

Features

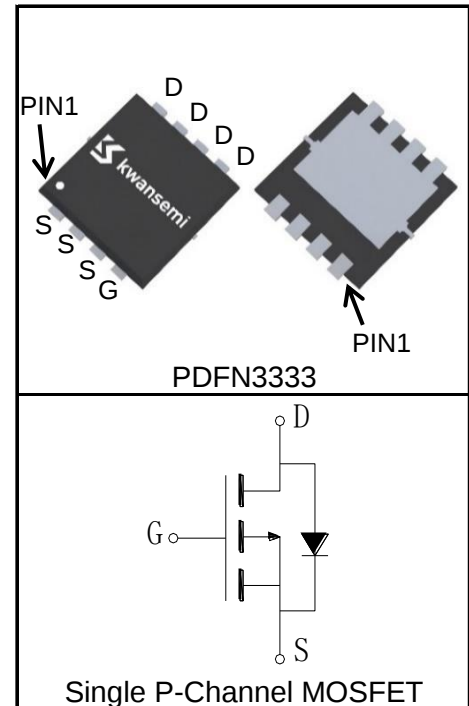
- -20V/-53A,
 $R_{DS(ON)} = 6.8m\Omega(Typ.)@V_{GS}=-4.5V$
 $R_{DS(ON)} = 8m\Omega(Typ.)@V_{GS}=-2.5V$
 $R_{DS(ON)} = 11m\Omega(Typ.)@V_{GS}=-1.8V$
- Low $R_{DS(ON)}$
- Super High Dense Cell Design
- Fast Switching Speed
- 100% avalanche tested

Applications

- Switching Application Systems



Pin Description



Absolute Maximum Ratings

Symbol	Parameter		Rating	Unit
Common Ratings (T _C =25°C Unless Otherwise Noted)				
V _{DSS}	Drain-Source Voltage		-20	V
V _{GSS}	Gate-Source Voltage		±12	
T _J	Maximum Junction Temperature		150	°C
T _J ,T _{STG}	Operating and Storage Temperature Range		-55 to 150	°C
I _S	Diode Continuous Forward Current	T _C =25°C	-53	A
Mounted on Large Heat Sink				
I _{DP} ^①	Pulse Drain Current	T _C =25°C	-212	A
I _D ^②	Continuous Drain Current@T _C (V _{GS} =-4.5V)	T _C =25°C	-53	A
		T _C =100°C	-33	
	Continuous Drain Current@T _A (V _{GS} =-4.5V) ^③	T _A =25°C	-17	
		T _A =70°C	-14	
P _D	Maximum Power Dissipation@T _C	T _C =25°C	32	W
		T _C =100°C	13	
	Maximum Power Dissipation@T _A ^③	T _A =25°C	3.5	
		T _A =70°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	144	mJ

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

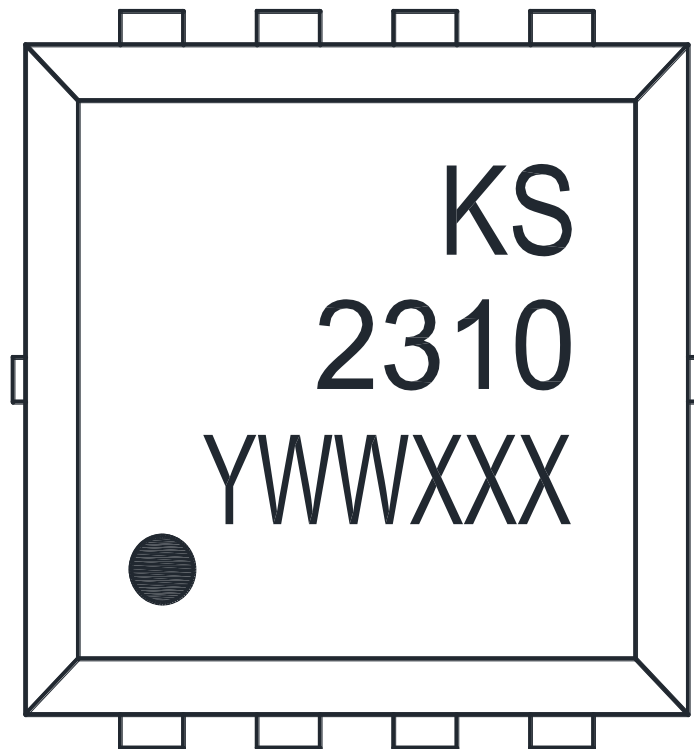
Symbol	Parameter	Test Condition	Rating			Unit
			Min.	Typ.	Max.	
Static Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _{DS} =-250μA	-20			V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =-20V, V _{GS} =0V			-1	μA
		T _J =125°C			-30	
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _{DS} =-250μA	-0.4	-0.7	-1	V
I _{GSS}	Gate Leakage Current	V _{GS} =±12V, V _{DS} =0V			±100	nA
R _{DS(ON)} ^⑤	Drain-Source On-state Resistance	V _{GS} =-4.5V, I _{DS} =-20A		6.8	8.5	mΩ
		V _{GS} =-2.5V, I _{DS} =-12A		8	12	mΩ
		V _{GS} =-1.8V, I _{DS} =-8A		11	15	mΩ
Diode Characteristics						
V _{SD} ^⑤	Diode Forward Voltage	I _{SD} =-20A, V _{GS} =0V		-0.88	-1.2	V
t _{rr}	Reverse Recovery Time	I _{SD} =-20A, dI _{SD} /dt=100A/μs		30		ns
Q _{rr}	Reverse Recovery Charge			159		nC
Dynamic Characteristics ^⑥						
R _G	Gate Resistance	V _{GS} =0V, V _{DS} =0V, F=1MHz		7		Ω
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =-10V, Frequency=200KHz		4350		pF
C _{oss}	Output Capacitance			490		
C _{rss}	Reverse Transfer Capacitance			460		
t _{d(ON)}	Turn-on Delay Time	V _{DD} =-10V, I _{DS} =-20A, V _{GS} =-4.5V, R _G =3Ω		22		ns
t _r	Turn-on Rise Time			34		
t _{d(OFF)}	Turn-off Delay Time			53		
t _f	Turn-off Fall Time			39		
Gate Charge Characteristics ^⑥						
Q _g	Total Gate Charge	V _{DS} =-10V, V _{GS} =-4.5V, I _{DS} =-20A		36		nC
Q _{gs}	Gate-Source Charge			5.4		
Q _{gd}	Gate-Drain Charge			10		

Notes:

- ①Pulse width limited by safe operating area.
- ②Calculated continuous current based on maximum allowable junction temperature. The package limitation current is -40A.
- ③When mounted on 1 inch square copper board, $t \leq 10\text{sec}$.
- ④Limited by T_{Jmax} , Starting $T_J = 25^\circ\text{C}$, $I_{ASmax} = -24\text{A}$, $L = 0.5\text{mH}$, $V_{DD} = -20\text{V}$, $R_G = 25\Omega$, $V_{GS} = -4.5\text{V}$. 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.

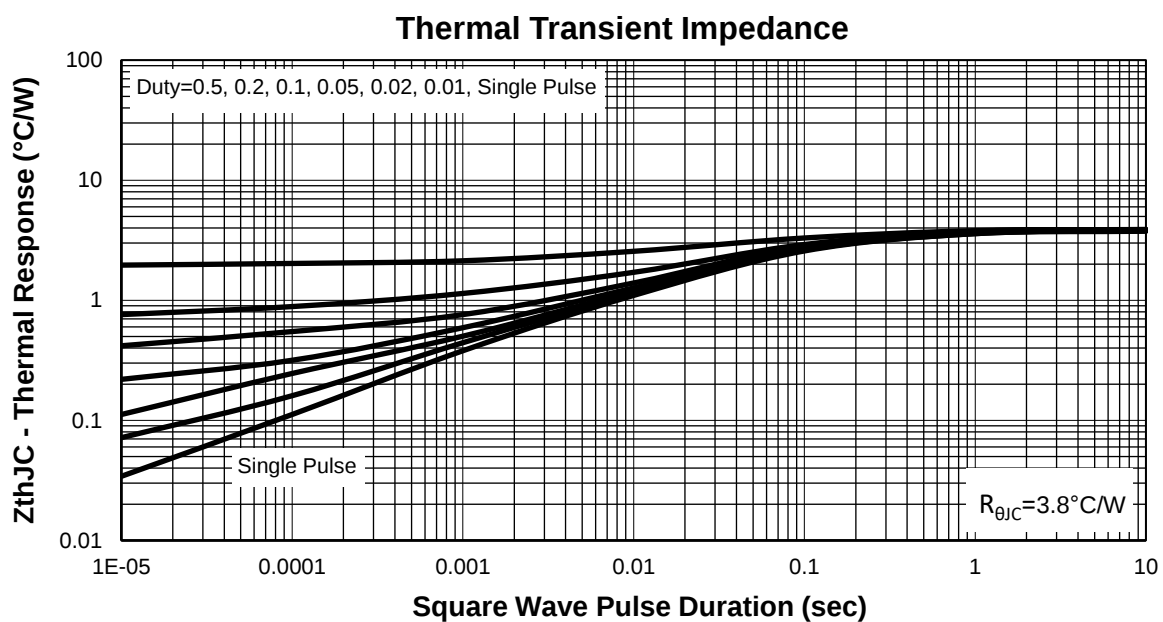
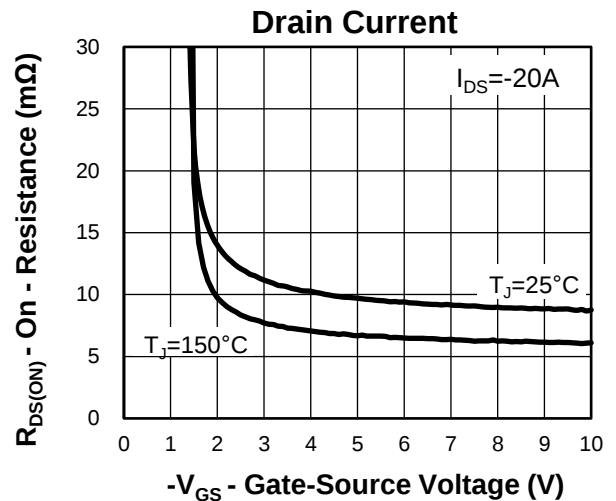
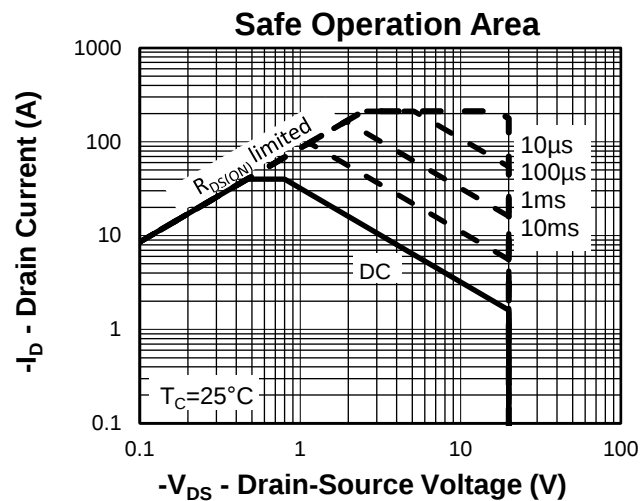
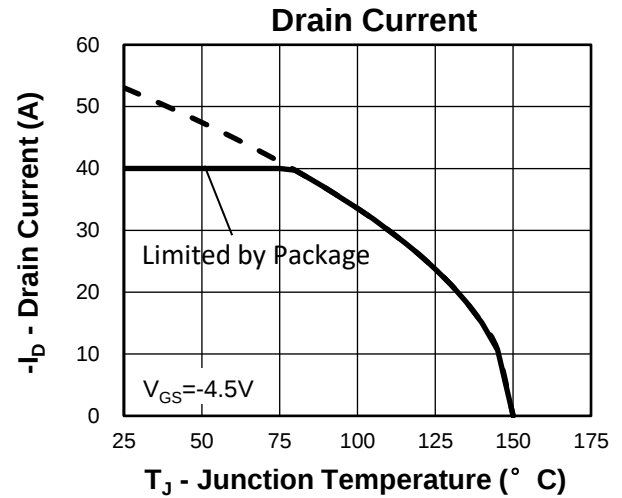
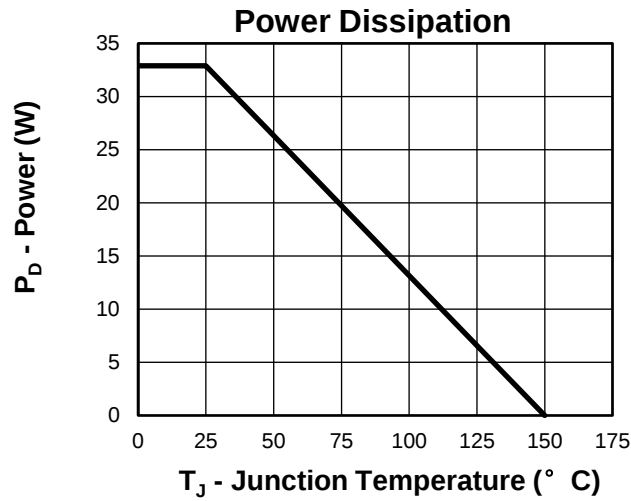
Ordering and Marking Information

Device	Package	Packaging	Quantity	Reel Size	Tape width
KS2310MB	PDFN3333	Tape&Reel	5000	13"	12mm

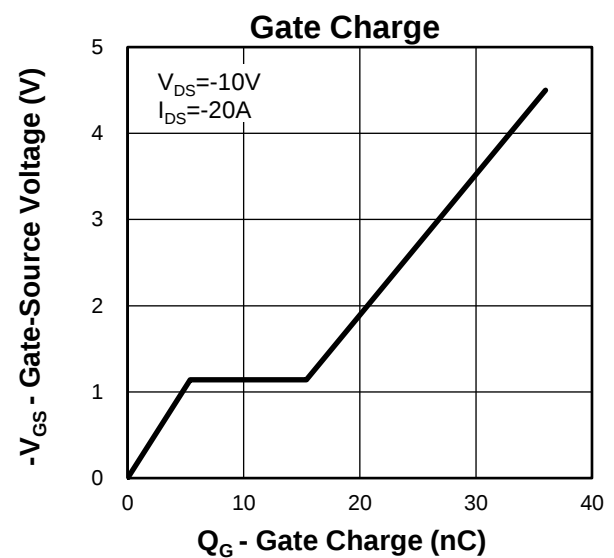
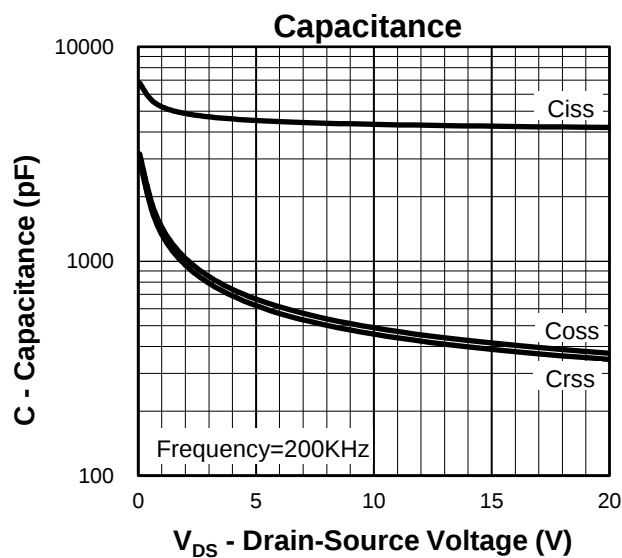
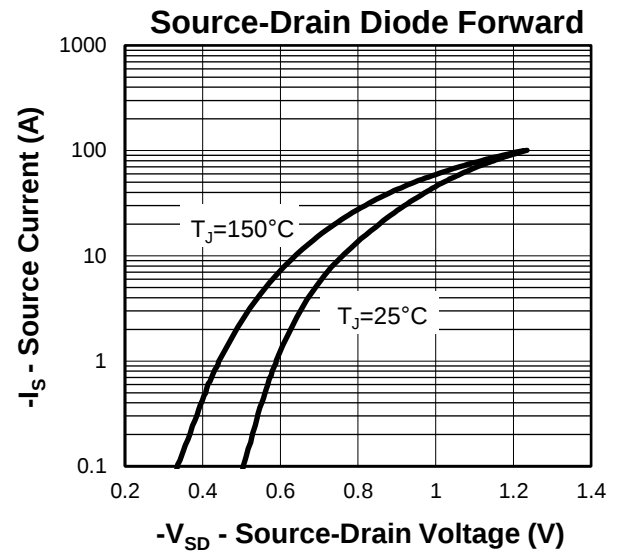
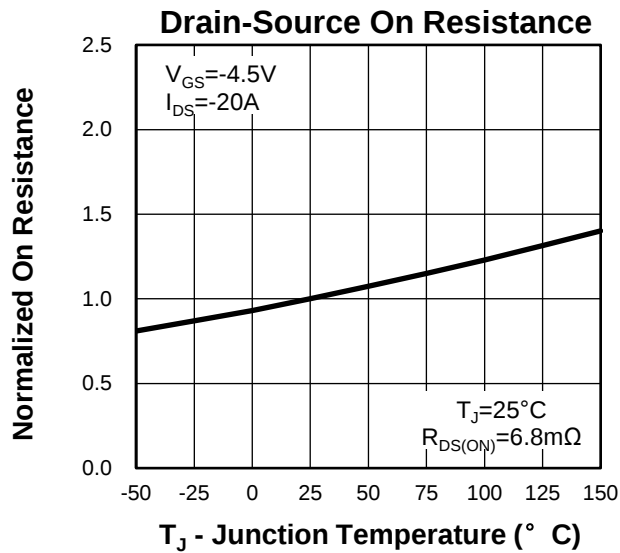
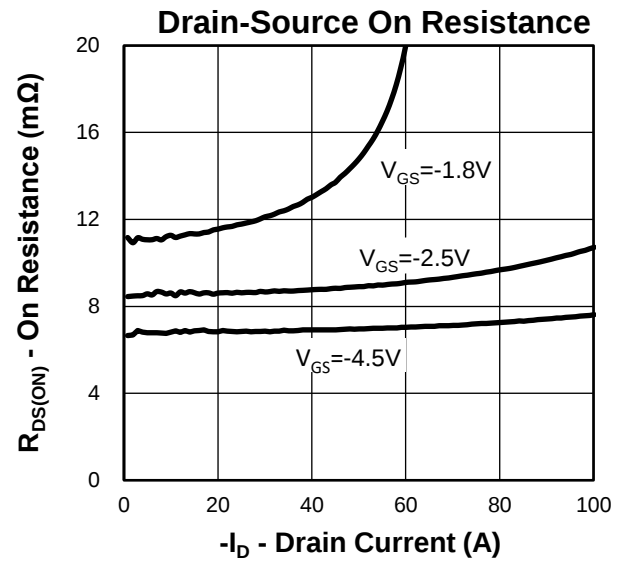
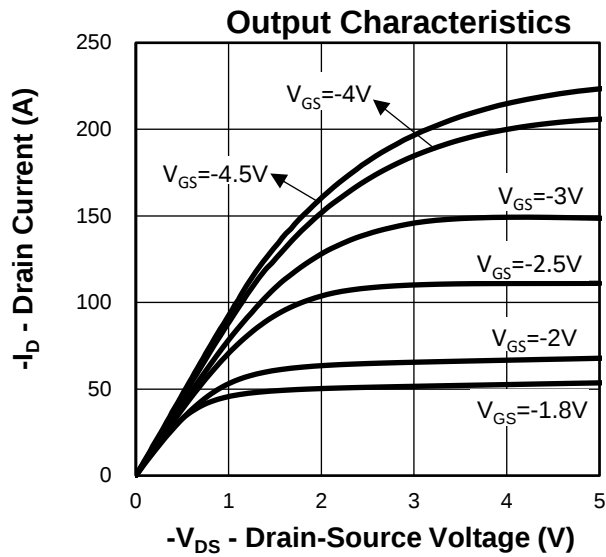


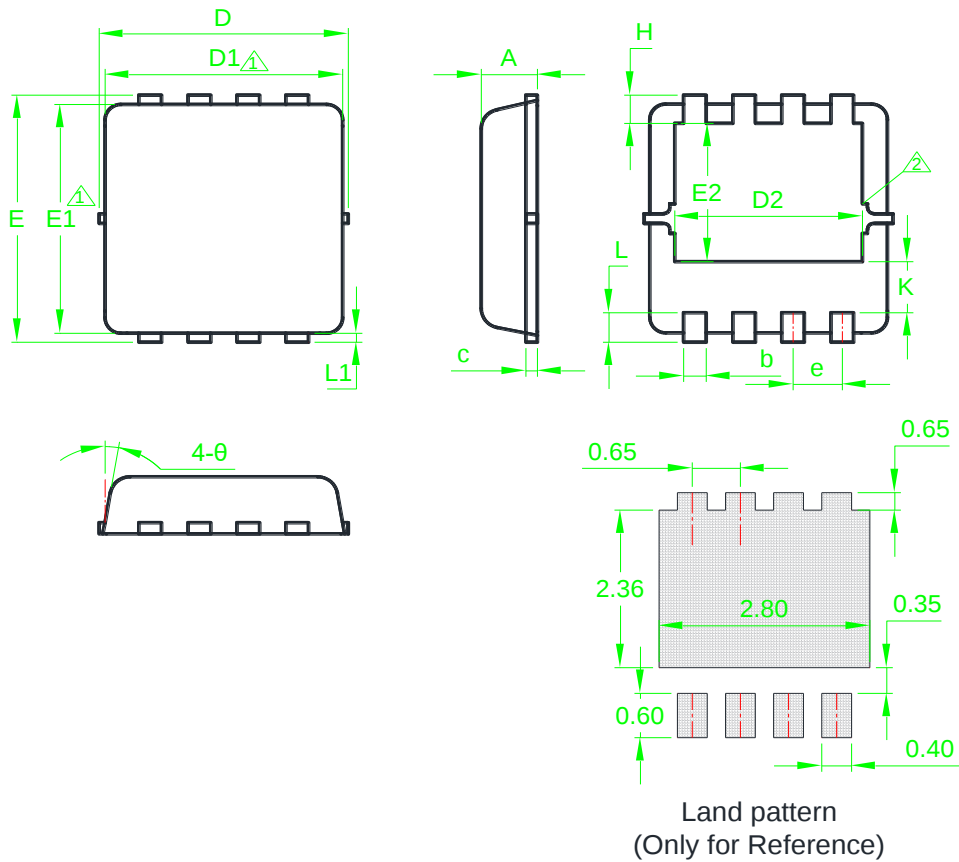
1st Line: Kwansemi Code(KS)
 2nd Line: Part Number(2310)
 3rd Line: Lot Number(YWWXXX)

Typical Characteristics



Typical Characteristics



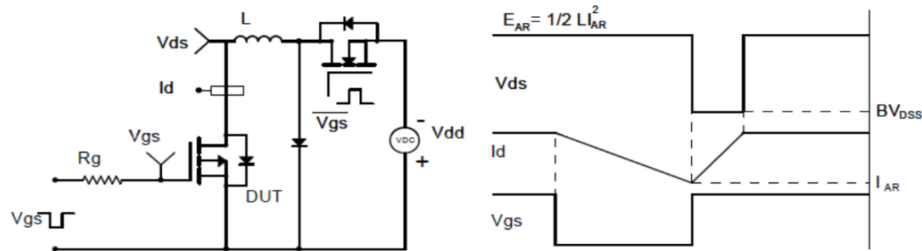
Package Information
PDFN3333


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							

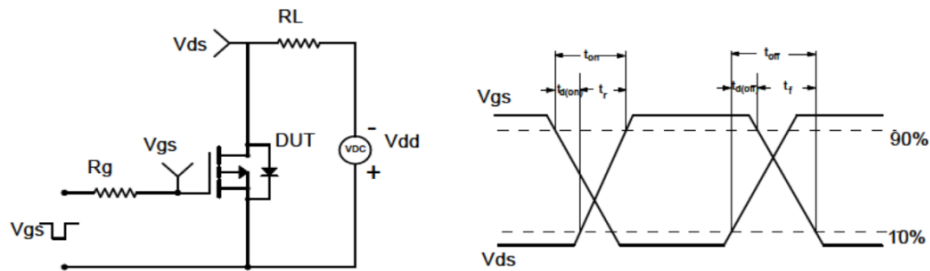
① Dimensions D1 and E1 do not include mold flash protrusions or gate burrs.

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

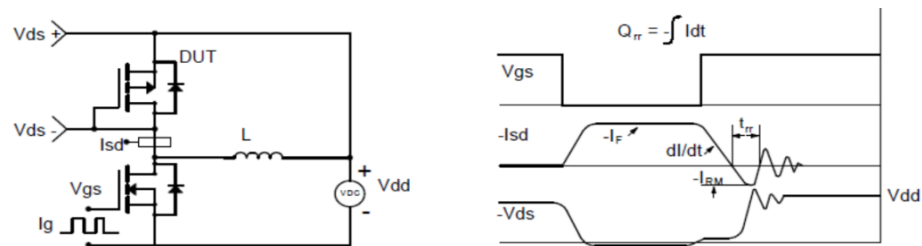
Avalanche Test Circuit and Waveforms



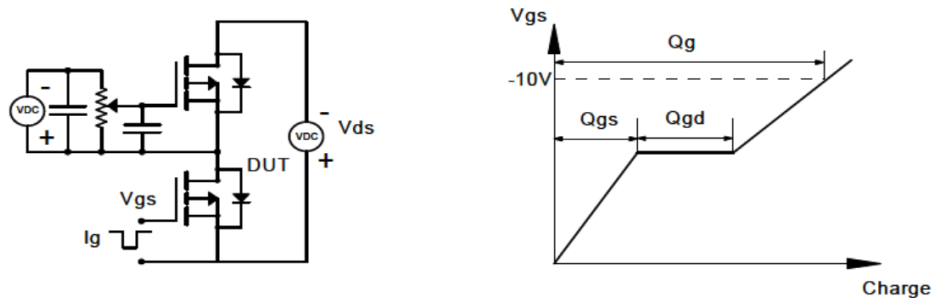
Switching Time Test Circuit and Waveforms



Diode Recovery Test Circuit and Waveforms



Gate Charge Test Circuit and Waveform



Customer Service

Kwansemi Semiconductor Co.,Ltd

Email:Sales@kwansemi.com

Web:www.kwansemi.com

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