

Features

- 100V/420A,
 $R_{DS(ON)} = 1.1m\Omega(Typ.)@V_{GS}=10V$
- Excellent $Q_G \times R_{DS(on)}$ product(FOM)
- SGT Technology
- 100% Avalanche Tested
- Good Thermal Performance

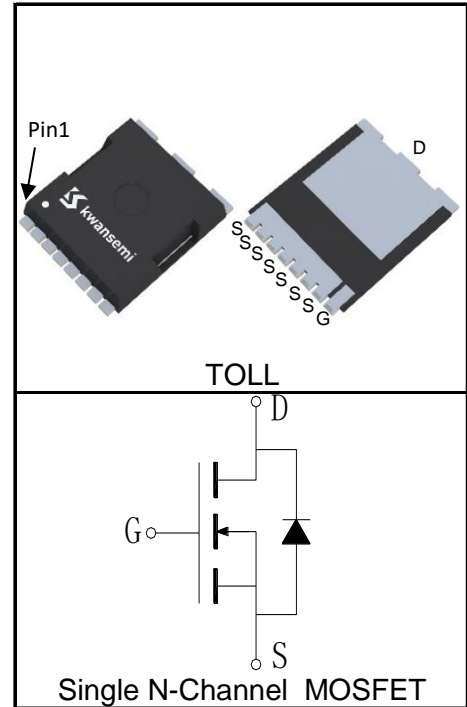
Applications

- Motor Control
- Battery Power Management



Halogen-Free

Pin Description



Absolute Maximum Ratings

Symbol	Parameter	Rating	Unit	
Common Ratings ($T_C=25^\circ C$ Unless Otherwise Noted)				
V_{DSS}	Drain-Source Voltage	100	V	
V_{GSS}	Gate-Source Voltage	± 20		
T_{Jmax}	Maximum Junction Temperature	175	$^\circ C$	
T_J, T_{STG}	Operating and Storage Temperature Range	-55 to 175	$^\circ C$	
I_S	Diode Continuous Forward Current	$T_C=25^\circ C$	420	A
Mounted on Large Heat Sink				
$I_{DP}^{①}$	Pulse Drain Current	$T_C=25^\circ C$	1680	A
$I_D^{②}$	Continuous Drain Current($V_{GS}=10V$)	$T_C=25^\circ C$	420	A
		$T_C=100^\circ C$	297	
P_D	Maximum Power Dissipation	$T_C=25^\circ C$	500	W
		$T_C=100^\circ C$	250	
$R_{\theta JC}$	Thermal Resistance-Junction to Case	0.3	$^\circ C/W$	
$R_{\theta JA}^{③}$	Thermal Resistance-Junction to Ambient	40	$^\circ C/W$	
Drain-Source Avalanche Ratings				
$E_{AS}^{④}$	Avalanche Energy, Single Pulsed	2162	mJ	

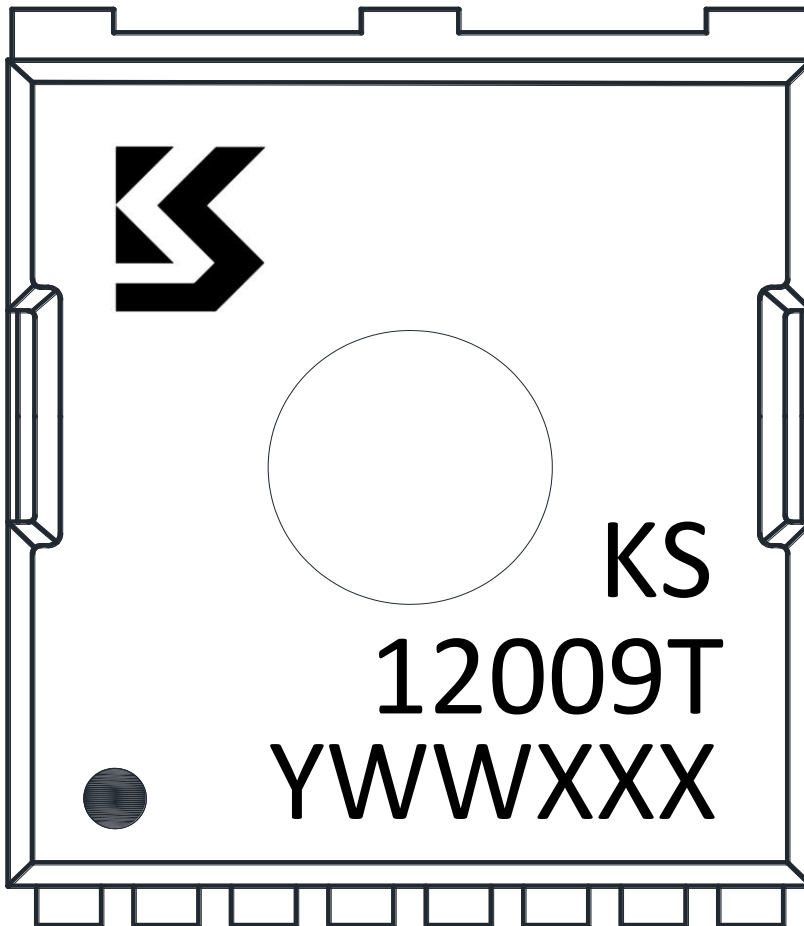
Electrical Characteristics ($T_C=25^\circ\text{C}$ Unless Otherwise Noted)

Symbol	Parameter	Test Condition	KS12009LBT			Unit
			Min.	Typ.	Max.	
Static Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_{DS}=250\mu A$	100			V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=100V, V_{GS}=0V$			1	μA
		$T_J=125^\circ C$			30	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_{DS}=250\mu A$	2	3	4	V
I_{GSS}	Gate Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$			± 100	nA
$R_{DS(ON)}^{(5)}$	Drain-Source On-state Resistance	$V_{GS}=10V, I_{DS}=40A$		1.1	1.3	$m\Omega$
		$V_{GS}=6V, I_{DS}=20A$		1.4	1.8	$m\Omega$
Diode Characteristics						
$V_{SD}^{(5)}$	Diode Forward Voltage	$I_{SD}=40A, V_{GS}=0V$		0.75	1.2	V
t_{rr}	Reverse Recovery Time	$I_{SD}=40A, dI_{SD}/dt=100A/\mu s$		84		ns
Q_{rr}	Reverse Recovery Charge			185		nC
Dynamic Characteristics⁽⁶⁾						
R_G	Gate Resistance	$V_{GS}=0V, V_{DS}=0V, F=1MHz$		1.5		Ω
C_{iss}	Input Capacitance	$V_{GS}=0V,$ $V_{DS}=50V,$ Frequency=200KHz		15510		pF
C_{oss}	Output Capacitance			3565		
C_{rss}	Reverse Transfer Capacitance			105		
$t_{d(ON)}$	Turn-on Delay Time	$V_{DD}=50V, I_{DS}=40A,$ $V_{GEN}=10V, R_G=3\Omega$		39		ns
t_r	Turn-on Rise Time			51		
$t_{d(OFF)}$	Turn-off Delay Time			116		
t_f	Turn-off Fall Time			57		
Gate Charge Characteristics⁽⁶⁾						
Q_g	Total Gate Charge	$V_{DS}=50V, V_{GS}=10V,$ $I_{DS}=40A$		226		nC
Q_{gs}	Gate-Source Charge			62		
Q_{gd}	Gate-Drain Charge			43		

- Notes:
- ① Pulse width limited by safe operating area.
 - ② Calculated continuous current based on maximum allowable junction temperature. The package limitation current is 400A.
 - 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 $T_J = 25^\circ C$, $I_{ASmax} = 93A$, $L = 0.5mH$, $V_{DD} = 48V$, $R_G = 25\Omega$, $V_{GS} = 10V$. Part not recommended for use above this value. 100% Final Test at $I_{AS} = 68A$, $L = 0.5mH$.
 - ⑤ Pulse test; Pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
 - ⑥ Guaranteed by design, not subject to production testing.

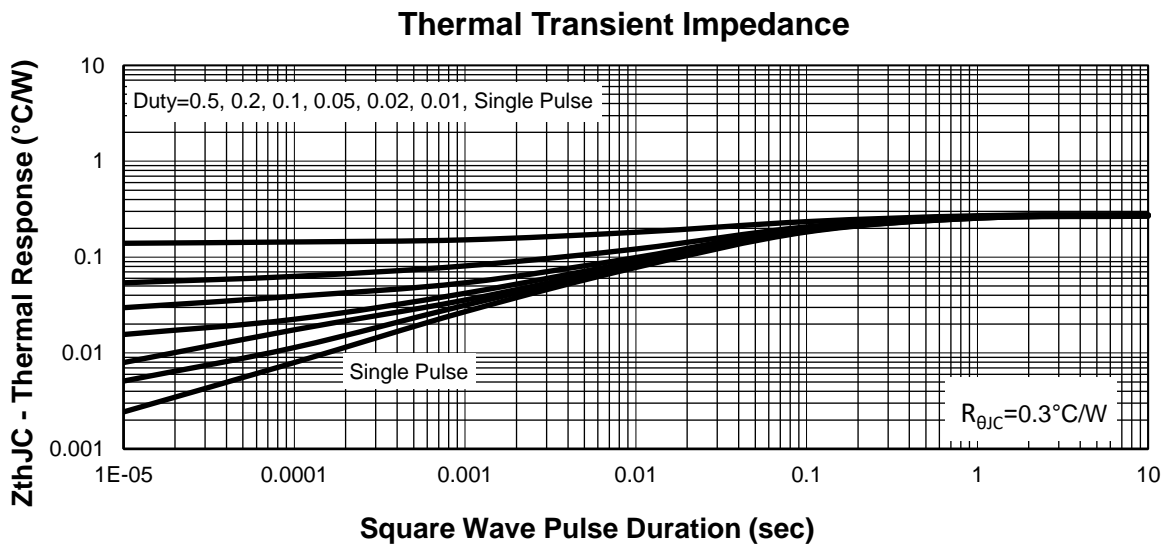
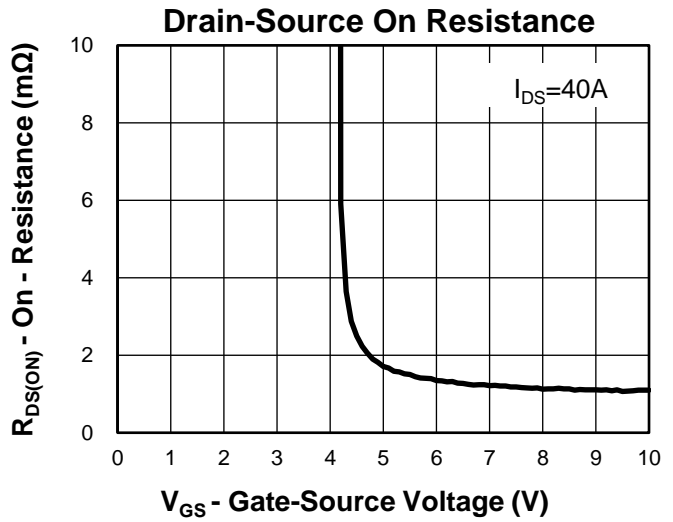
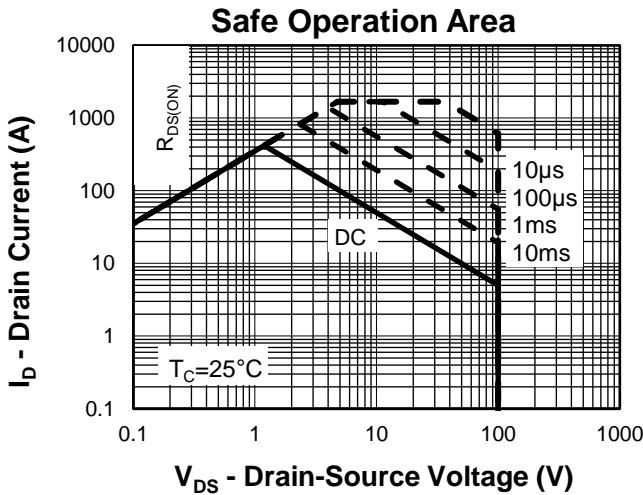
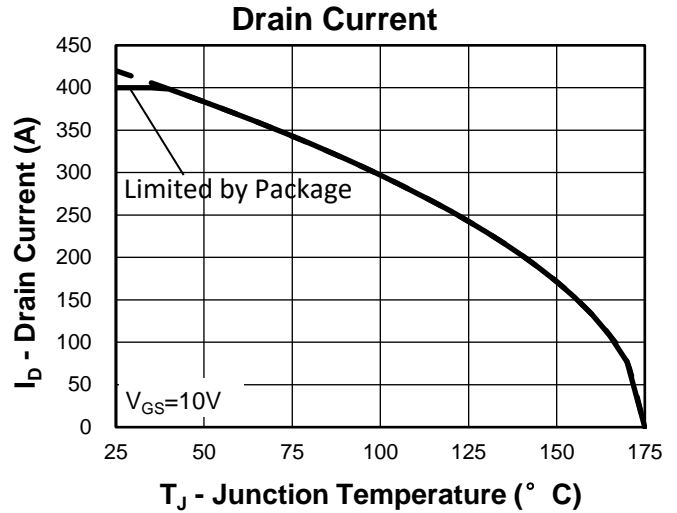
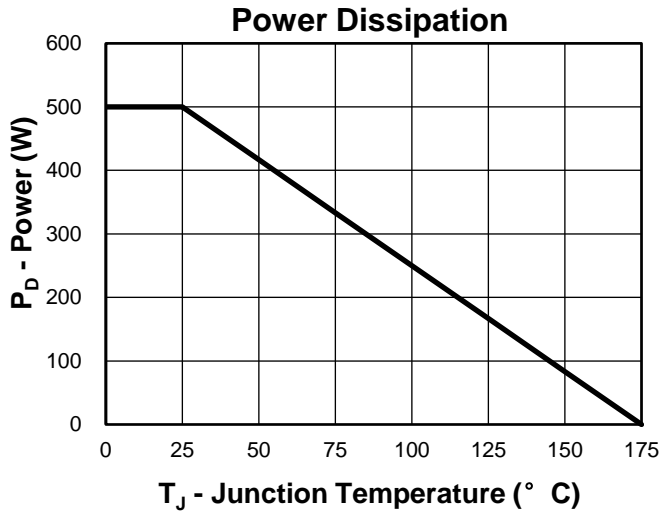
Ordering and Marking Information

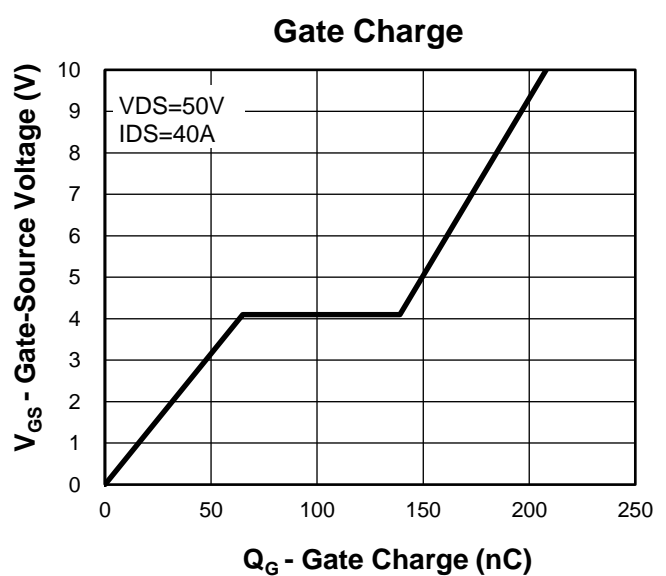
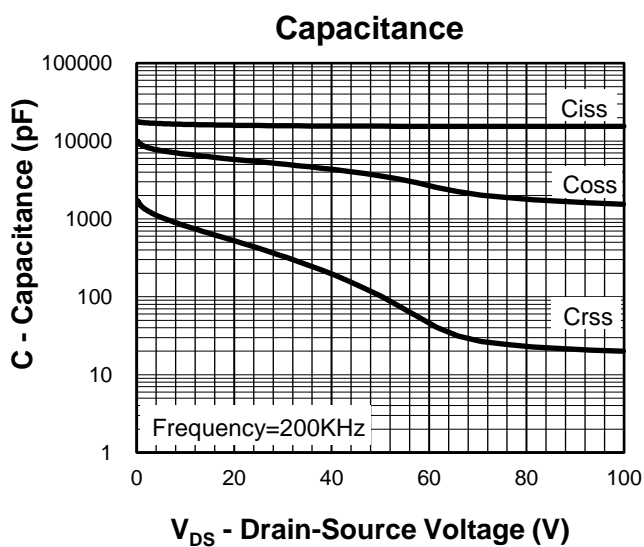
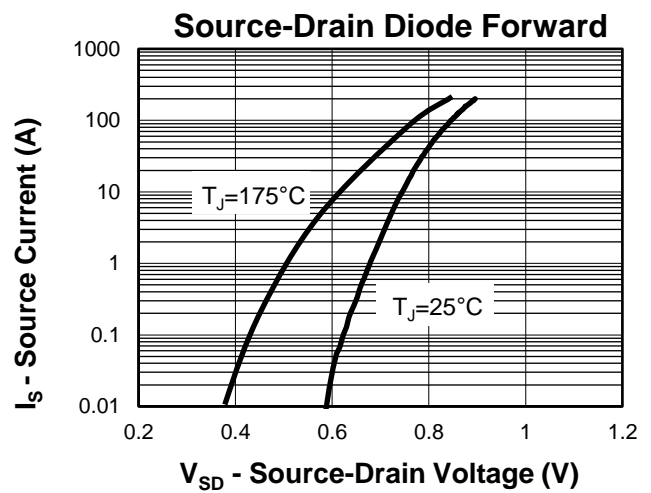
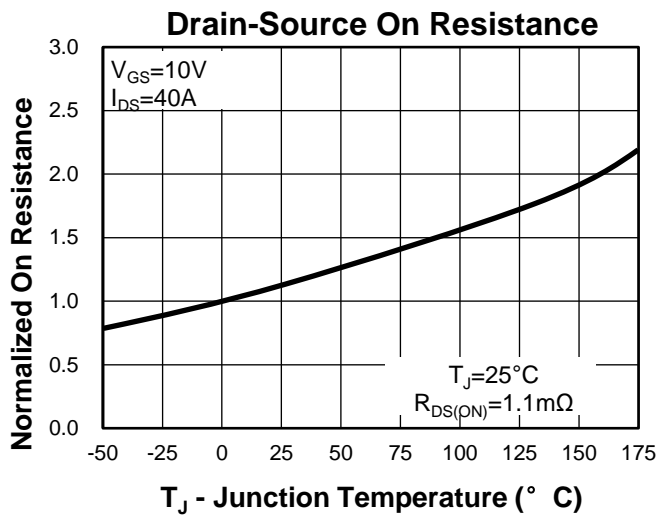
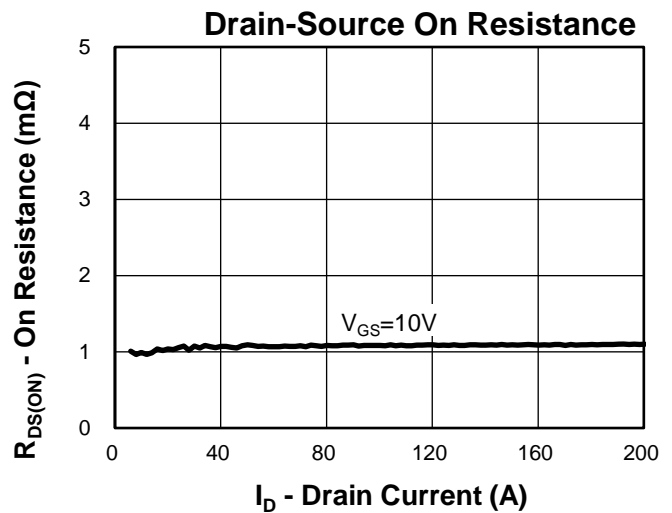
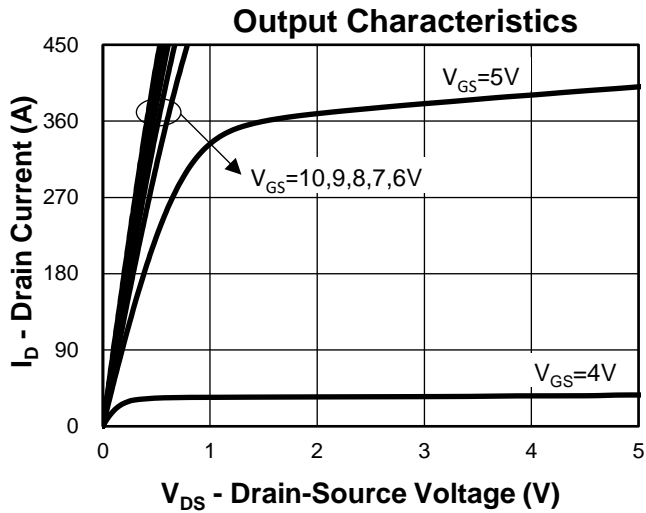
Device	Package	Packaging	Quantity	Reel Size	Tape width
KS12009LBT	TOLL	Tape&Reel	2000	13"	24mm

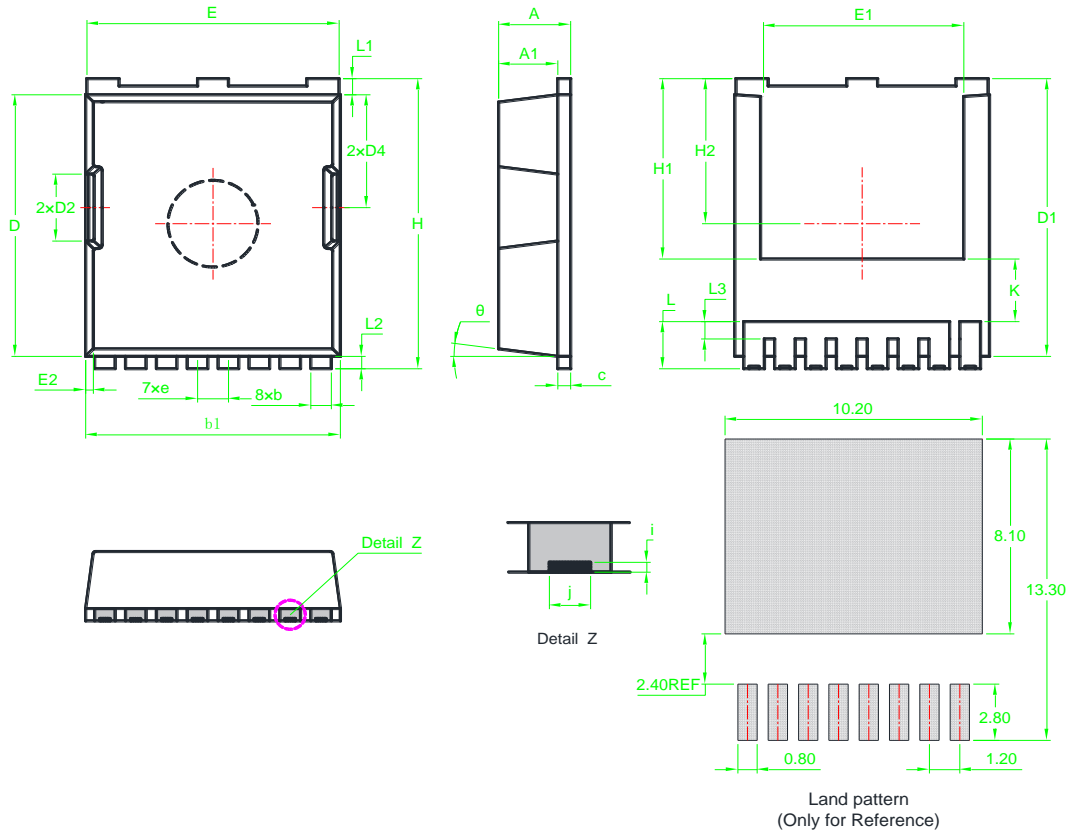


1st Line: Kwansemi LOGO
2nd Line: Kwansemi Code(KS)
3rd Line: Part Number(12009T)
4th Line: Lot Number(YWWXXX)

Typical Characteristics



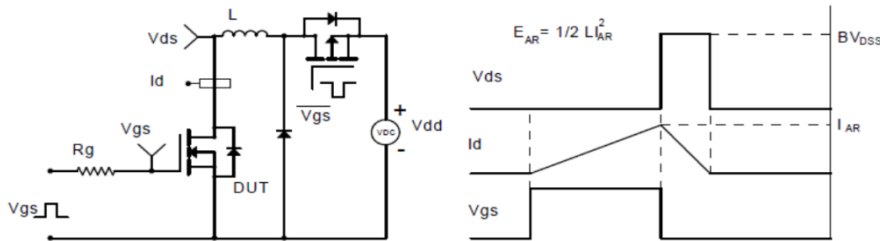
Typical Characteristics


Package Information
TOLL

 Land pattern
(Only for Reference)

SYMBOL	MM			INCH			SYMBOL	MM			INCH		
	MIN	NOM	MAX	MIN	NOM	MAX		MIN	NOM	MAX	MIN	NOM	MAX
A	2.20	2.30	2.40	0.087	0.091	0.094	e	1.20BSC			0.047REF		
A1	1.70	1.80	1.90	0.067	0.071	0.075	H	11.58	11.68	11.78	0.455906	0.459843	0.46378
b	0.65	*	0.90	0.026	*	0.035	H1	6.95BSC			0.274BSC		
b1	9.80	9.90	10.00	0.386	0.390	0.394	H2	5.90BSC			0.232BSC		
c	0.40	0.50	0.60	0.016	0.020	0.024	i	0.10REF			0.004REF		
D	10.28	10.38	10.48	0.405	0.409	0.413	j	0.40REF			0.016REF		
D1	10.98	11.08	11.28	0.432	0.436	0.444	K	3.0REF			0.118REF		
D2	3.20	3.30	3.40	0.126	0.130	0.134	L	1.60	*	2.10	0.063	*	0.083
D4	4.45	4.55	4.65	0.175	0.179	0.183	L1	0.60	0.70	0.80	0.024	0.028	0.031
E	9.80	9.90	10.00	0.386	0.390	0.394	L2	0.50	0.60	0.70	0.020	0.024	0.028
E1	8.00	8.10	8.20	0.315	0.319	0.323	L3	0.40	*	0.80	0.016	*	0.031
E2	0.30	*	0.80	0.012	*	0.031	θ	10° REF			10° REF		

Note: Dimensions do not inclusive burrs and mold flash.

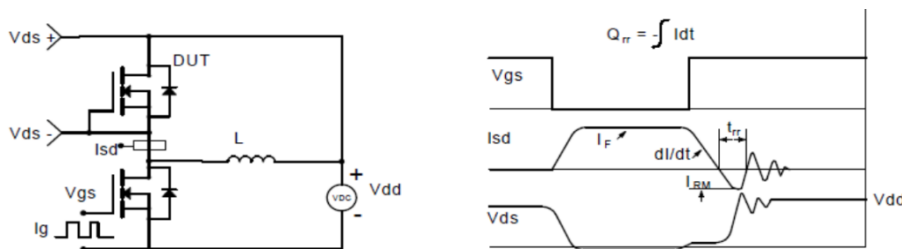
Avalanche Test Circuit and Waveforms



Switching Time Test Circuit and Waveforms



Diode Recovery Test Circuit and Waveforms



Gate Charge Test Circuit and Waveform



Customer Service

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