

### Features

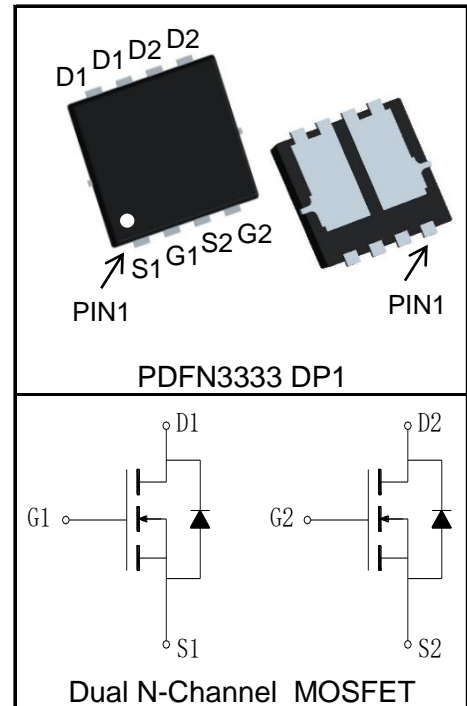
- 40V/22A,  
 $R_{DS(ON)} = 13m\Omega(Typ.)@V_{GS}=10V$   
 $R_{DS(ON)} = 21m\Omega(Typ.)@V_{GS}=4.5V$
- Excellent  $Q_G \times R_{DS(on)}$  product(FOM)
- SGT Technology
- Fast Switching Speed
- 100% avalanche tested

### Applications

- Switching Application Systems



### Pin Description



### Absolute Maximum Ratings

Symbol	Parameter	Rating	Unit
<b>Common Ratings</b> ( $T_C=25^\circ C$ Unless Otherwise Noted)			
$V_{DSS}$	Drain-Source Voltage	40	V
$V_{GSS}$	Gate-Source Voltage	$\pm 20$	V
$T_J$	Maximum Junction Temperature	150	$^\circ C$
$T_{STG}$	Storage Temperature Range	-55 to 150	$^\circ C$
$I_S$	Diode Continuous Forward Current	$T_C=25^\circ C$ 22	A
<b>Mounted on Large Heat Sink</b>			
$I_{DP}^{①}$	300 $\mu s$ Pulse Drain Current Tested	$T_C=25^\circ C$ 88	A
$I_D^{②}$	Continuous Drain Current@ $T_C(V_{GS}=10V)$	$T_C=25^\circ C$ 22	A
		$T_C=100^\circ C$ 14	
	Continuous Drain Current@ $T_A(V_{GS}=10V)^{③}$	$T_A=25^\circ C$ 10	
		$T_A=70^\circ C$ 8	
$P_D$	Maximum Power Dissipation@ $T_C$	$T_C=25^\circ C$ 14	W
		$T_C=100^\circ C$ 6	
	Maximum Power Dissipation@ $T_A^{③}$	$T_A=25^\circ C$ 2.8	
		$T_A=70^\circ C$ 1.8	

Symbol	Parameter	Rating	Unit
$R_{\theta JC}$	Thermal Resistance-Junction to Case	9	°C/W
$R_{\theta JA}$ ③	Thermal Resistance-Junction to Ambient	45	°C/W
<b>Drain-Source Avalanche Ratings</b>			
$E_{AS}$ ④	Avalanche Energy, Single Pulsed	4	mJ

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

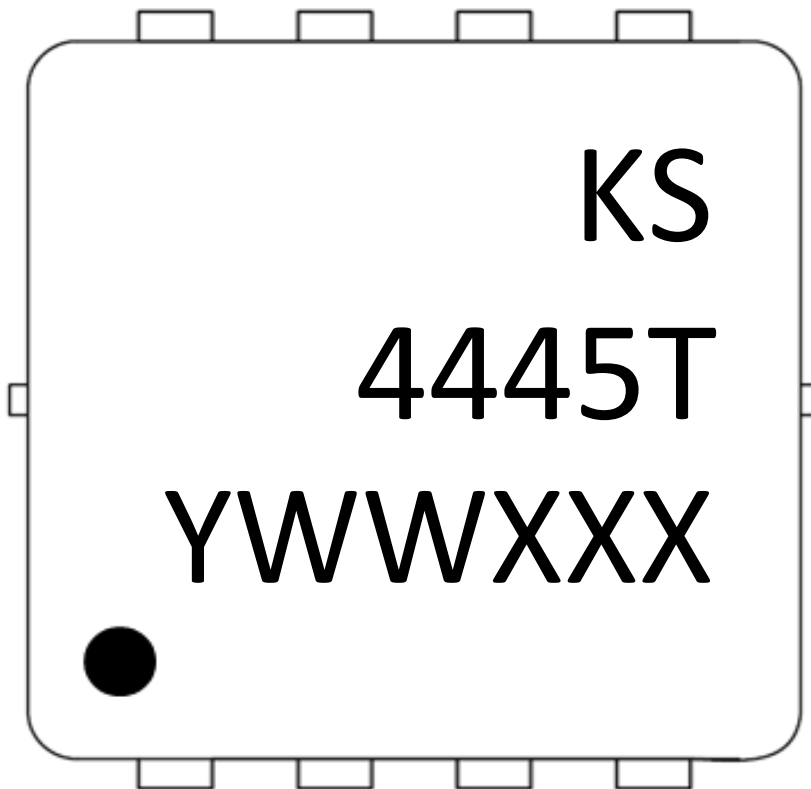
Symbol	Parameter	Test Condition	KS4445MAT			Unit
			Min.	Typ.	Max.	
<b>Static Characteristics</b>						
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_{DS}=250\mu A$	40			V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS}=40V, V_{GS}=0V$			1	$\mu A$
		$T_J=125^\circ\text{C}$			30	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_{DS}=250\mu A$	1.2	1.7	2.3	V
$I_{GSS}$	Gate Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$			$\pm 100$	nA
$R_{DS(ON)}$ ⑤	Drain-Source On-state Resistance	$V_{GS}=10V, I_{DS}=10A$		13	18	$m\Omega$
		$V_{GS}=4.5V, I_{DS}=8A$		21	26	$m\Omega$
<b>Diode Characteristics</b>						
$V_{SD}$ ⑤	Diode Forward Voltage	$I_{SD}=10A, V_{GS}=0V$		0.88	1.2	V
$t_{rr}$	Reverse Recovery Time	$I_{SD}=10A, dI_{SD}/dt=100A/\mu s$		14		ns
$Q_{rr}$	Reverse Recovery Charge			25		nC
<b>Dynamic Characteristics</b> ⑥						
$R_G$	Gate Resistance	$V_{GS}=0V, V_{DS}=0V, F=1\text{MHz}$		0.8		$\Omega$
$C_{iss}$	Input Capacitance	$V_{GS}=0V,$ $V_{DS}=20V,$ Frequency=1.0MHz		400		$\mu F$
$C_{oss}$	Output Capacitance			230		
$C_{riss}$	Reverse Transfer Capacitance			15		
$t_{d(ON)}$	Turn-on Delay Time	$V_{DD}=20V, I_{DS}=10A,$ $V_{GS}=10V, R_G=3\Omega$		7		ns
$t_r$	Turn-on Rise Time			10		
$t_{d(OFF)}$	Turn-off Delay Time			17		
$t_f$	Turn-off Fall Time			11		
<b>Gate Charge Characteristics</b> ⑥						
$Q_g$	Total Gate Charge	$V_{DS}=20V, V_{GS}=10V,$ $I_{DS}=10A$		7		nC
$Q_{gs}$	Gate-Source Charge			2.3		
$Q_{gd}$	Gate-Drain Charge			1.9		

**Notes:**

- ①Pulse width limited by safe operating area.
- ②Calculated continuous current based on maximum allowable junction temperature.
- ③When mounted on 1 inch square copper board,  $t \leq 10\text{sec}$ .
- ④Limited by  $T_{J\text{max}}$ ,  $I_{AS} = 4\text{A}$ ,  $L = 0.5\text{mH}$ ,  $V_{DD} = 24\text{V}$ ,  $R_G = 25\Omega$ , Starting  $T_J = 25^\circ\text{C}$ .
- ⑤Pulse test;Pulse width  $\leq 300\mu\text{s}$ , duty cycle  $\leq 2\%$ .
- ⑥Guaranteed by design, not subject to production testing.

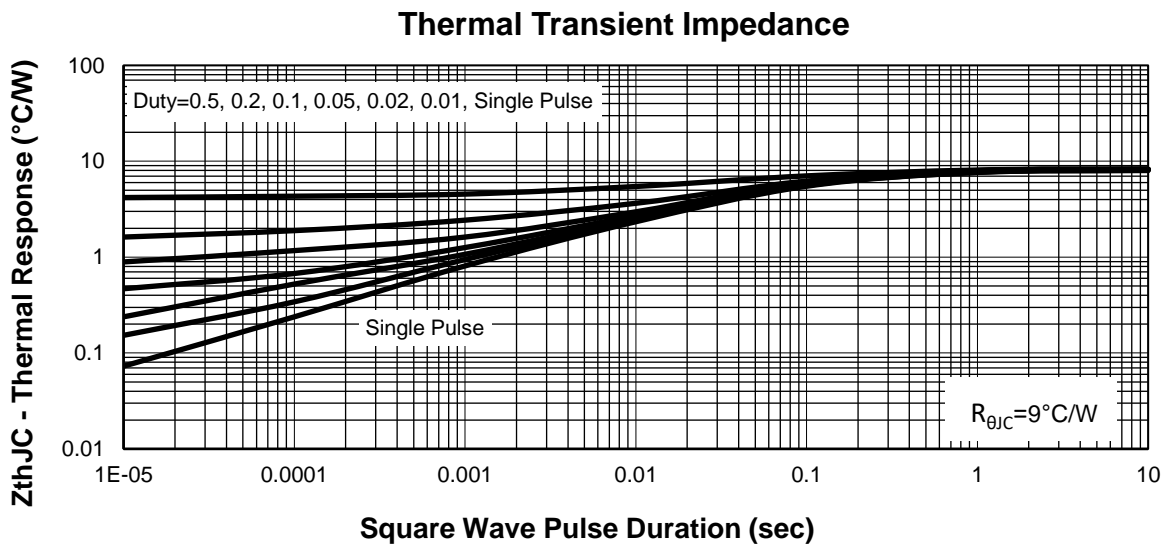
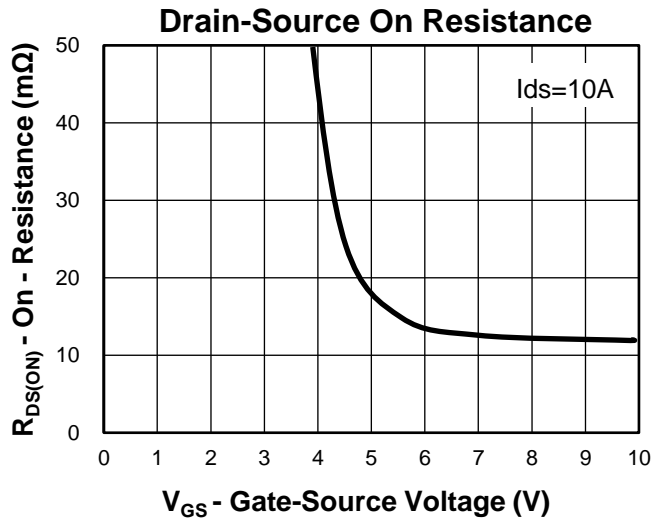
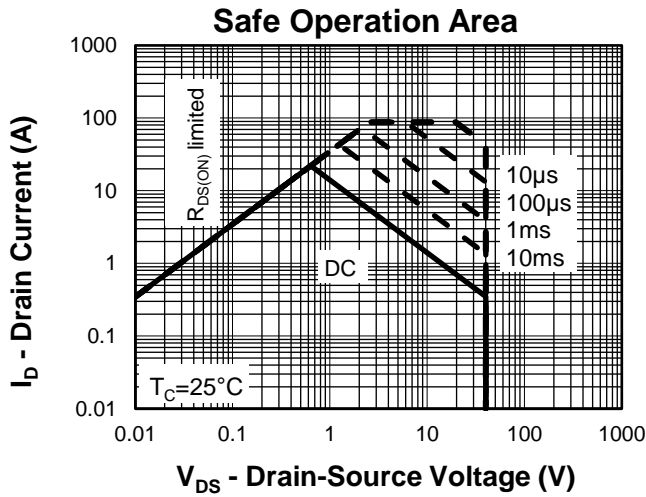
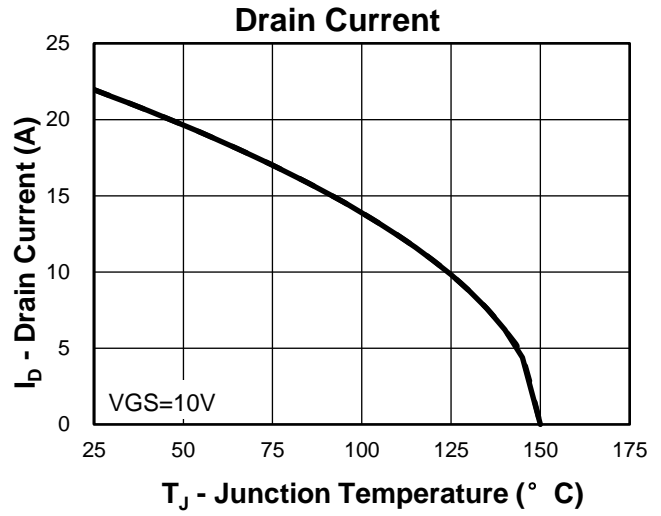
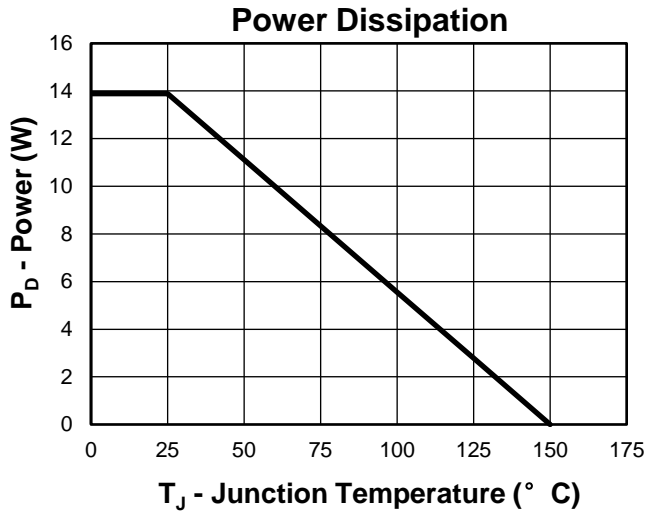
**Ordering and Marking Information**

Device	Package	Packaging	Quantity	Reel Size	Tape width
KS4445MAT	PDFN3333	Tape&Reel	5000	13"	12mm

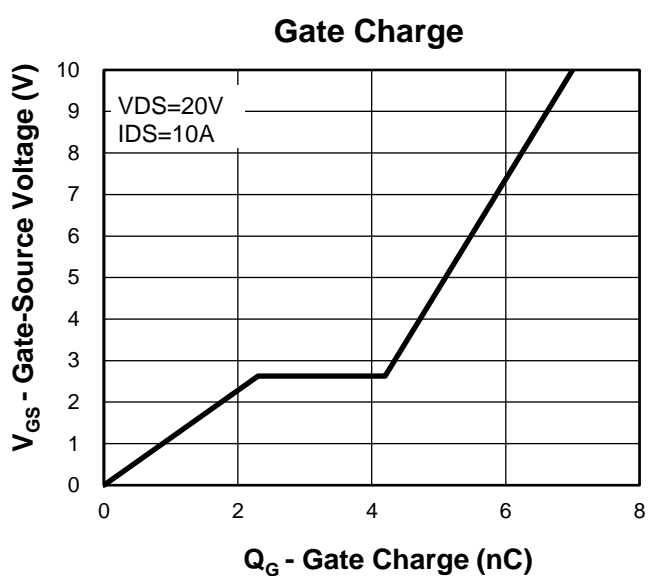
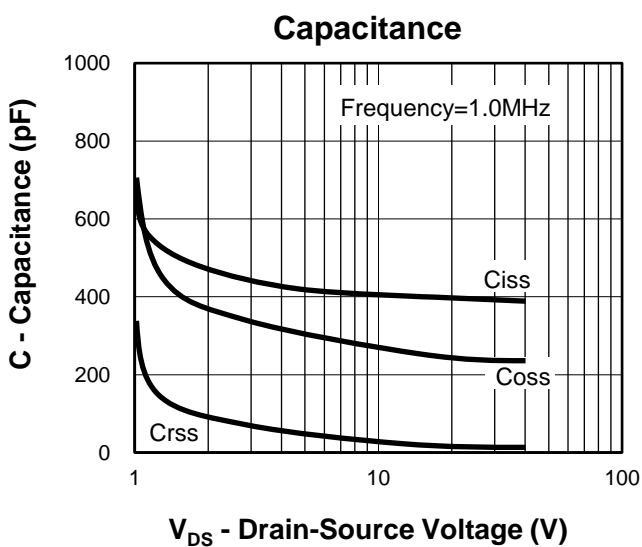
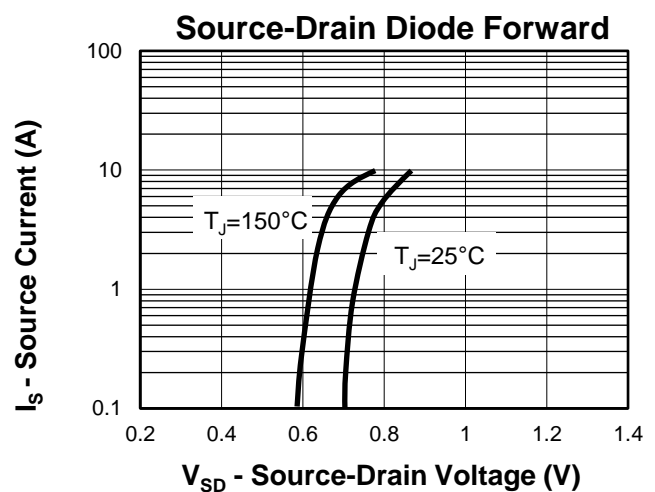
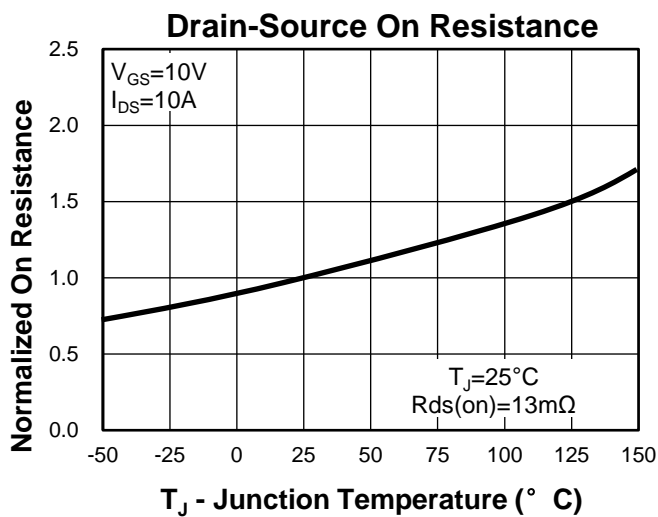
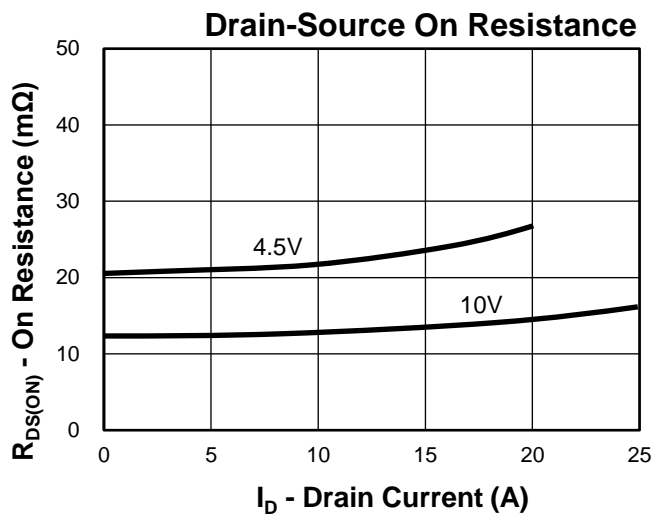
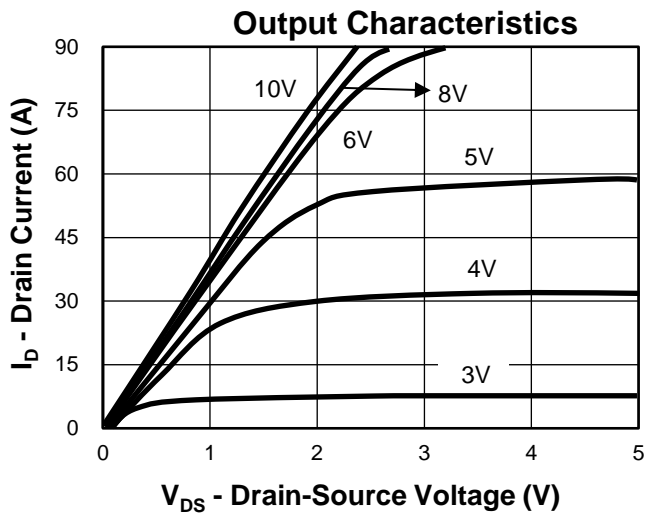


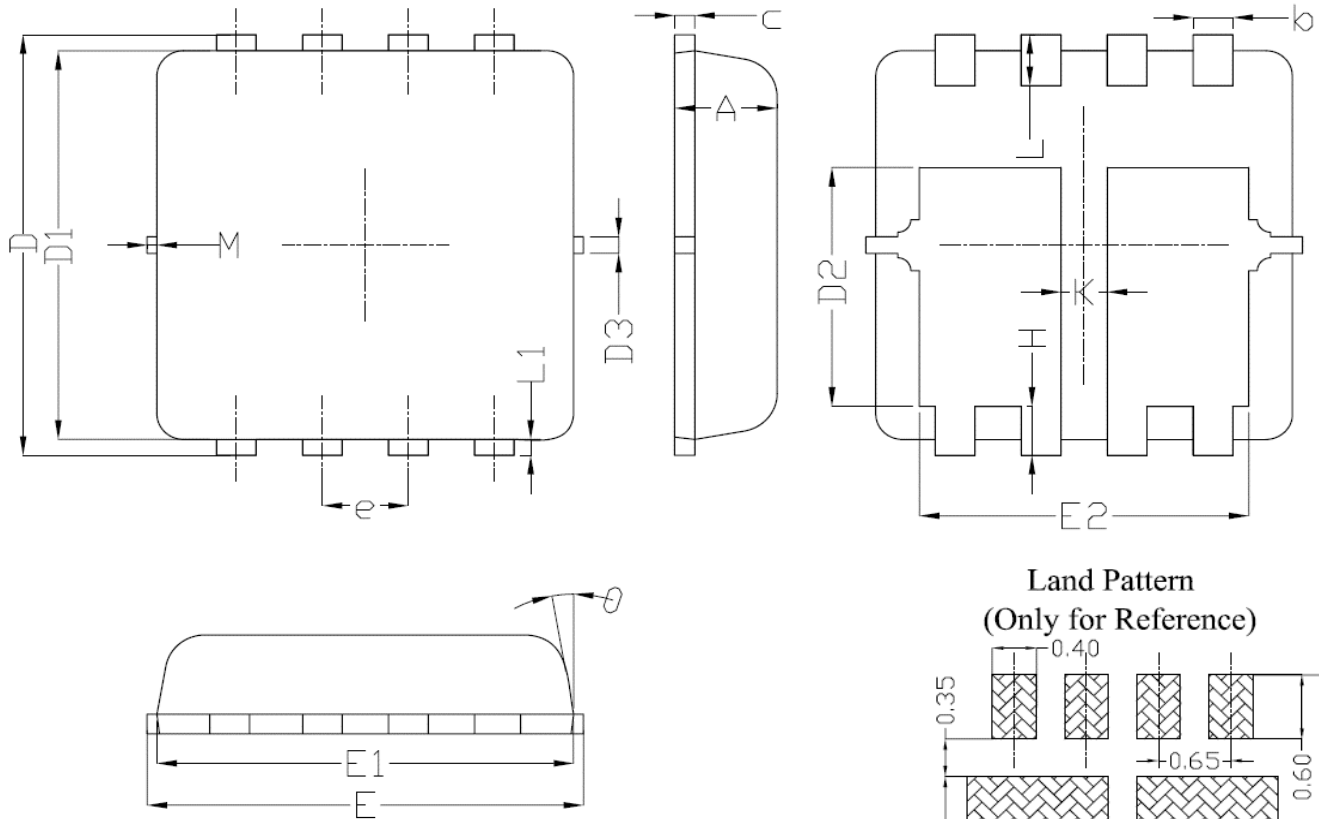
1st Line: Kwansemi Code(KS)  
 2nd Line: Part Number(4445T)  
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### Typical Characteristics



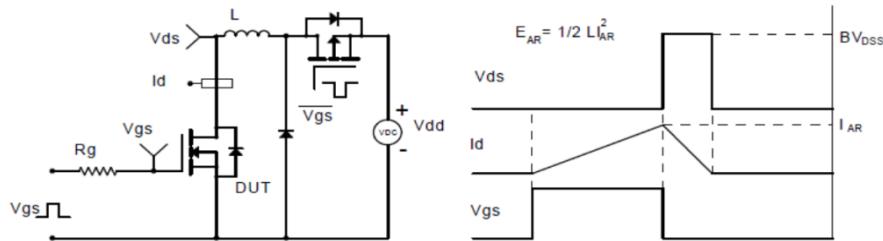
### Typical Characteristics



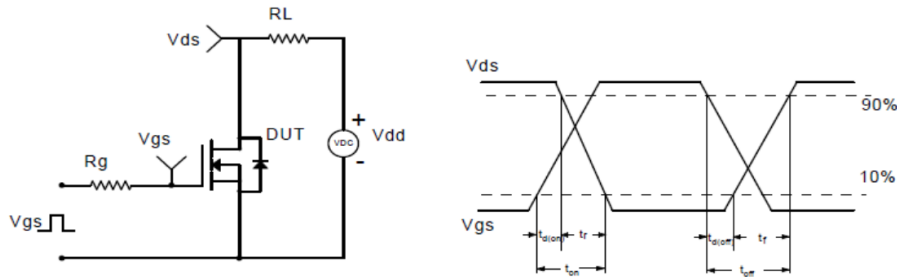
**Package Information**
**PDFN3333 DP1**


SYMBOL	MM			INCH		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.70	0.75	0.80	0.028	0.030	0.031
b	0.25	0.30	0.35	0.010	0.012	0.014
c	0.10	0.15	0.25	0.004	0.006	0.010
D	3.25	3.35	3.45	0.128	0.132	0.136
D1	3.00	3.10	3.20	0.118	0.122	0.126
D2	1.78	1.88	1.98	0.070	0.074	0.078
D3		0.13			0.005	
E	3.20	3.30	3.40	0.126	0.130	0.134
E1	3.00	3.15	3.20	0.118	0.124	0.126
E2	2.39	2.49	2.59	0.094	0.098	0.102
e	0.65 BSC			0.026 BSC		
H	0.30	0.39	0.50	0.012	0.015	0.020
L	0.30	0.40	0.50	0.012	0.016	0.020
L1		0.13			0.005	
K	0.30			0.012		
θ	0°		12°	0°		12°
M			0.15			0.006

### Avalanche Test Circuit and Waveforms



### Switching Time Test Circuit and Waveforms



### Diode Recovery Test Circuit and Waveforms



### Gate Charge Test Circuit and Waveform



### Customer Service

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