

Features

- -30V/-34A,
 $R_{DS(ON)} = 15m\Omega(Typ.)@V_{GS}=-10V$
 $R_{DS(ON)} = 21m\Omega(Typ.)@V_{GS}=-4.5V$
- Low $R_{DS(ON)}$
- Super High Dense Cell Design
- Fast Switching Speed
- 100% Avalanche Tested

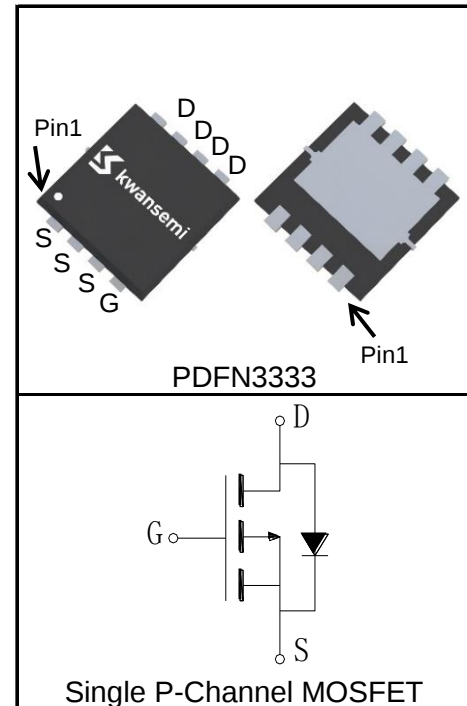
Applications

- Switching Application Systems



Halogen-Free

Pin Description



Absolute Maximum Ratings

Symbol	Parameter		Rating	Unit
Common Ratings (T _C =25°C Unless Otherwise Noted)				
V _{DSS}	Drain-Source Voltage		-30	V
V _{GSS}	Gate-Source Voltage		±20	
T _{Jmax}	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	-34	A
Mounted on Large Heat Sink				
I _{DP} ^①	Pulse Drain Current	T _C =25°C	-136	A
I _D ^②	Continuous Drain Current@T _C (V _{GS} =-10V)	T _C =25°C	-34	A
		T _C =100°C	-21	
	Continuous Drain Current@T _A (V _{GS} =-10V) ^③	T _A =25°C	-11	
		T _A =70°C	-9	
P _D	Maximum Power Dissipation@T _C	T _C =25°C	29	W
		T _C =100°C	11	
	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	4.2	°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	90	mJ

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

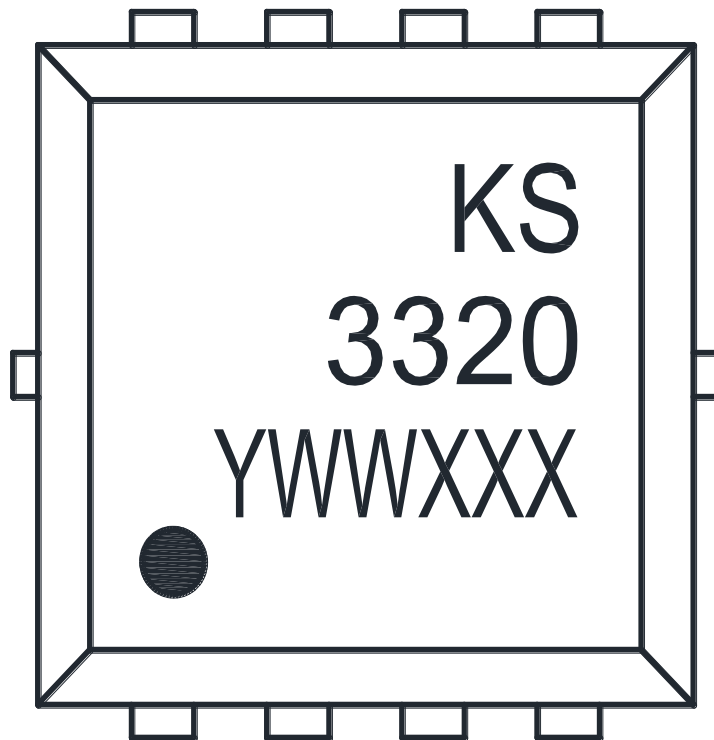
Symbol	Parameter	Test Condition	KS3320MA			Unit
			Min.	Typ.	Max.	
Static Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _{DS} =-250μA	-30			V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =-30V, V _{GS} =0V			-1	μA
		T _J =125°C			-30	
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _{DS} =-250μA	-1.1	-1.5	-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} =-14A		15	18	mΩ
		V _{GS} =-4.5V, I _{DS} =-10A		21	28	mΩ
Diode Characteristics						
V _{SD} ^⑤	Diode Forward Voltage	I _{SD} =-14A, V _{GS} =0V		-0.9	-1.2	V
t _{rr}	Reverse Recovery Time	I _{SD} =-14A, dI _{SD} /dt=100A/μs		17		ns
Q _{rr}	Reverse Recovery Charge			26		nC
Dynamic Characteristics ^⑥						
R _G	Gate Resistance	V _{GS} =0V, V _{DS} =0V, F=1MHz		8		Ω
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =-15V, Frequency=1.0MHz		1385		pF
C _{oss}	Output Capacitance			165		
C _{rss}	Reverse Transfer Capacitance			150		
t _{d(ON)}	Turn-on Delay Time	V _{DD} =-15V, I _{DS} =-14A, V _{GS} =-10V, R _G =3Ω		16		ns
t _r	Turn-on Rise Time			20		
t _{d(OFF)}	Turn-off Delay Time			37		
t _f	Turn-off Fall Time			25		
Gate Charge Characteristics ^⑥						
Q _g	Total Gate Charge	V _{DS} =-15V, V _{GS} =-10V, I _{DS} =-14A		31		nC
Q _{gs}	Gate-Source Charge			5.2		
Q _{gd}	Gate-Drain Charge			5.9		

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 $T_{J\text{max}}$, Starting $T_J = 25^\circ\text{C}$, $I_{AS\text{max}} = -19\text{A}$, $L = 0.5\text{mH}$, $V_{DD} = -20\text{V}$, $R_G = 25\Omega$, $V_{GS} = -10\text{V}$. Part not recommended for use above this value. 100% Final Test at $I_{AS} = -10\text{A}$, $L = 0.5\text{mH}$.
- ⑤Pulse test; Pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$.
- ⑥Guaranteed by design, not subject to production testing.

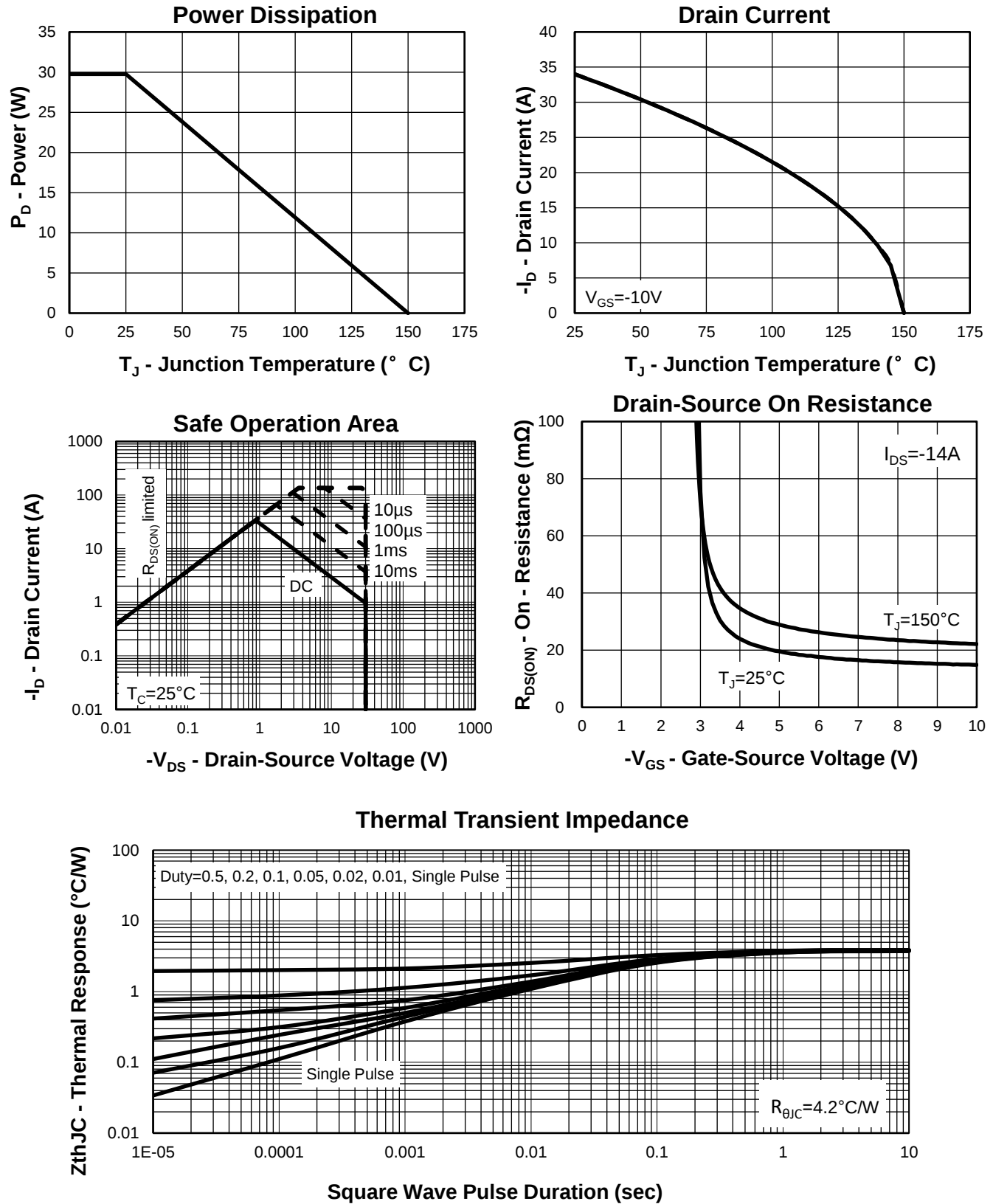
Ordering and Marking Information

Device	Package	Packaging	Quantity	Reel Size	Tape width
KS3320MA	PDFN3333	Tape&Reel	5000	13"	12mm

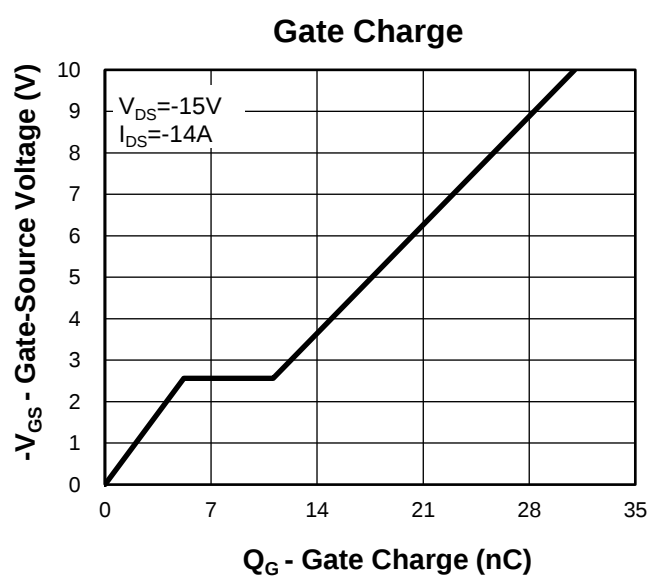
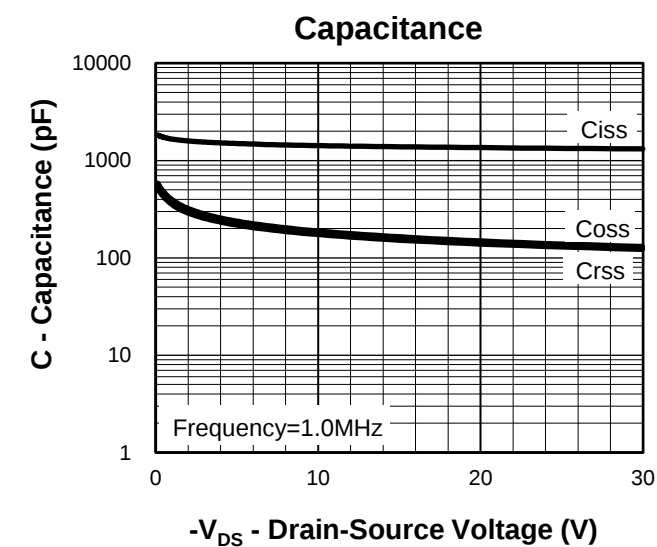
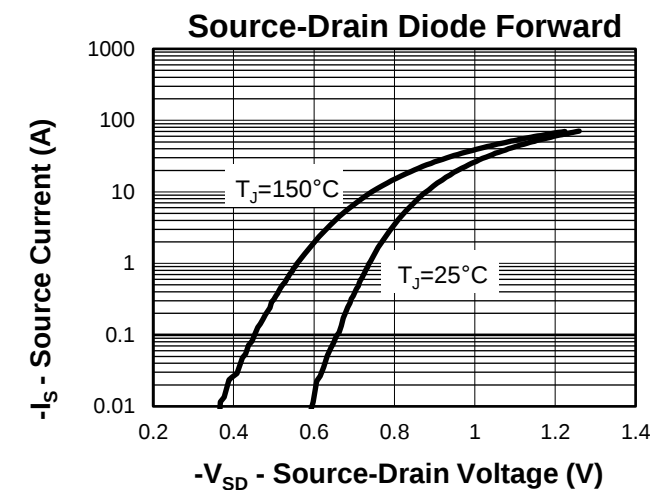
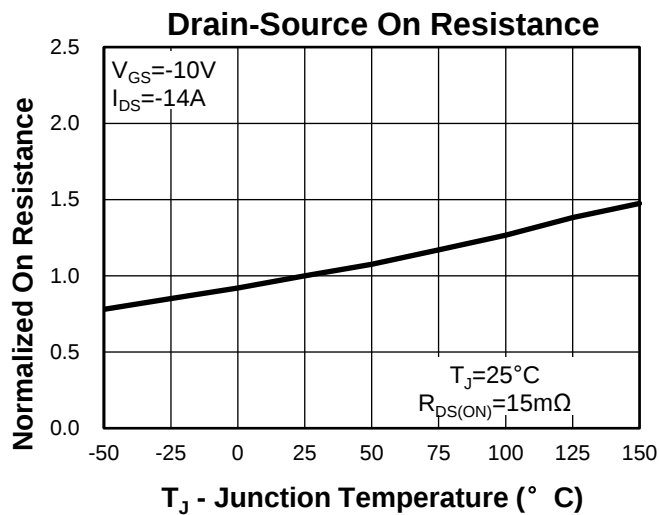
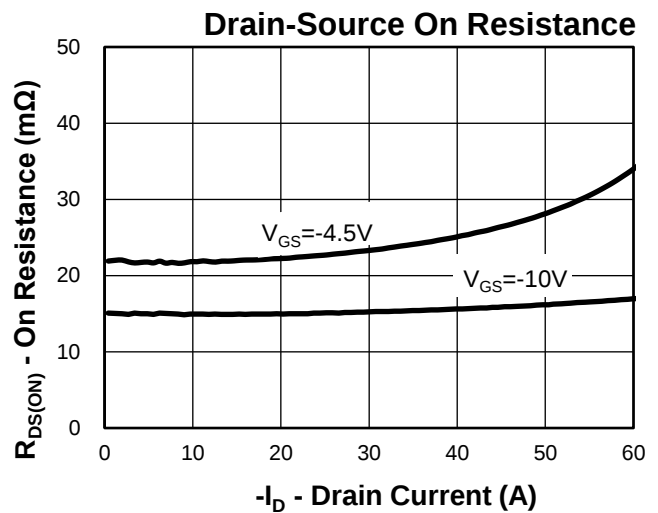
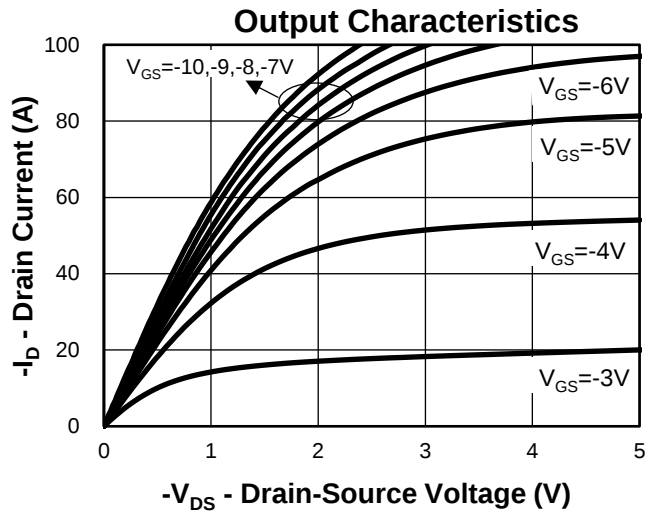


1st Line: Kwansemi Code(KS)
 2nd Line: Part Number(3320)
 3rd Line: Lot Number(YWWXXX)

Typical Characteristics

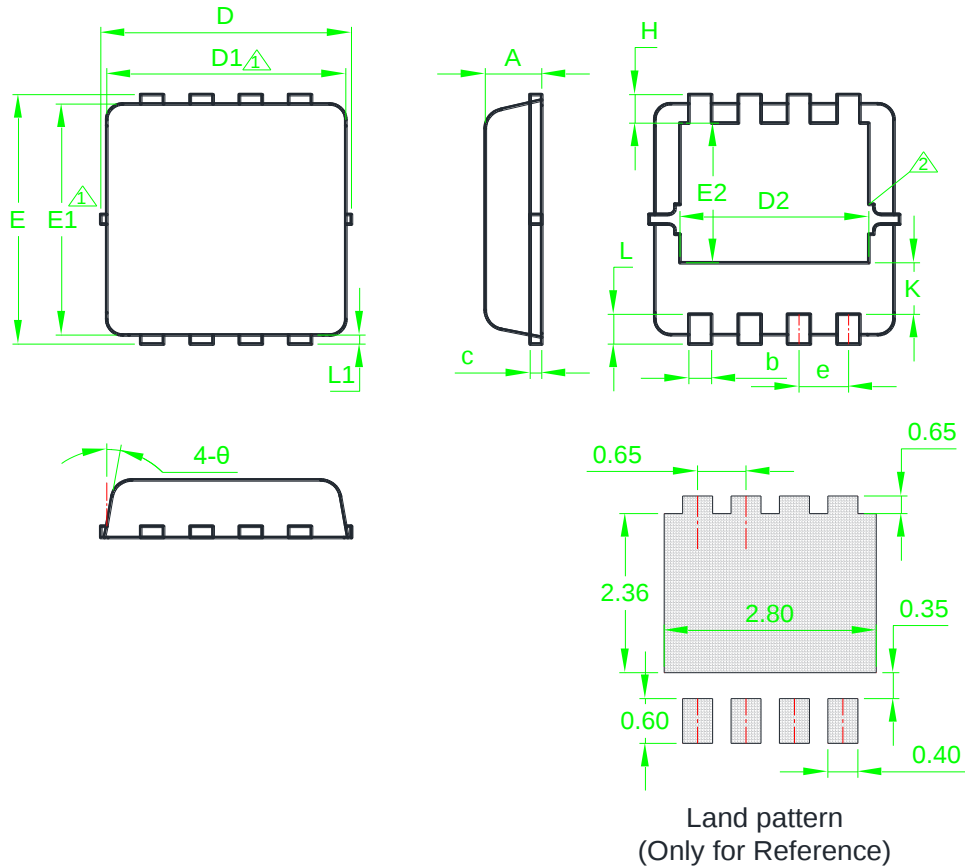


Typical Characteristics



Package Information

PDFN3333

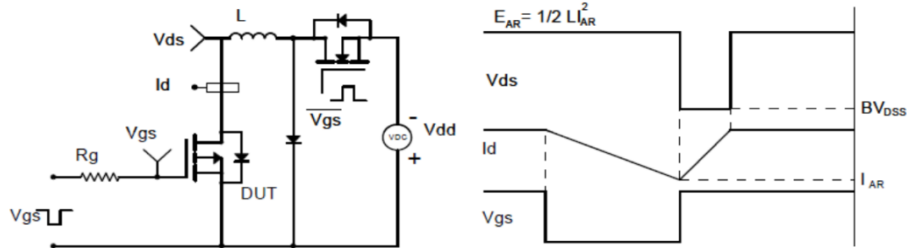


SYMBOL	MM			INCH			SYMBOL	MM			INCH		
	MIN	NOM	MAX	MIN	NOM	MAX		MIN	NOM	MAX	MIN	NOM	MAX
A	0.70	0.80	0.90	0.028	0.031	0.035	E2	1.40	*	1.95	0.055	*	0.077
b	0.25	0.30	0.35	0.010	0.012	0.014	e	0.65BSC			0.026BSC		
c	0.10	0.20	0.30	0.004	0.008	0.012	H	0.30	0.40	0.50	0.012	0.016	0.020
D	3.20	3.30	3.40	0.126	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							

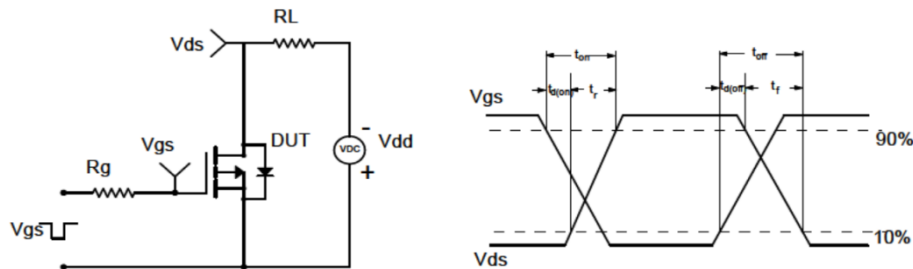
① Dimensions D1 and E1 do not include mold flash protrusions or gate burrs.

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

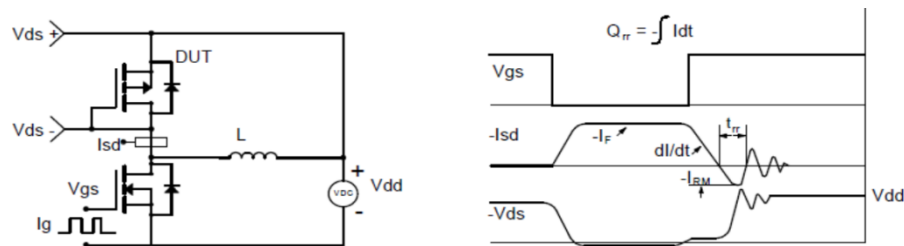
Avalanche Test Circuit and Waveforms



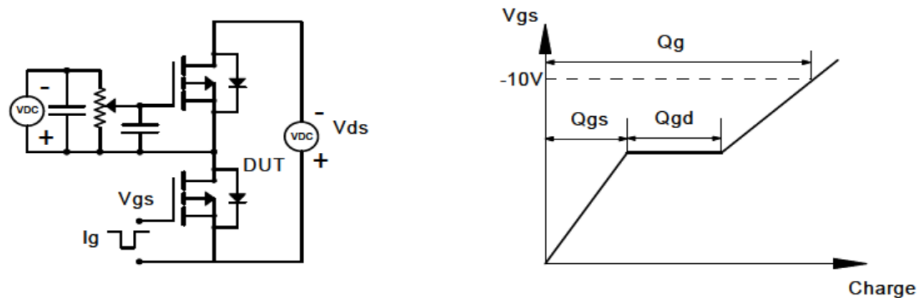
Switching Time Test Circuit and Waveforms



Diode Recovery Test Circuit and Waveforms



Gate Charge Test Circuit and Waveform



Customer Service

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