

Features

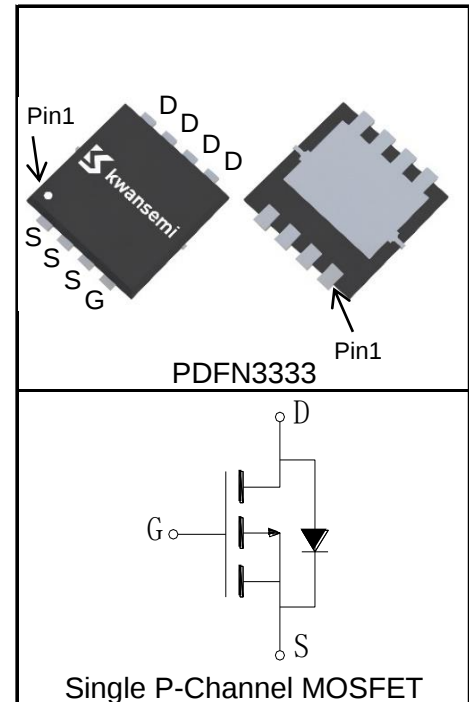
- -40V/-32A,
 $R_{DS(ON)} = 15m\Omega(Typ.)@V_{GS}=-10V$
 $R_{DS(ON)} = 20m\Omega(Typ.)@V_{GS}=-4.5V$
- Low $R_{DS(ON)}$
- Super High Dense Cell Design
- Fast Switching Speed
- 100% avalanche tested

Applications

- Switching Application Systems



Pin Description



Absolute Maximum Ratings

Symbol	Parameter	Rating	Unit
Common Ratings ($T_C=25^\circ\text{C}$ Unless Otherwise Noted)			
V_{DSS}	Drain-Source Voltage	-40	V
V_{GSS}	Gate-Source Voltage	± 20	
T_{Jmax}	Maximum Junction Temperature	150	$^\circ\text{C}$
T_J, T_{STG}	Operating and Storage Temperature Range	-55 to 150	$^\circ\text{C}$
I_S	Diode Continuous Forward Current	$T_C=25^\circ\text{C}$ -32	A
Mounted on Large Heat Sink			
$I_{DP}^{①}$	Pulse Drain Current	$T_C=25^\circ\text{C}$ -128	A
$I_D^{②}$	Continuous Drain Current@ $T_C(V_{GS}=-10V)$	$T_C=25^\circ\text{C}$ -32	A
		$T_C=100^\circ\text{C}$ -20	
	Continuous Drain Current@ $T_A(V_{GS}=-10V)^{③}$	$T_A=25^\circ\text{C}$ -10	
		$T_A=70^\circ\text{C}$ -8	
P_D	Maximum Power Dissipation@ T_C	$T_C=25^\circ\text{C}$ 32	W
		$T_C=100^\circ\text{C}$ 13	
	Maximum Power Dissipation@ $T_A^{③}$	$T_A=25^\circ\text{C}$ 3.5	
		$T_A=70^\circ\text{C}$ 2.3	

Symbol	Parameter	Rating	Unit
$R_{\theta JC}$	Thermal Resistance-Junction to Case	3.8	°C/W
$R_{\theta JA}^{③}$	Thermal Resistance-Junction to Ambient	35	°C/W
Drain-Source Avalanche Ratings			
$E_{AS}^{④}$	Avalanche Energy, Single Pulsed	182	mJ

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

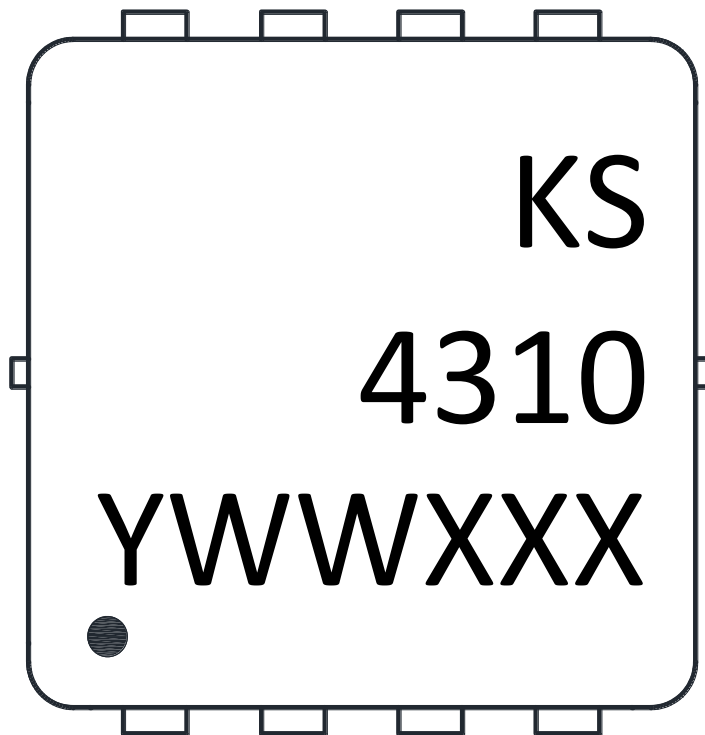
Symbol	Parameter	Test Condition	KS4310MA			Unit
			Min.	Typ.	Max.	
Static Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _{DS} =-250μA	-40			V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =-40V, V _{GS} =0V			-1	μA
		T _J =125°C			-30	
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _{DS} =-250μA	-1.1	-1.6	-2.3	V
I _{GSS}	Gate Leakage Current	V _{GS} =±20V, V _{DS} =0V			±100	nA
R _{DS(ON)} ⑤	Drain-Source On-state Resistance	V _{GS} =-10V, I _{DS} =-15A		15	20	mΩ
		V _{GS} =-4.5V, I _{DS} =-10A		20	26	mΩ
Diode Characteristics						
V _{SD} ⑤	Diode Forward Voltage	I _{SD} =-15A, V _{GS} =0V		-0.9	-1.2	V
t _{rr}	Reverse Recovery Time	I _{SD} =-15A, dI _{SD} /dt=100A/μs		45		ns
Q _{rr}	Reverse Recovery Charge			42		nC
Dynamic Characteristics ⑥						
R _G	Gate Resistance	V _{GS} =0V,V _{DS} =0V,F=1MHz		7.5		Ω
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =-20V, Frequency=1.0MHz		2950		pF
C _{oss}	Output Capacitance			205		
C _{rss}	Reverse Transfer Capacitance			180		
t _{d(ON)}	Turn-on Delay Time	V _{DD} =-20V, I _{DS} =-15A, V _{GS} =-10V,R _G =3Ω		12		ns
t _r	Turn-on Rise Time			19		
t _{d(OFF)}	Turn-off Delay Time			43		
t _f	Turn-off Fall Time			11		
Gate Charge Characteristics ⑥						
Q _g	Total Gate Charge	V _{DS} =-20V, V _{GS} =-10V, I _{DS} =-15A		48		nC
Q _{gs}	Gate-Source Charge			6.7		
Q _{gd}	Gate-Drain Charge			12		

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_{Jmax} , Starting $T_J = 25^\circ\text{C}$, $I_{ASmax} = -27\text{A}$, $L = 0.5\text{mH}$, $V_{DD} = -20\text{V}$, $R_G = 25\Omega$, $V_{GS} = -10\text{V}$. Part not recommended for use above this value. 100% Final Test at $I_{AS} = -12\text{A}$, $L = 0.5\text{mH}$.
- ⑤Pulse test; Pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$.
- ⑥Guaranteed by design, not subject to production testing.

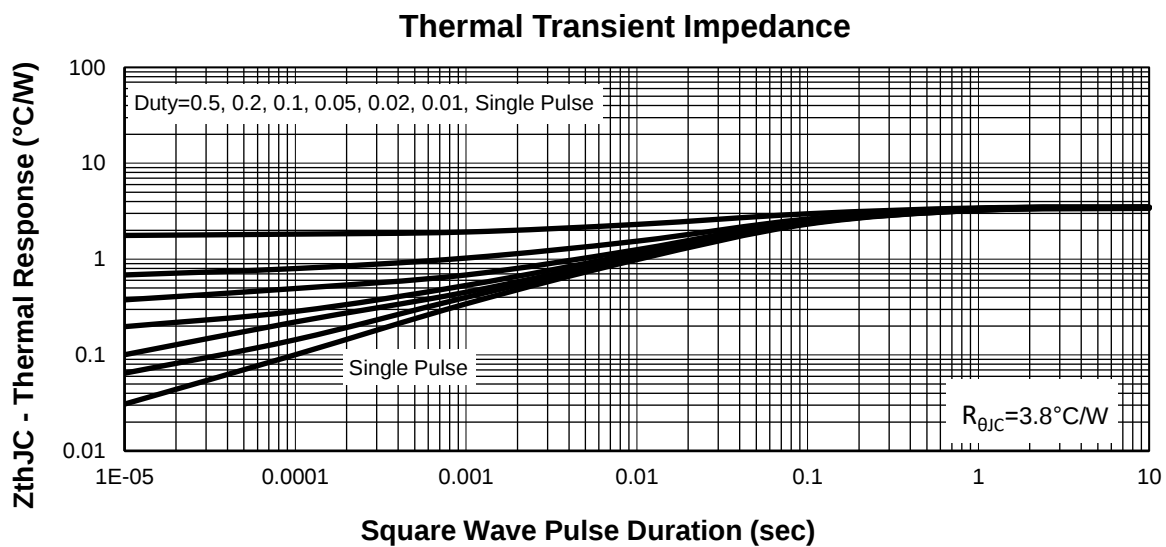
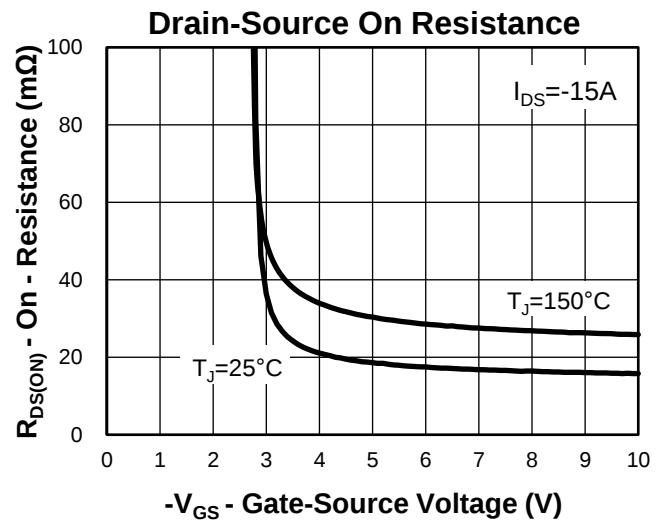
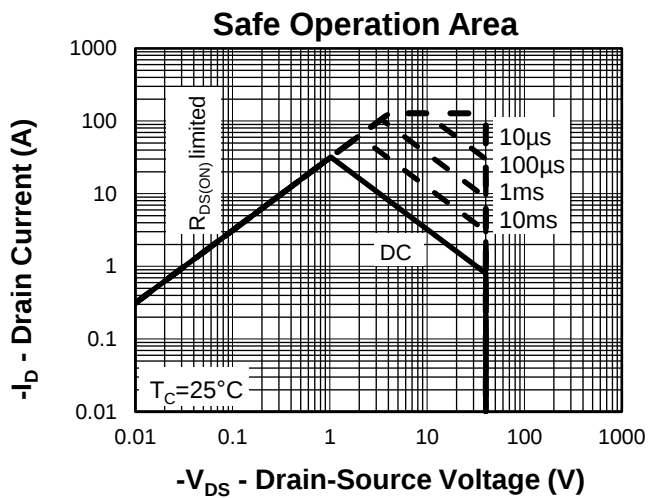
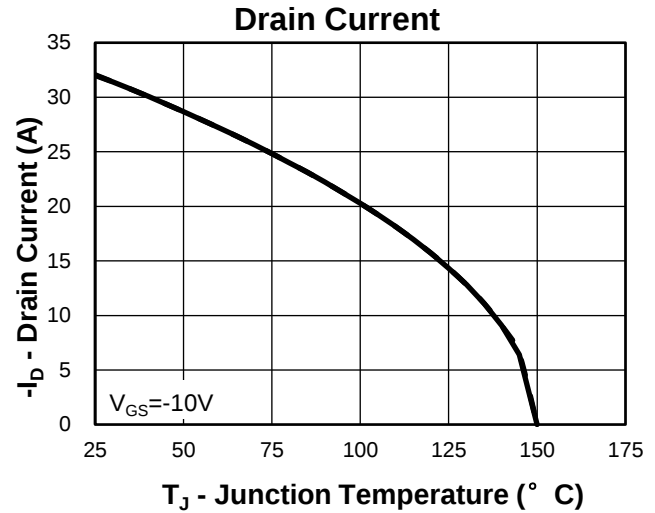
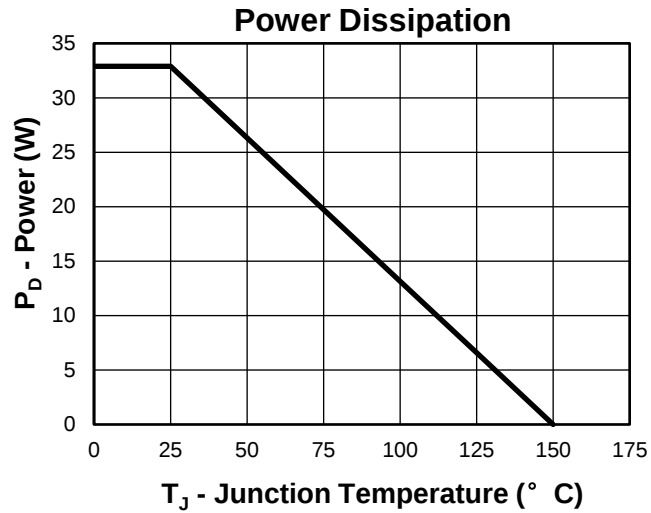
Ordering and Marking Information

Device	Package	Packaging	Quantity	Reel Size	Tape width
KS4310MA	PDFN3333	Tape&Reel	5000	13"	12mm

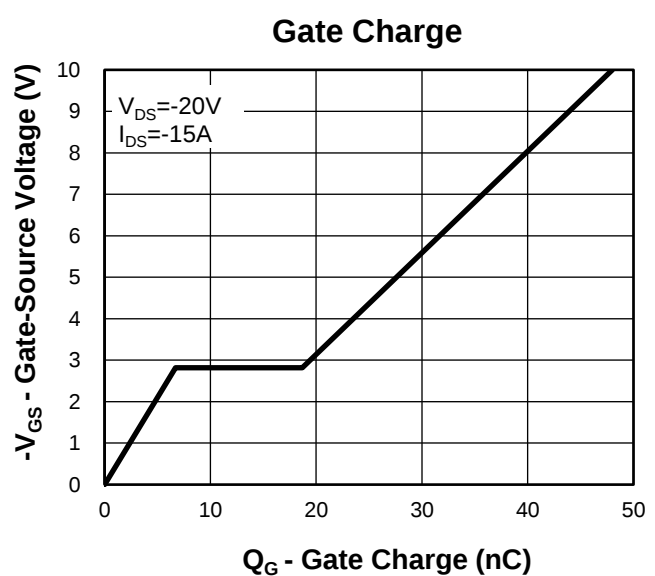
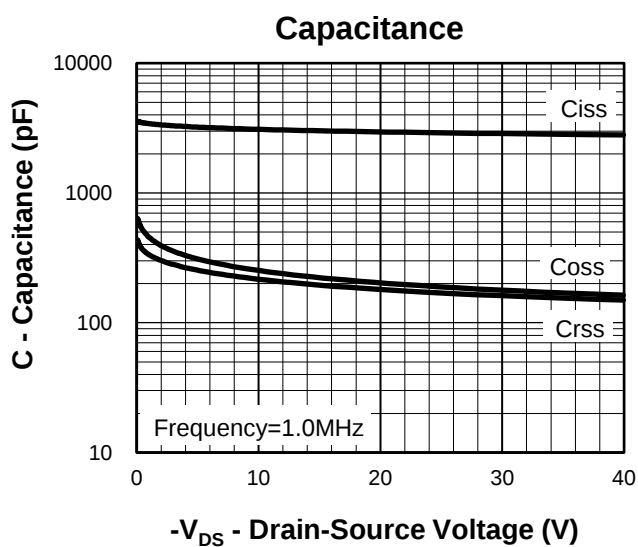
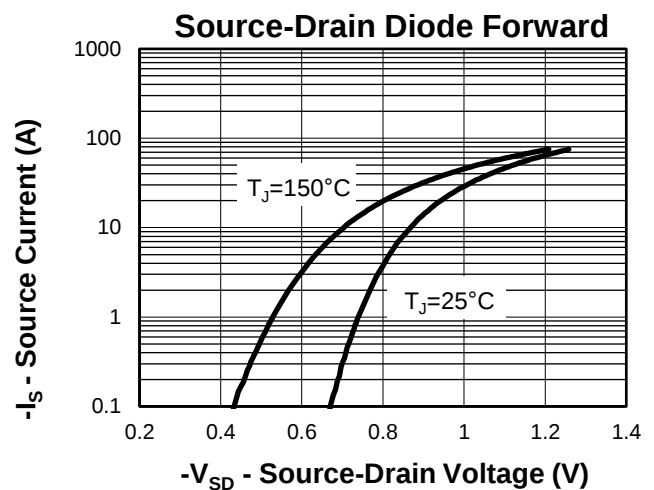
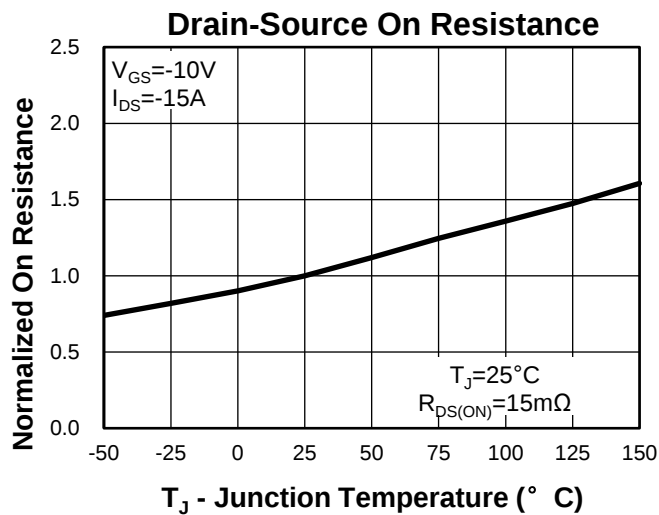
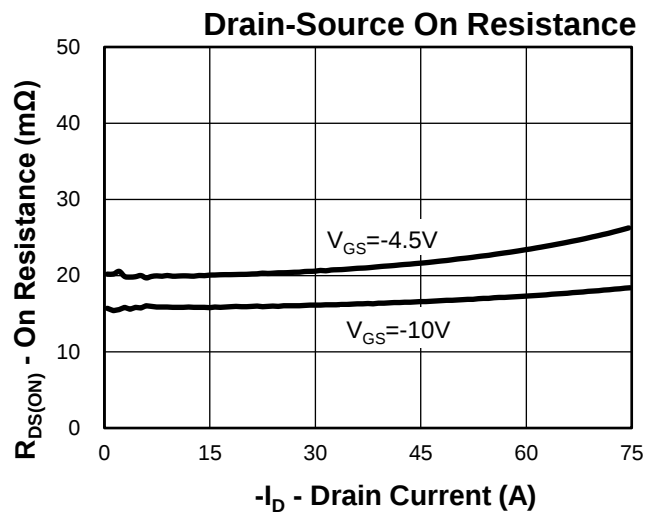
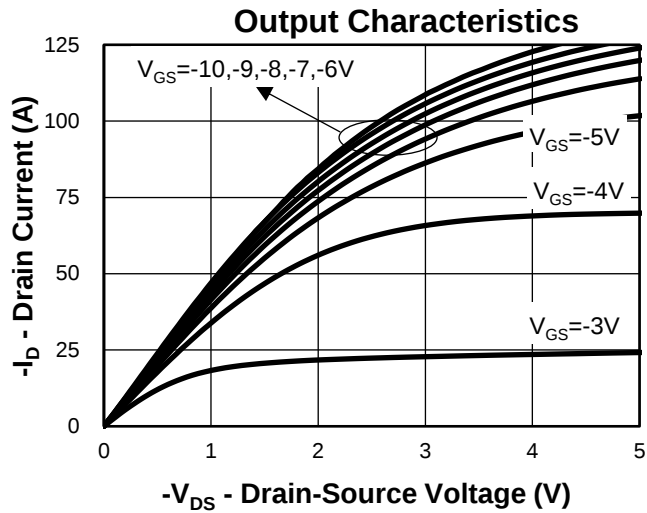


1st Line: Kwansemi Code(KS)
 2nd Line: Part Number(4310)
 3rd Line: Lot Number(YWWXXX)

Typical Characteristics

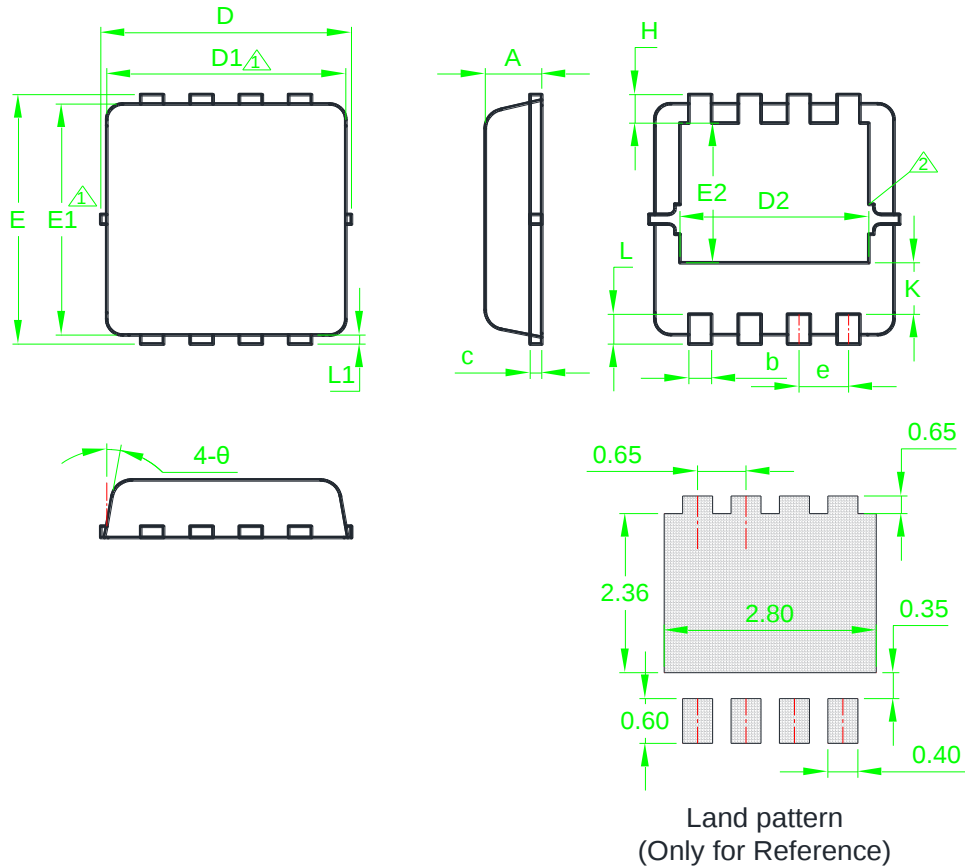


Typical Characteristics



Package Information

PDFN3333

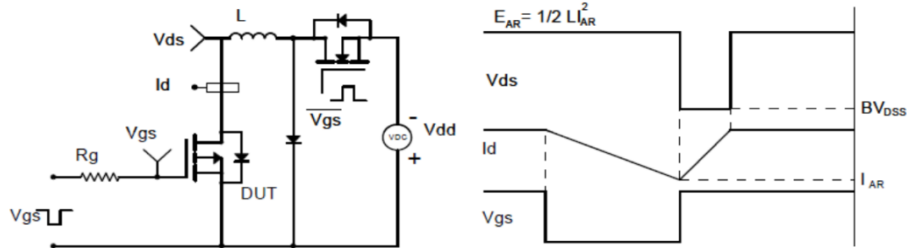


SYMBOL	MM			INCH			SYMBOL	MM			INCH		
	MIN	NOM	MAX	MIN	NOM	MAX		MIN	NOM	MAX	MIN	NOM	MAX
A	0.70	0.80	0.90	0.028	0.031	0.035	E2	1.40	*	1.95	0.055	*	0.077
b	0.25	0.30	0.35	0.010	0.012	0.014	e	0.65BSC			0.026BSC		
c	0.10	0.20	0.30	0.004	0.008	0.012	H	0.30	0.40	0.50	0.012	0.016	0.020
D	3.20	3.30	3.40	0.126	0.130	0.134	K	0.50	*	*	0.020	*	*
D1	3.00	3.10	3.20	0.118	0.122	0.126	L	0.30	0.40	0.50	0.012	0.016	0.020
D2	2.35	2.45	2.55	0.093	0.096	0.100	L1	0.15BSC			0.006BSC		
E	3.20	3.30	3.40	0.126	0.130	0.134	θ	6°	*	12°	6°	*	12°
E1	2.90	3.05	3.20	0.114	0.120	0.126							

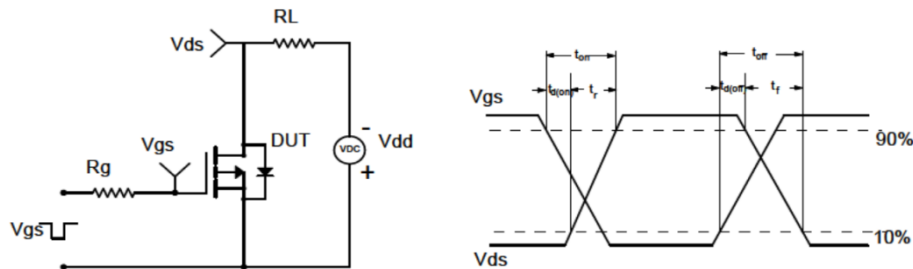
① Dimensions D1 and E1 do not include mold flash protrusions or gate burrs.

② The size and shape of exposed pad are variable depending on mold.

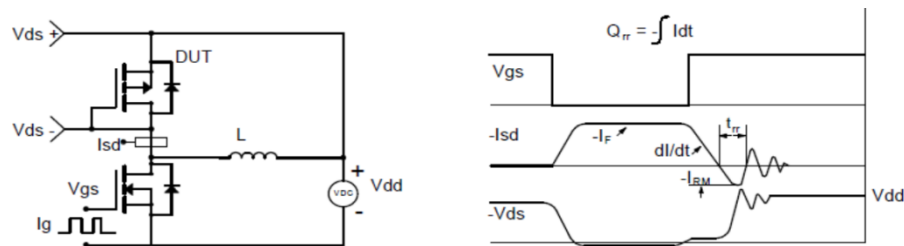
Avalanche Test Circuit and Waveforms



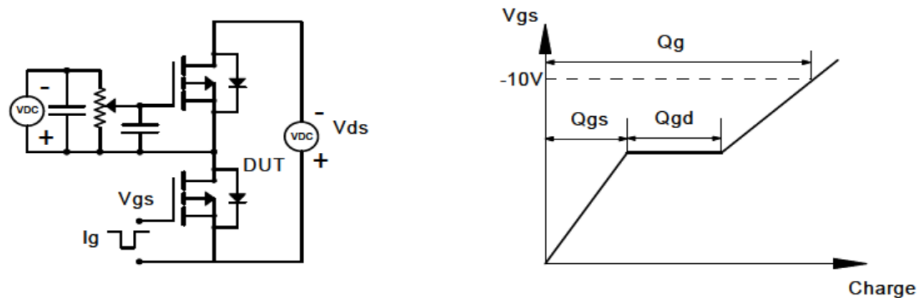
Switching Time Test Circuit and Waveforms



Diode Recovery Test Circuit and Waveforms



Gate Charge Test Circuit and Waveform



Customer Service

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