

Features

- -40V/-45A,
 $R_{DS(ON)} = 13m\Omega(Typ.)@V_{GS}=-10V$
 $R_{DS(ON)} = 18m\Omega(Typ.)@V_{GS}=-4.5V$
- Low $R_{DS(ON)}$
- Super High Dense Cell Design
- Reliable and Rugged
- 100% Avalanche Tested

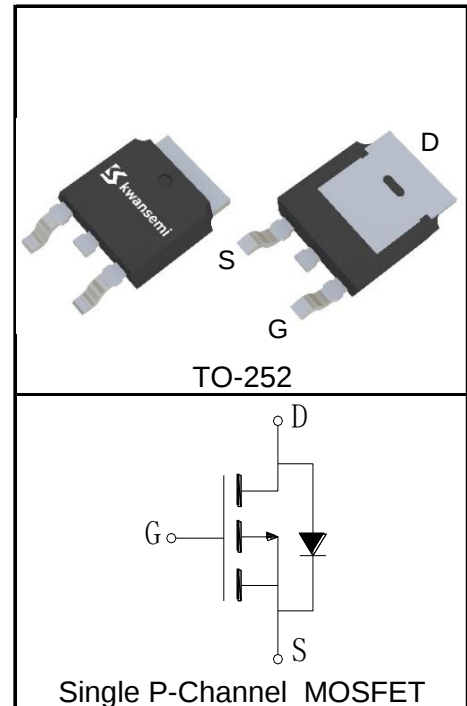
Applications

- Power Switching Appliaction
- Load Switching



Halogen-Free

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	175	$^\circ\text{C}$
T_J, T_{STG}	Operating and Storage Temperature Range	-55 to 175	$^\circ\text{C}$
I_S	Diode Continuous Forward Current	$T_C=25^\circ\text{C}$ -45	A
Mounted on Large Heat Sink			
$I_{DP}^{①}$	Pulse Drain Current	$T_C=25^\circ\text{C}$ -180	A
$I_D^{②}$	Continuous Drain Current($V_{GS}=-10V$)	$T_C=25^\circ\text{C}$ -45	A
		$T_C=100^\circ\text{C}$ -31	
P_D	Maximum Power Dissipation	$T_C=25^\circ\text{C}$ 55	W
		$T_C=100^\circ\text{C}$ 27	
$R_{\theta JC}$	Thermal Resistance-Junction to Case	2.7	$^\circ\text{C/W}$
$R_{\theta JA}^{③}$	Thermal Resistance-Junction to Ambient	100	$^\circ\text{C/W}$
Drain-Source Avalanche Ratings			
$E_{AS}^{④}$	Avalanche Energy, Single Pulsed	169	mJ

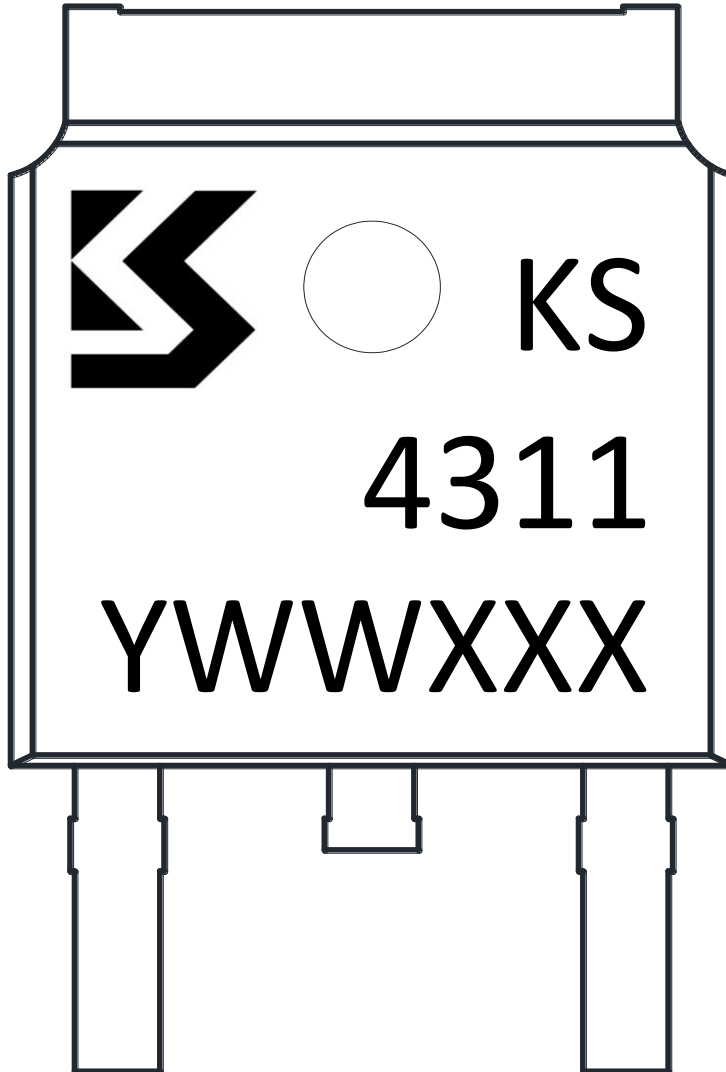
Electrical Characteristics ($T_C=25^{\circ}\text{C}$ Unless Otherwise Noted)

Symbol	Parameter	Test Condition	KS4311DA			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	-1.8	-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} =-20A		13	16	mΩ
		V _{GS} =-4.5V, I _{DS} =-15A		18	23	mΩ
Diode Characteristics						
V _{SD} ⑤	Diode Forward Voltage	I _{SD} =-20A, V _{GS} =0V		-0.89	-1.2	V
t _{rr}	Reverse Recovery Time	I _{SD} =-20A, dI _{SD} /dt=-100A/μs		62		ns
Q _{rr}	Reverse Recovery Charge			53		nC
Dynamic Characteristics ⑥						
R _G	Gate Resistance	V _{GS} =0V, V _{DS} =0V, F=1MHz		17		Ω
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =-20V, Frequency=1.0MHz		2440		pF
C _{oss}	Output Capacitance			200		
C _{rss}	Reverse Transfer Capacitance			155		
t _{d(ON)}	Turn-on Delay Time	V _{DD} =-20V, I _{DS} =-20A, V _{GEN} =-10V, R _G =3Ω		23		ns
t _r	Turn-on Rise Time			28		
t _{d(OFF)}	Turn-off Delay Time			67		
t _f	Turn-off Fall Time			19		
Gate Charge Characteristics ⑥						
Q _g	Total Gate Charge	V _{DS} =-20V, V _{GS} =-10V, I _{DS} =-20A		48		nC
Q _{gs}	Gate-Source Charge			8.5		
Q _{gd}	Gate-Drain Charge			13		

- 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 $T_J = 25^{\circ}\text{C}$, $I_{ASmax} = -26A$, $L=0.5\text{mH}$, $V_{DD} = -20V$, $R_G = 25\Omega$, $V_{GS}=-10V$. Part not recommended for use above this value. 100% Final Test at $I_{AS}=-19A$, $L=0.5\text{mH}$.
 - ⑤ Pulse test; Pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
 - ⑥ Guaranteed by design, not subject to production testing.

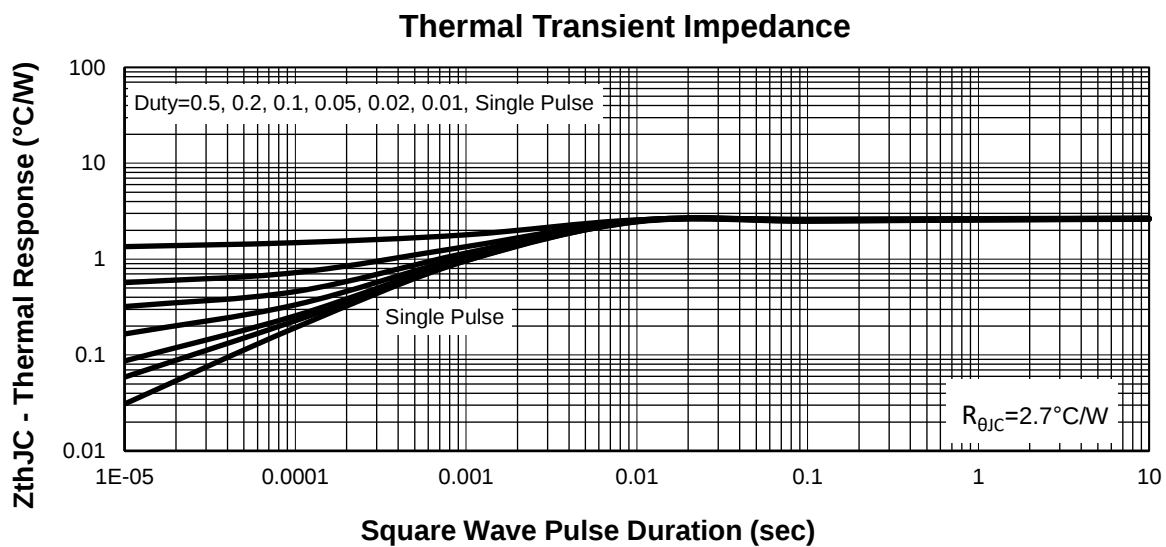
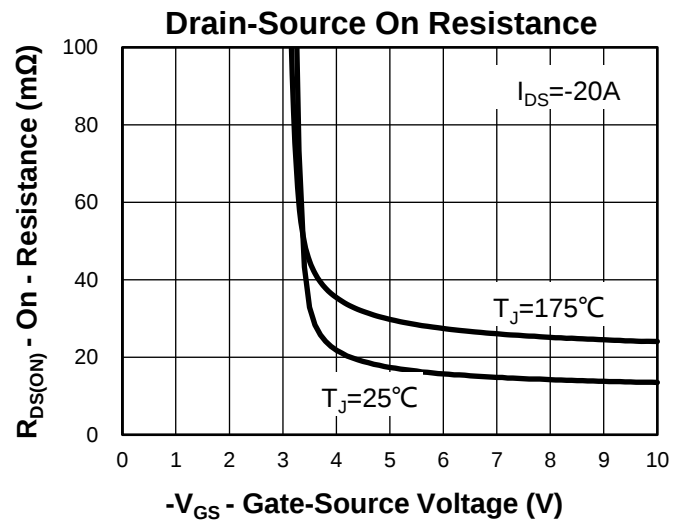
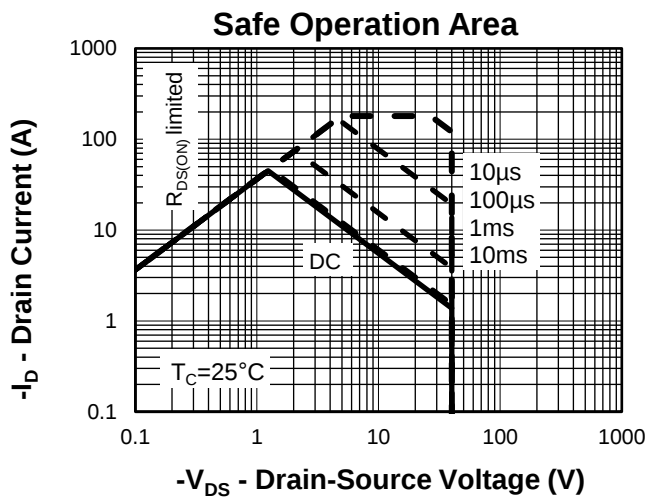
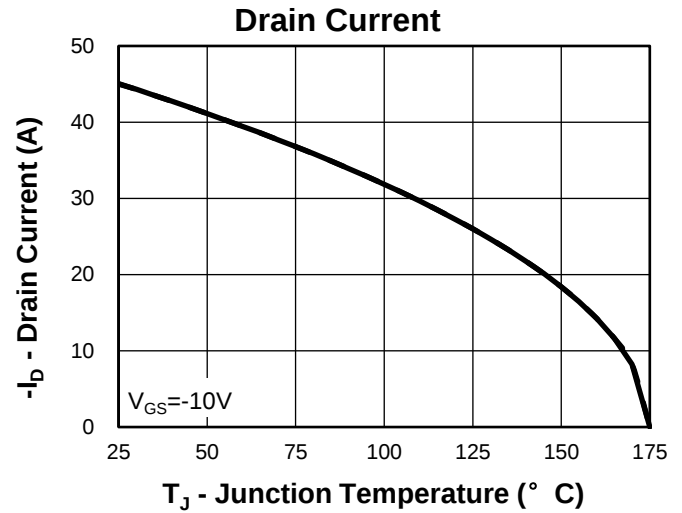
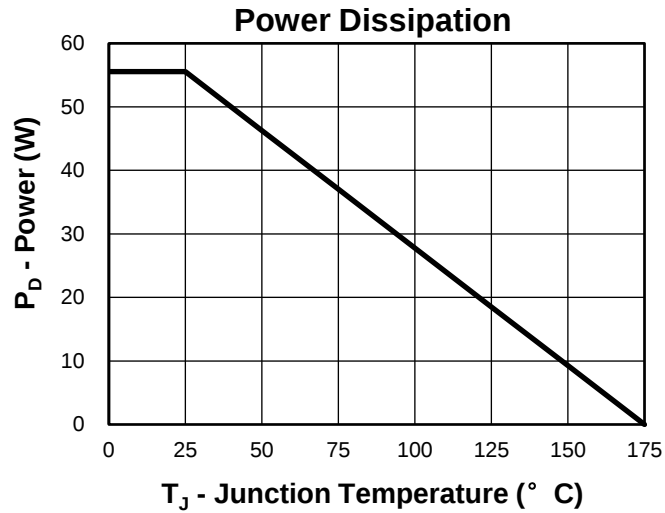
Ordering and Marking Information

Device	Package	Packaging	Quantity	Reel Size	Tape width
KS4311DA	TO-252	Tape&Reel	2500	13"	16mm

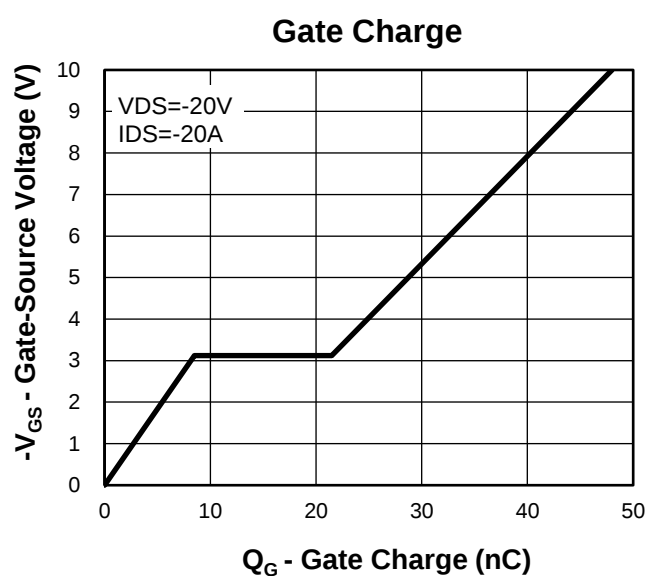
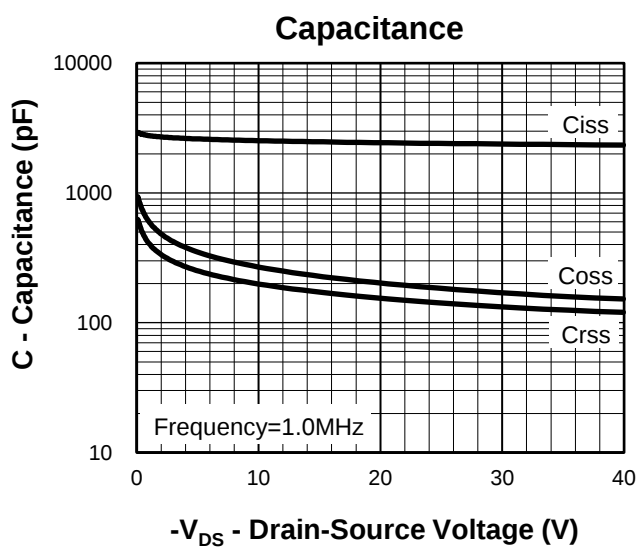
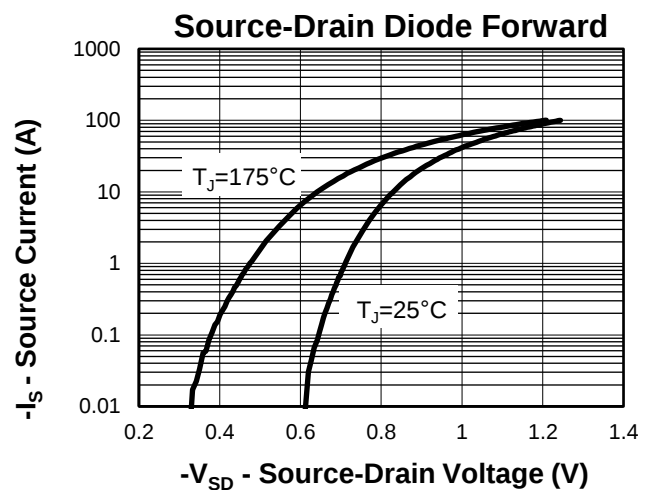
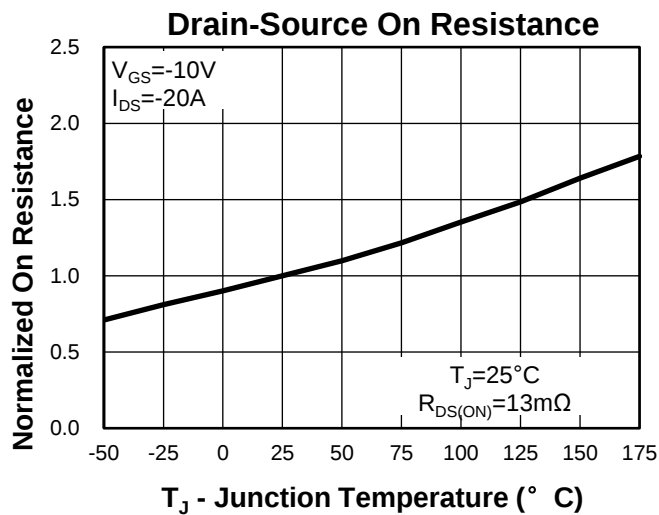
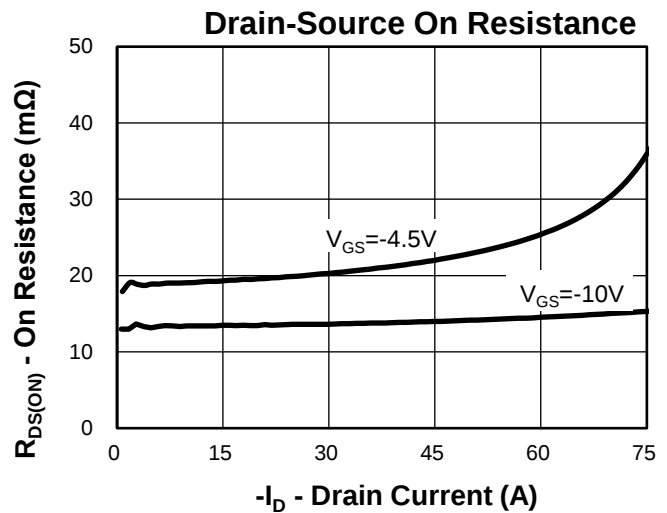
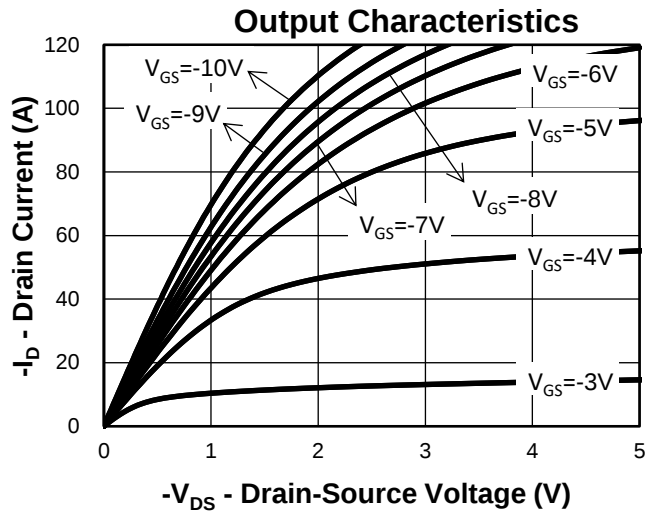


1st Line: Kwansemi LOGO, Kwansemi Code(KS)
2nd Line: Part Number(4311)
3rd Line: Lot Number(YWWXXX)

Typical Characteristics

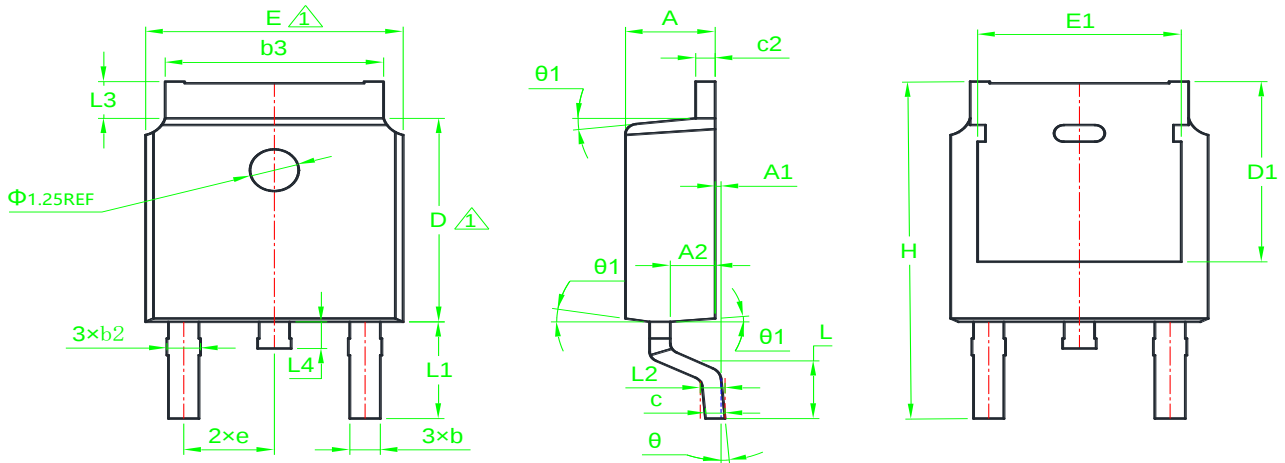


Typical Characteristics



Package Information

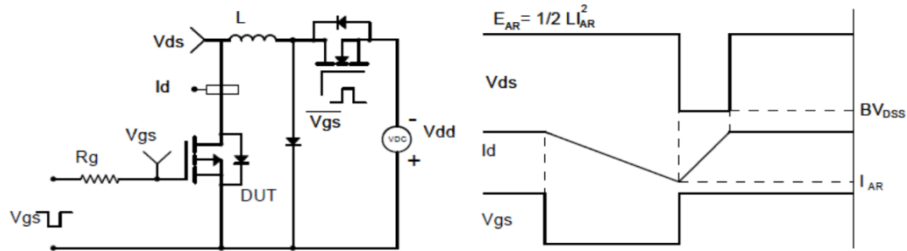
TO-252



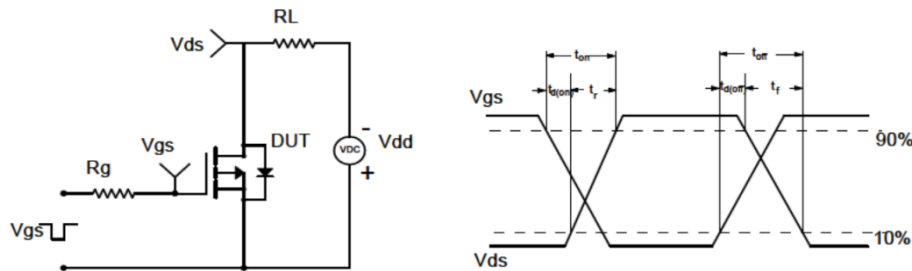
SYMBOL	MM			INCH			SYMBOL	MM			INCH		
	MIN	NOM	MAX	MIN	NOM	MAX		MIN	NOM	MAX	MIN	NOM	MAX
A	2.20	2.30	2.38	0.087	0.091	0.094	E	6.40	6.60	6.70	0.252	0.260	0.264
A1	0.00	*	0.15	0.000	*	0.006	E1	4.55	*	5.15	0.179	*	0.203
A2	0.90	1.00	1.10	0.035	0.039	0.043	H	9.60	10.10	10.40	0.378	0.398	0.409
b	0.65	0.75	0.85	0.026	0.030	0.033	L	1.40	1.50	1.70	0.055	0.059	0.067
b2	0.72	*	0.90	0.028	*	0.035	L1	2.90REF			0.114REF		
b3	5.13	5.33	5.46	0.202	0.210	0.215	L2	0.508BSC			0.020BSC		
c	0.47	0.51	0.54	0.019	0.020	0.021	L3	0.90	*	1.25	0.035	*	0.049
D	6.00	6.10	6.20	0.236	0.240	0.244	L4	0.60	*	1.00	0.024	*	0.039
D1	5.25	5.35	5.60	0.207	0.211	0.220	theta	0°	*	10°	0°	*	10°
e	2.286BSC			0.090BSC			theta1	5°	*	9°	5°	*	9°

△ Dimensions D and E do not include mold flash protrusions or gate burrs.

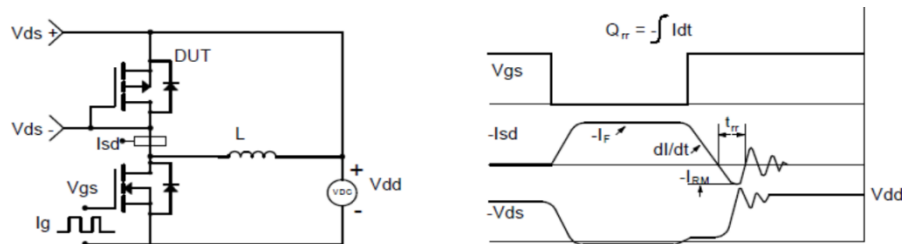
Avalanche Test Circuit and Waveforms



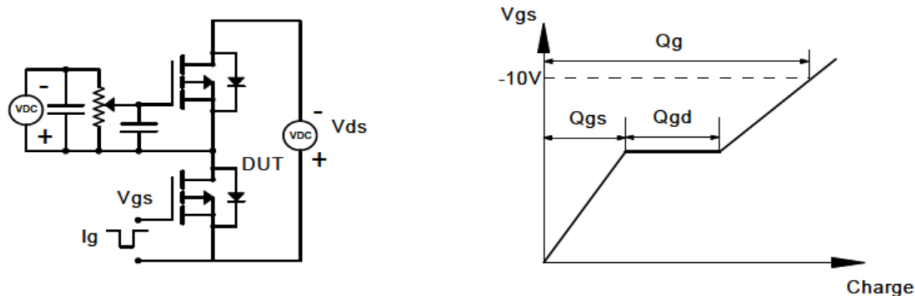
Switching Time Test Circuit and Waveforms



Diode Recovery Test Circuit and Waveforms



Gate Charge Test Circuit and Waveform



Customer Service

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