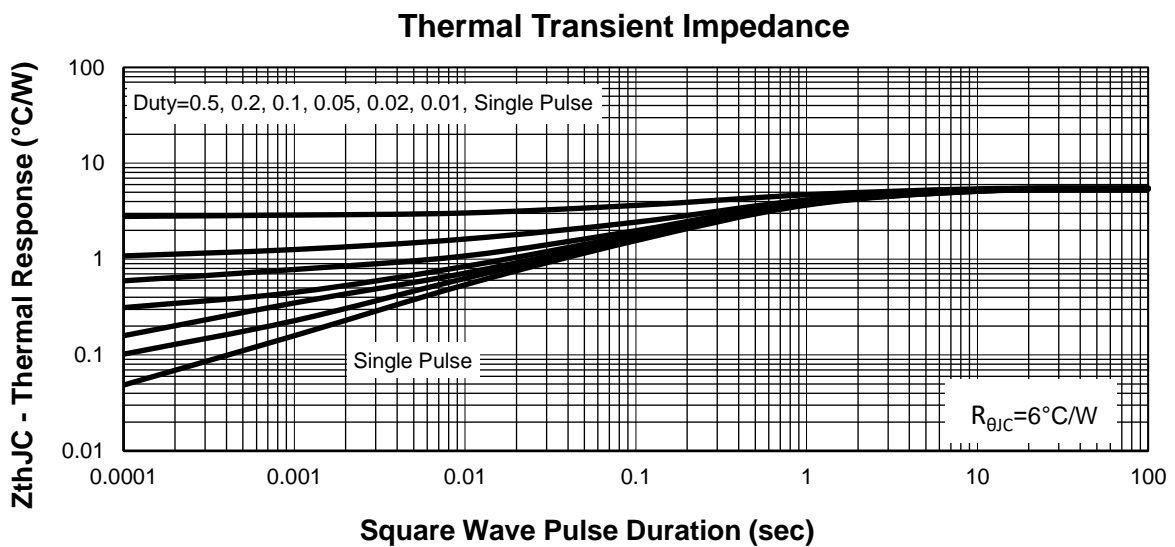
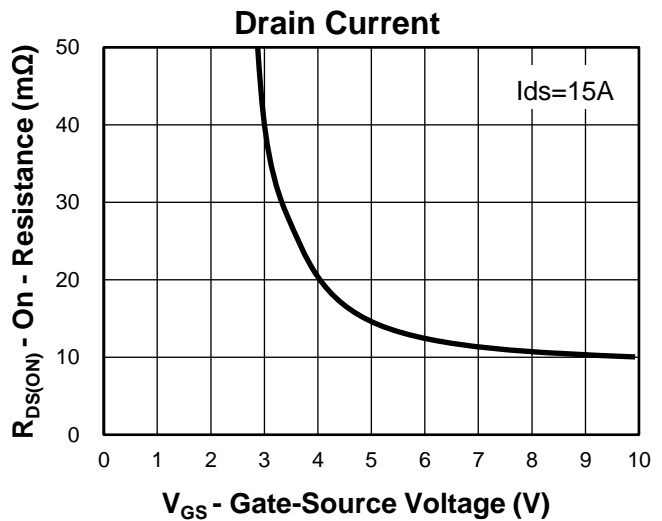
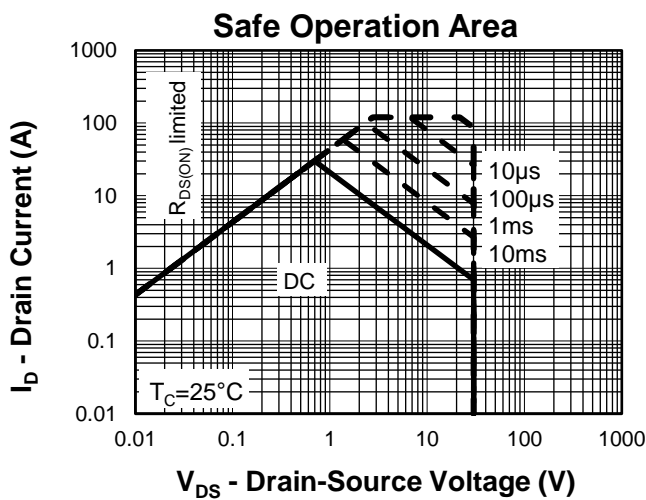
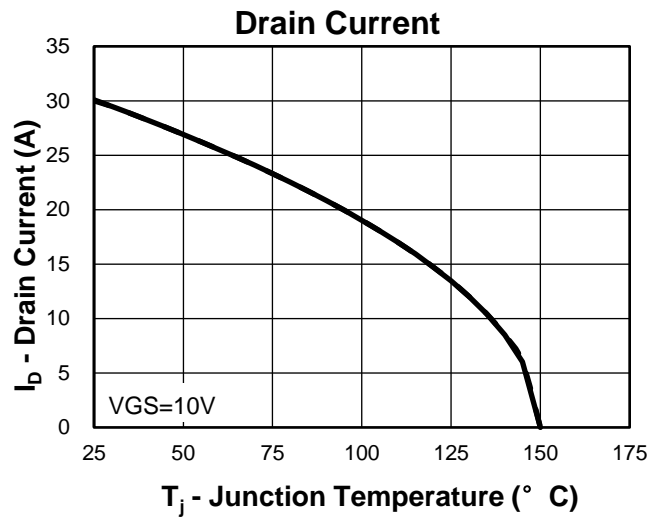
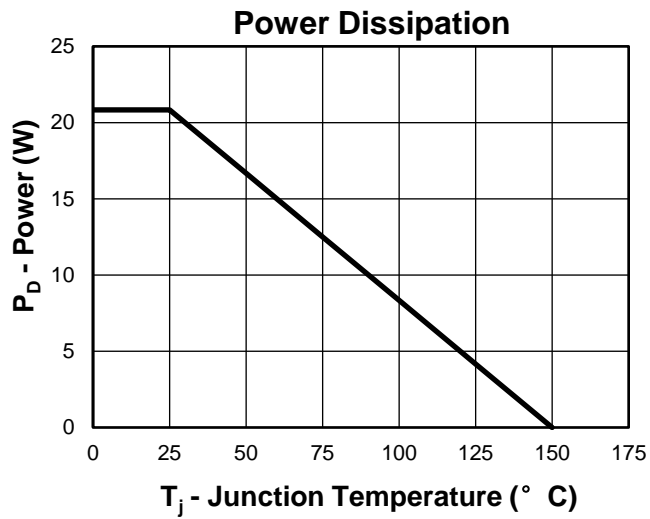
**Ordering and Marking Information**

Device	Package	Packaging	Quantity	Reel Size	Tape width
KS3624NA	PDFN5060 DP1	Tape&Reel	5000	13"	12mm

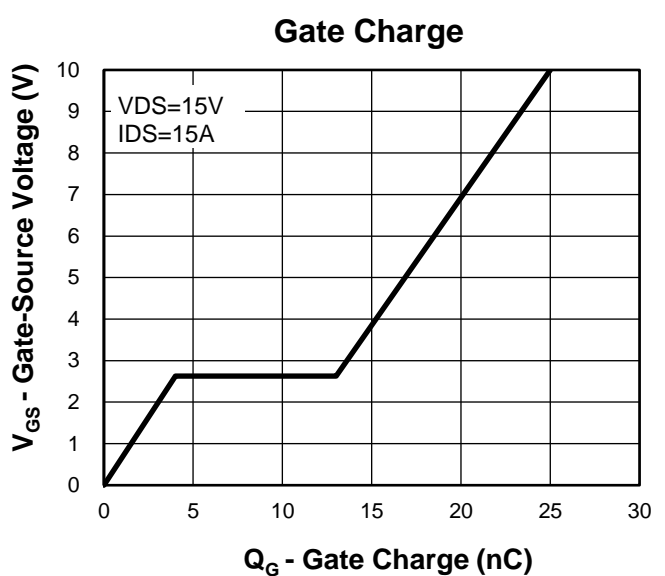
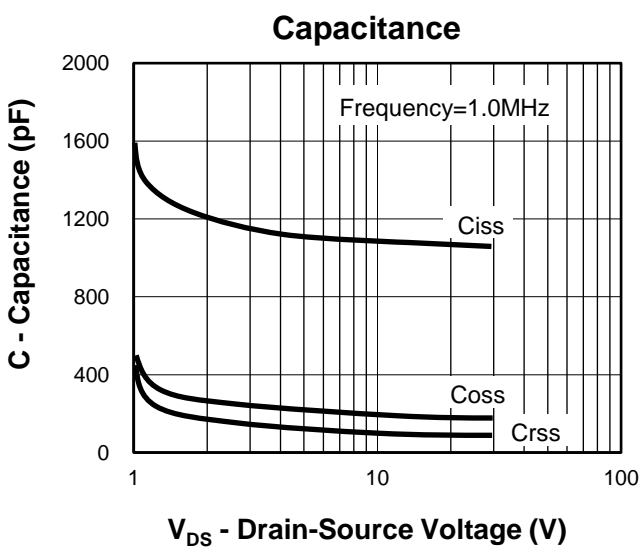
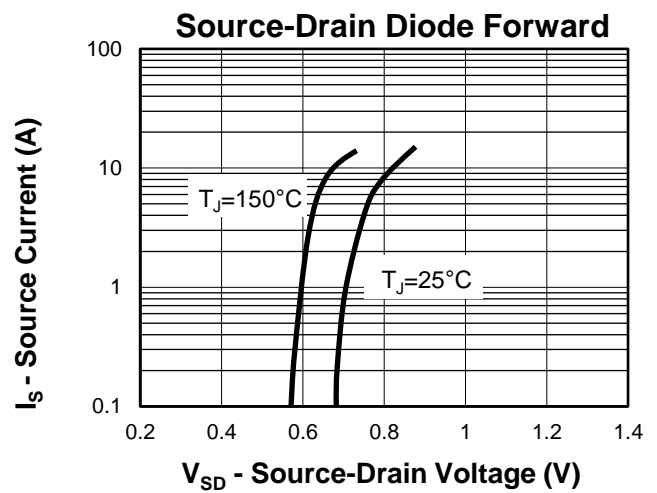
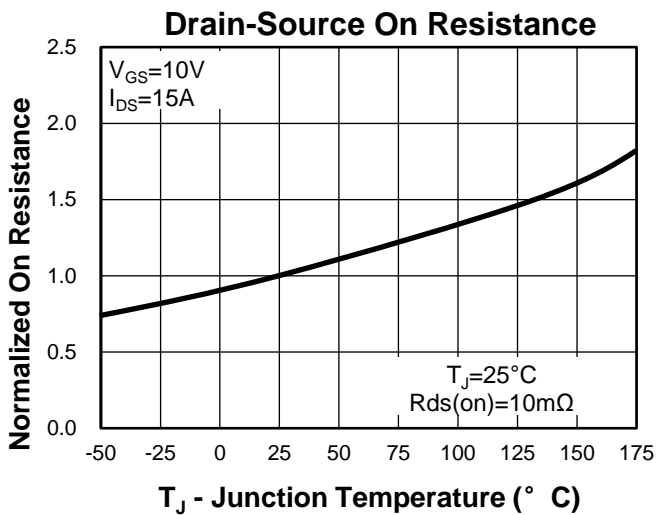
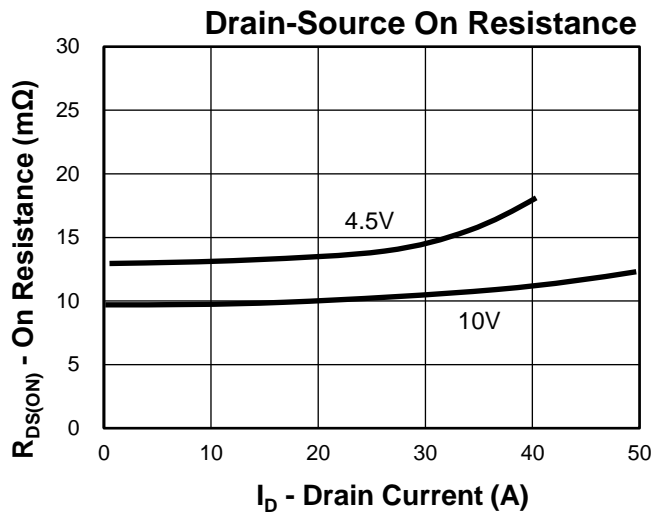
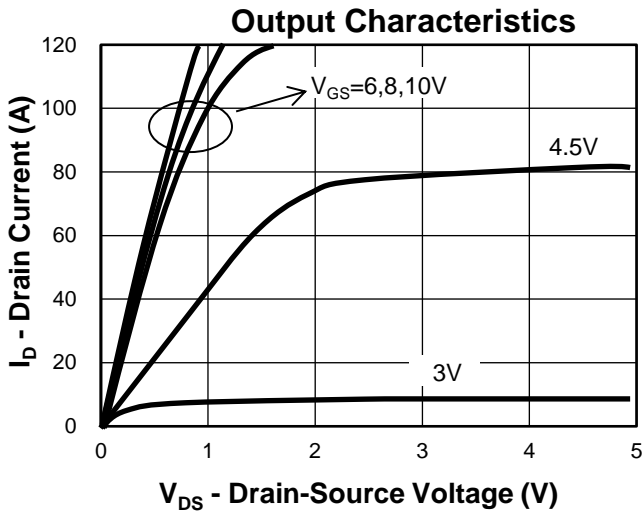


Y =Year,2017-A,2018-B,etc.  
WW =Week.  
XXX =Lot number.

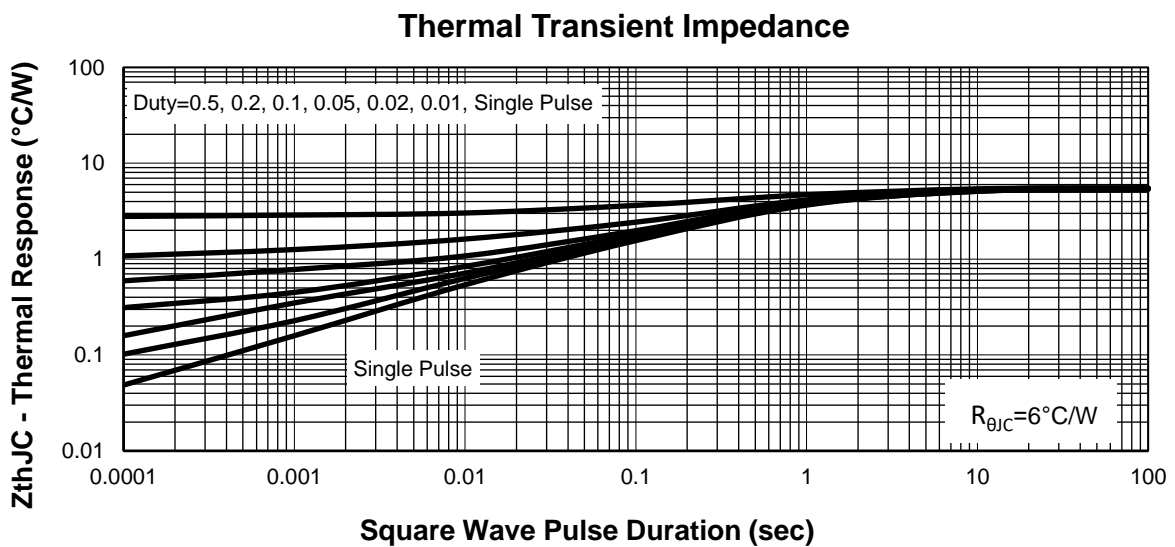
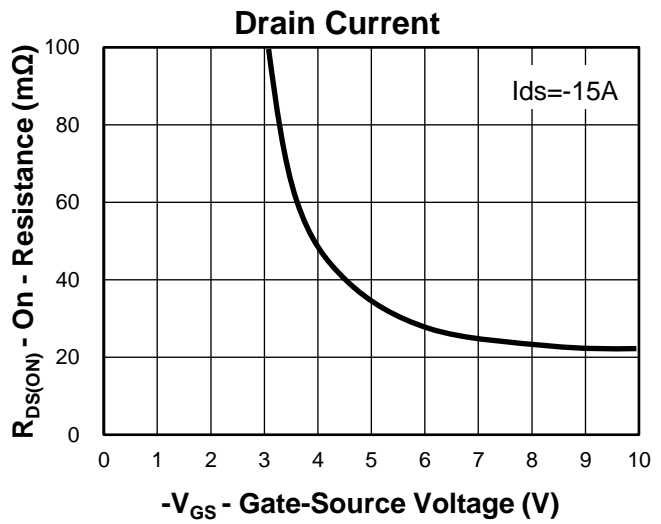
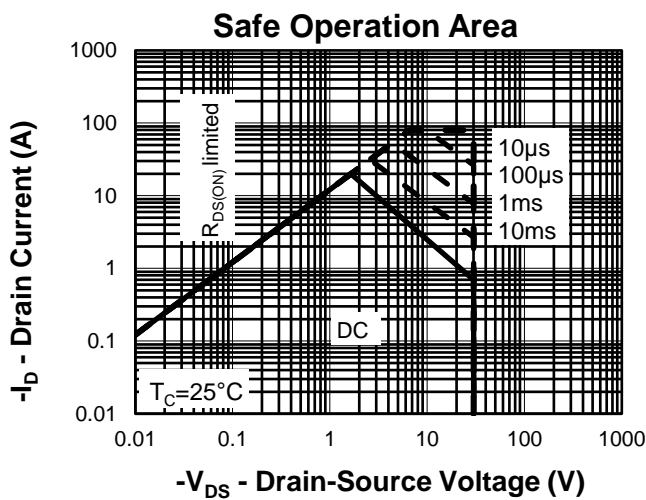
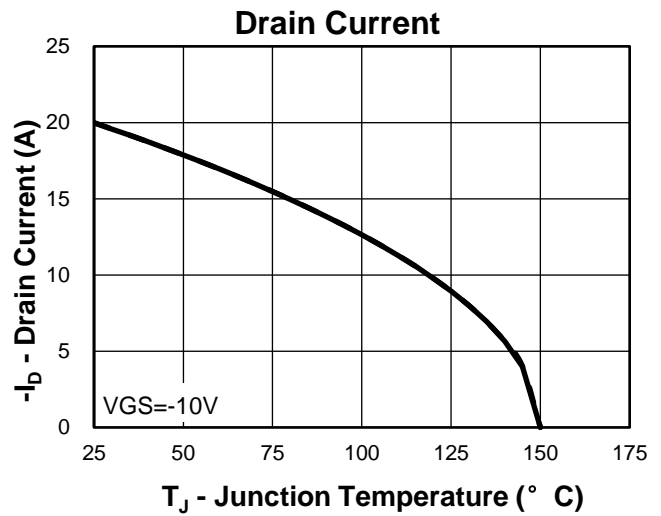
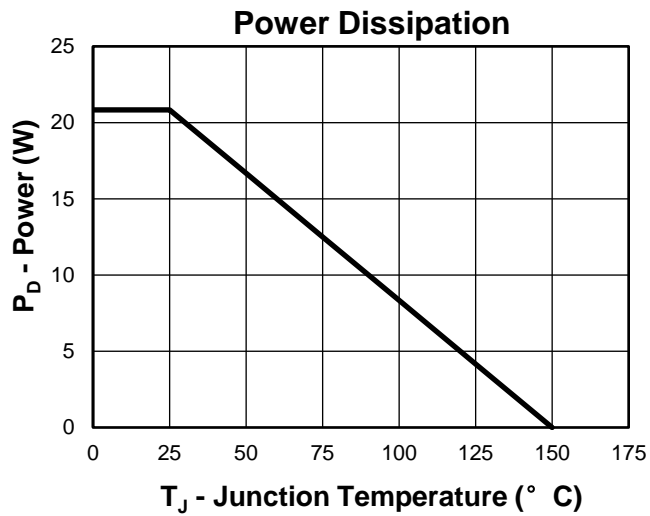
### Typical Characteristics(N-Channel)



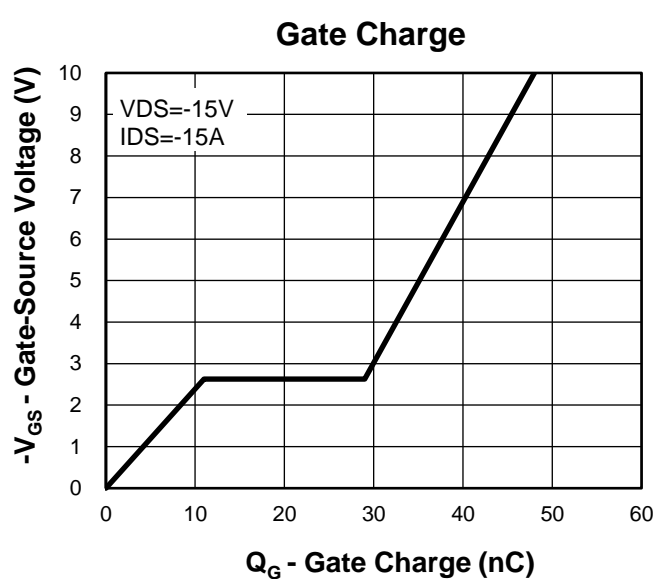
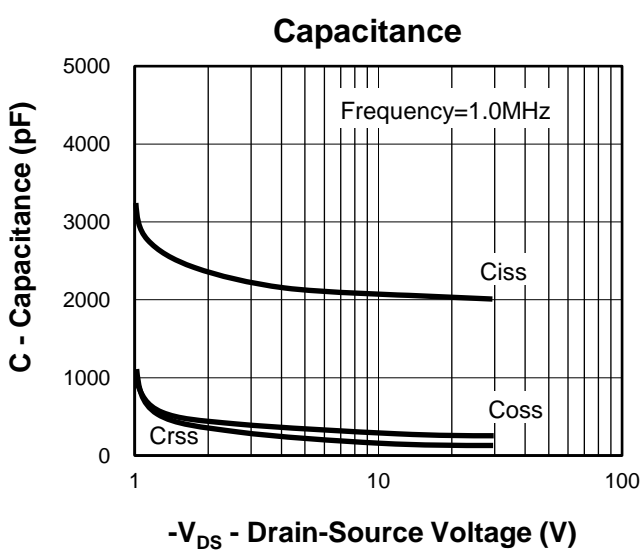
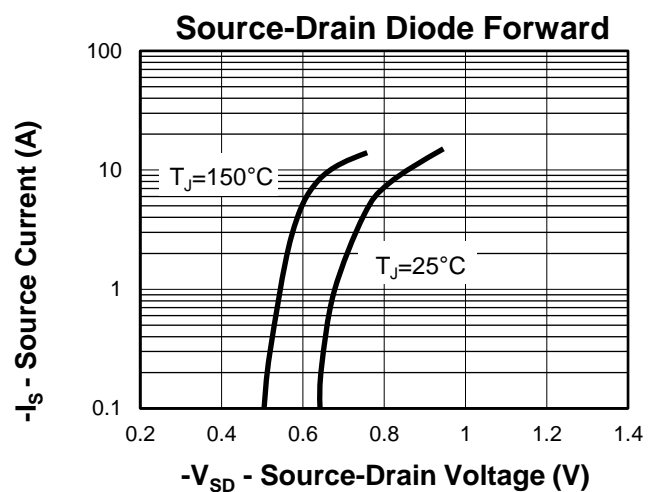
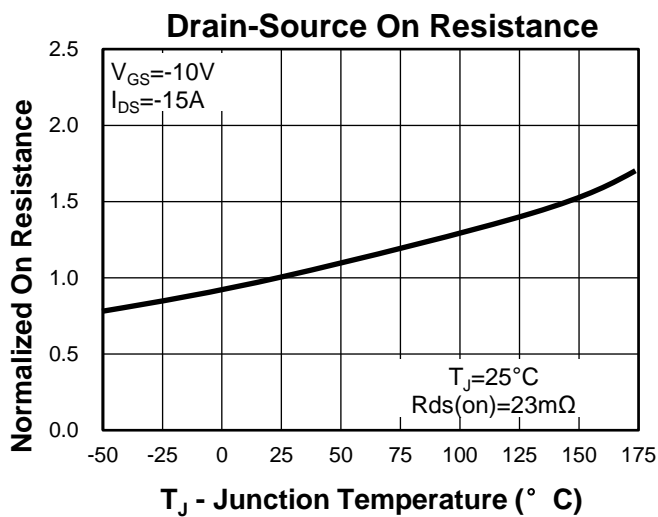
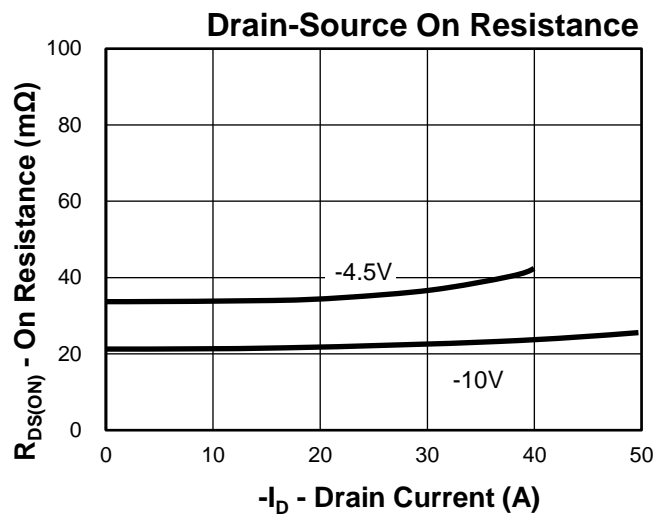
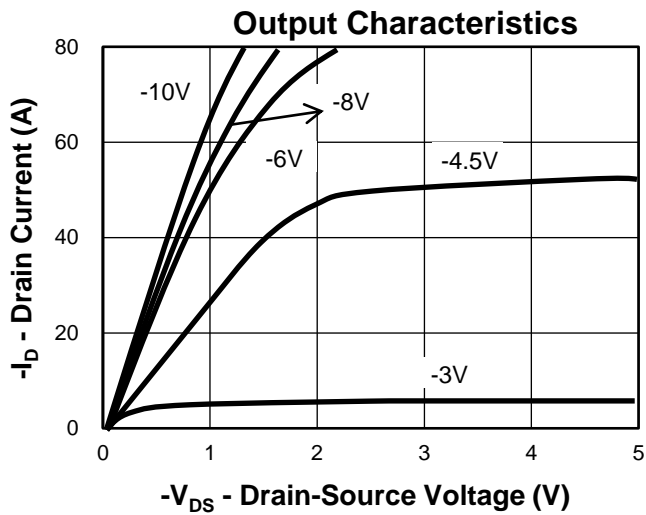
Typical Characteristics(N-Channel)



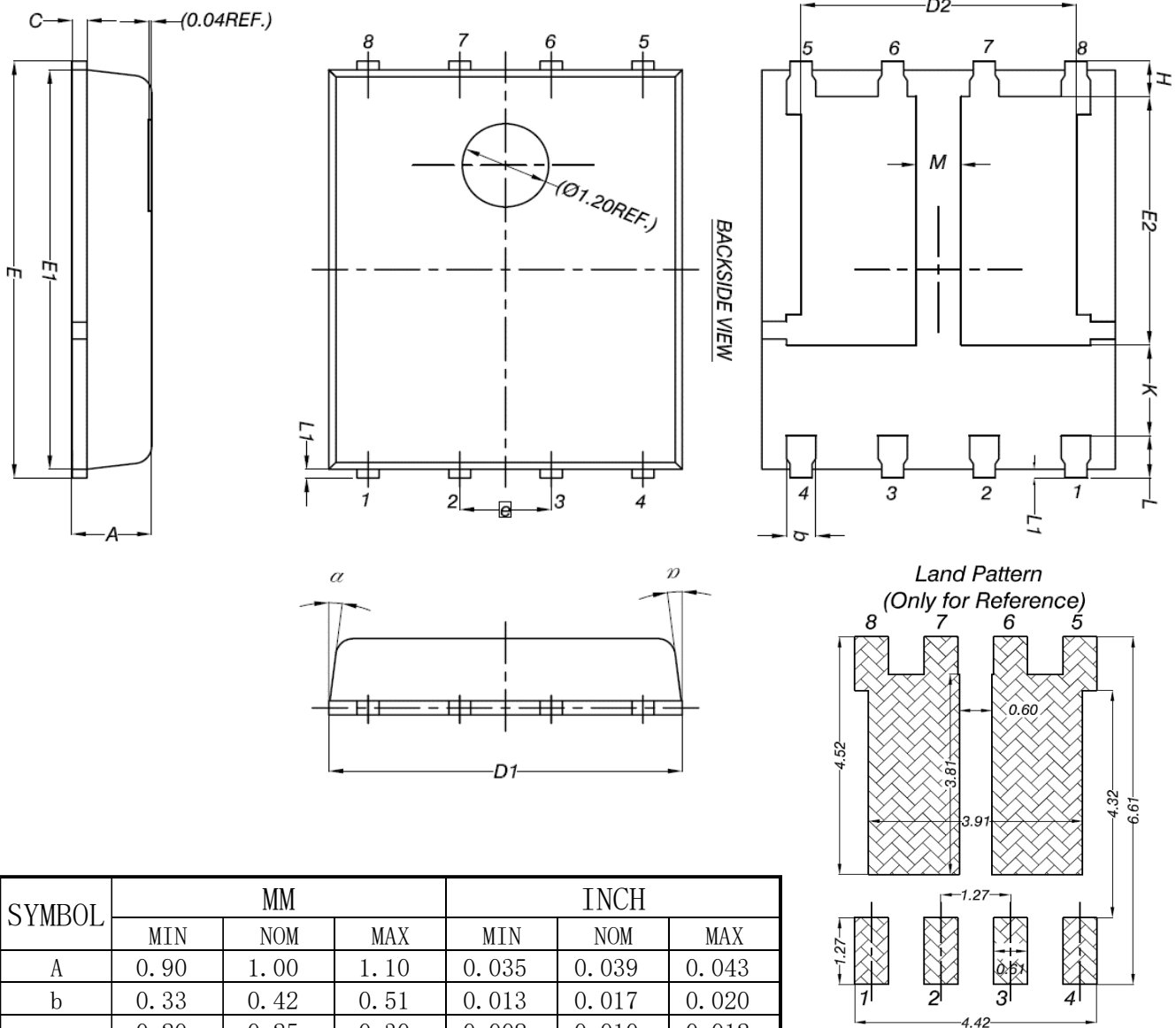
Typical Characteristics(P-Channel)



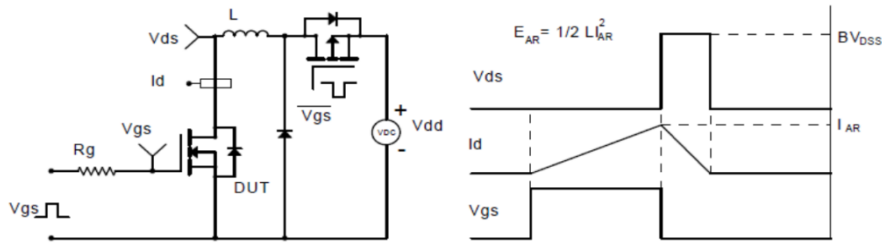
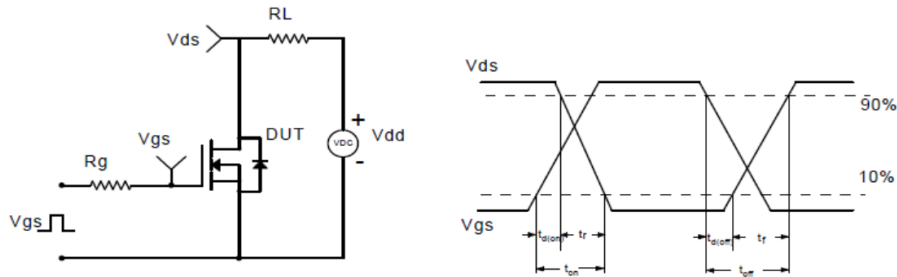
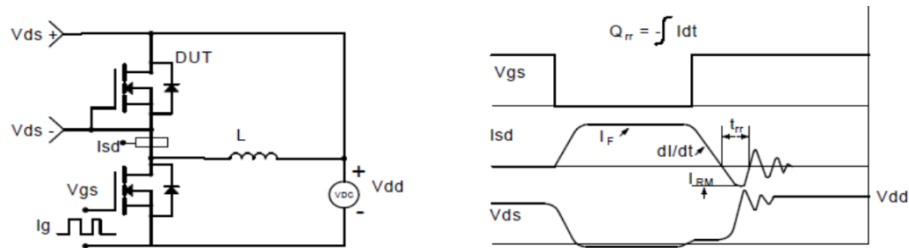
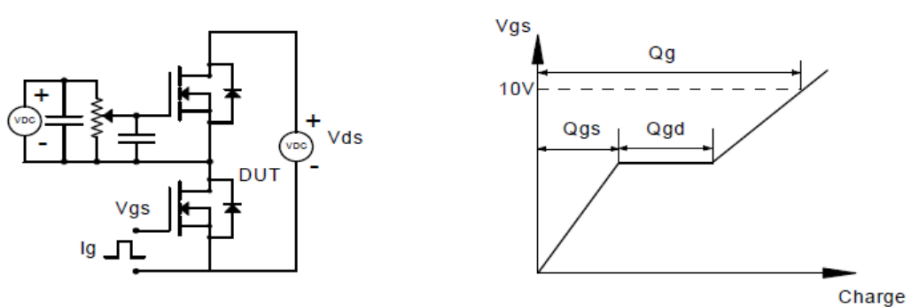
### Typical Characteristics(P-Channel)

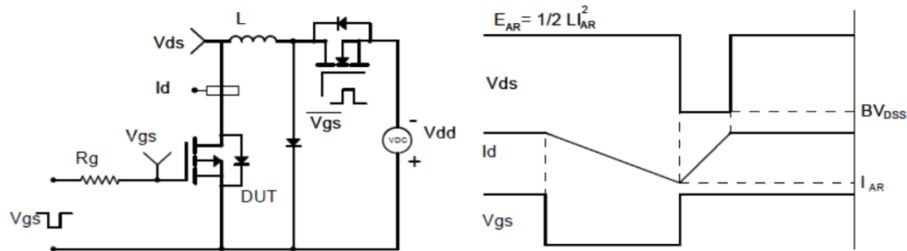
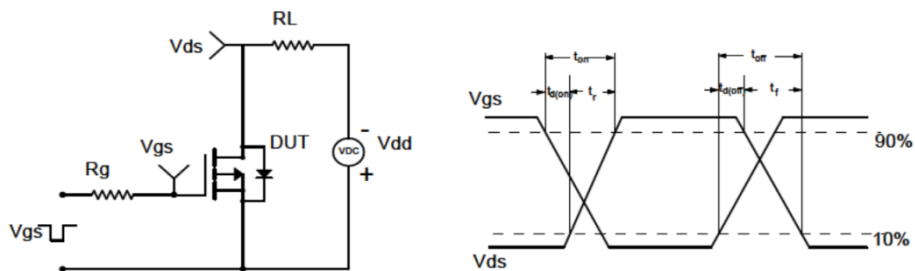
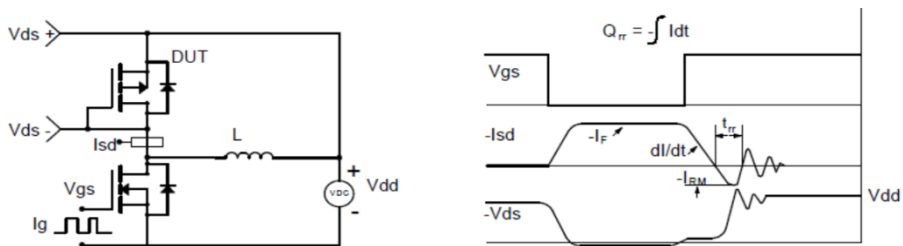
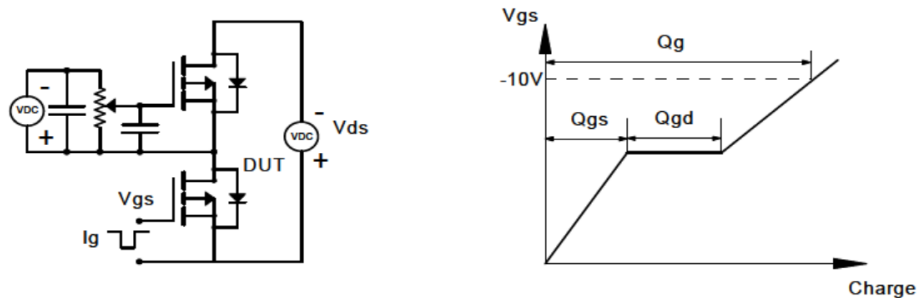




**Package Information**
**PDFN5060 DP1**


SYMBOL	MM			INCH		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.90	1.00	1.10	0.035	0.039	0.043
b	0.33	0.42	0.51	0.013	0.017	0.020
c	0.20	0.25	0.30	0.008	0.010	0.012
D1	4.80	4.90	5.00	0.189	0.193	0.197
D2	3.61	3.79	3.96	0.142	0.149	0.156
E	5.90	6.00	6.10	0.232	0.236	0.240
E1	5.65	5.75	5.85	0.222	0.226	0.230
E2	3.38	3.58	3.78	0.133	0.141	0.149
e	1.27 BSC			0.050 BSC		
H	0.41	0.51	0.61	0.016	0.020	0.024
k	1.10			0.043		
L	0.51	0.61	0.71	0.020	0.024	0.028
L1	0.06	0.13	0.20	0.002	0.005	0.008
M	0.50			0.020		
a	0°		12°	0°		12°

**Avalanche Test Circuit and Waveforms(N-Channel)**

**Switching Time Test Circuit and Waveforms(N-Channel)**

**Diode Recovery Test Circuit and Waveforms(N-Channel)**

**Gate Charge Test Circuit and Waveform(N-Channel)**


**Avalanche Test Circuit and Waveforms(P-Channel)**

**Switching Time Test Circuit and Waveforms(P-Channel)**

**Diode Recovery Test Circuit and Waveforms(P-Channel)**

**Gate Charge Test Circuit and Waveform(P-Channel)**

**Customer Service**

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