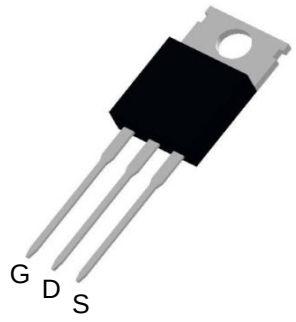
KS1501CA

Single N-Channel Advanced Power MOSFET

Features

- 150V/120A,
  $R_{DS\ (ON)}$ =11mΩ(Typ.)@V_{GS}=10V
- Low $R_{DS\ (ON)}$
- Super High Dense Cell Design
- Reliable and Rugged
- 100% Avalanche Tested

Pin Description



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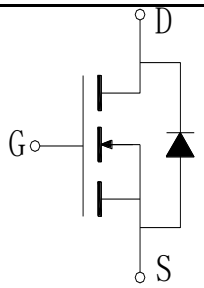


Single N-Channel MOSFET

Applications

- DC-DC Converters and Off-line UPS
- Power Management in Inverter System

RoHS Pb HF Halogen-Free

Absolute Maximum Ratings

Symbol	Parameter		Rating	Unit
Common Ratings (T_C=25°C Unless Otherwise Noted)				
V_{DSS}	Drain-Source Voltage		150	V
V_{GSS}	Gate-Source Voltage		±20	
T_J	Maximum Junction Temperature		150	°C
T_{STG}	Storage Temperature Range		-55 to 150	°C
I_S	Diode Continuous Forward Current	T_C=25°C	120	A
Mounted on Large Heat Sink				
I_{DP} ①	300μs Pulse Drain Current Tested	T_C=25°C	480	A
I_D ②	Continuous Drain Current(V_{GS}=10V)	T_C=25°C	120	A
		T_C=100°C	76	
P_D	Maximum Power Dissipation	T_C=25°C	312	W
		T_C=100°C	125	
$R_{\theta JC}$	Thermal Resistance-Junction to Case		0.4	°C/W
$R_{\theta JA}$ ③	Thermal Resistance-Junction to Ambient		62.5	°C/W
Drain-Source Avalanche Ratings				
E_{AS} ④	Avalanche Energy, Single Pulsed		784	mJ

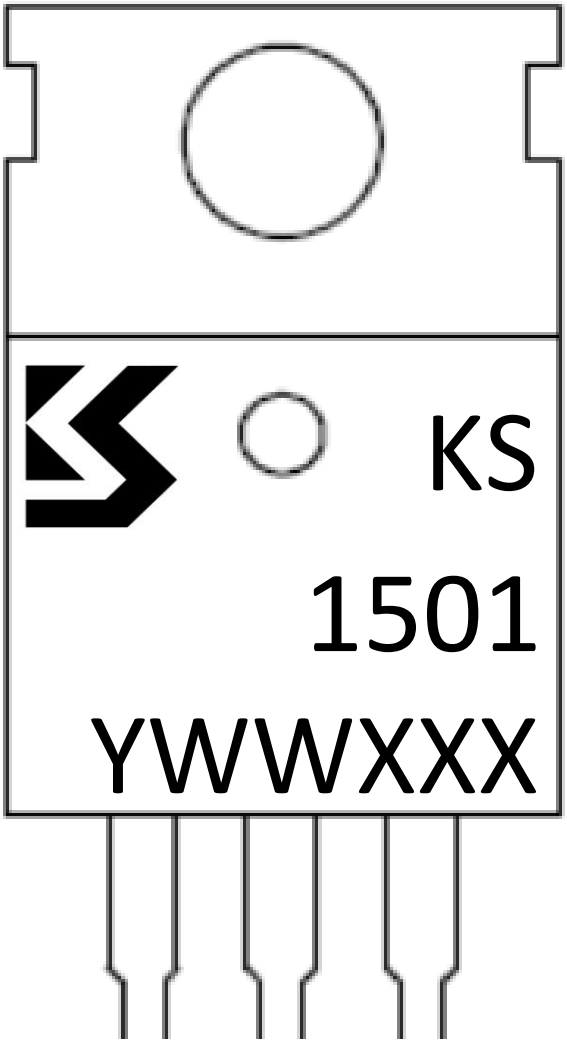
Electrical Characteristics (T_C=25°C Unless Otherwise Noted)

Symbol	Parameter	Test Condition	KS1501CA			Unit
			Min.	Typ.	Max.	
Static Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_{DS}=250μA	150			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=150V, V_{GS}=0V			1	μA
		T_J=125°C			30	
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_{DS}=250μA	3	4	5	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}=30A		11	14	mΩ
Diode Characteristics						
V_{SD} ⑤	Diode Forward Voltage	I_{SD}=30A, V_{GS}=0V		0.8	1.2	V
t_{rr}	Reverse Recovery Time	I_{SD}=20A, dI_{SD}/dt=100A/μs		61		ns
Q_{rr}	Reverse Recovery Charge			93		nC
Dynamic Characteristics ⑥						
R_G	Gate Resistance	V_{GS}=0V,V_{DS}=0V,F=1MHz		1.8		Ω
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=20V, Frequency=1.0MHz		5900		pF
C_{oss}	Output Capacitance			470		
C_{rss}	Reverse Transfer Capacitance			130		
$t_{d(ON)}$	Turn-on Delay Time	V_{DD}=75V, I_{DS}=10A, V_{GEN}=10V,R_G=6Ω		29		ns
t_r	Turn-on Rise Time			43		
$t_{d(OFF)}$	Turn-off Delay Time			87		
t_f	Turn-off Fall Time			18		
Gate Charge Characteristics ⑥						
Q_g	Total Gate Charge	V_{DS}=120V, V_{GS}=10V, I_{DS}=20A		155		nC
Q_{gs}	Gate-Source Charge			34		
Q_{gd}	Gate-Drain Charge			61		

Notes:
①Pulse width limited by safe operating area.
②Calculated continuous current based on maximum allowable junction temperature. The package limitation current is 75A.
③When mounted on 1 inch square copper board, t≤10sec. The value in any given application depends on the user's specific board design.
④Limited by T_{Jmax}, I_{AS} =56A, L=0.5mH, V_{DD} = 48V, R_G = 25Ω , Starting TJ = 25°C.
⑤Pulse test;Pulse width≤300μs, duty cycle≤2%.
⑥Guaranteed by design, not subject to production testing.

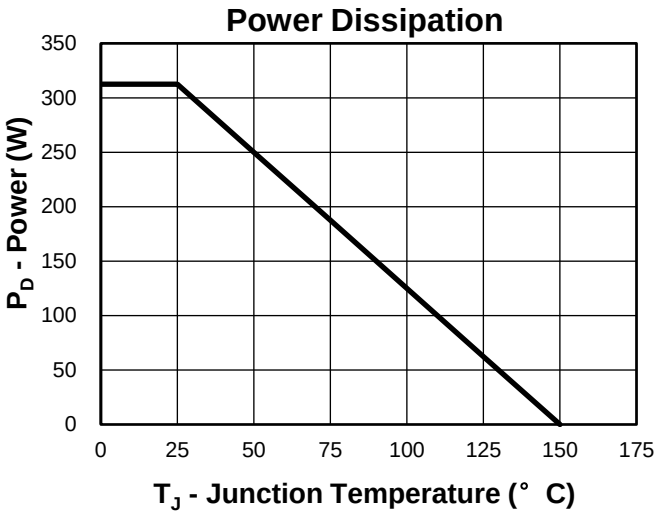
Ordering and Marking Information

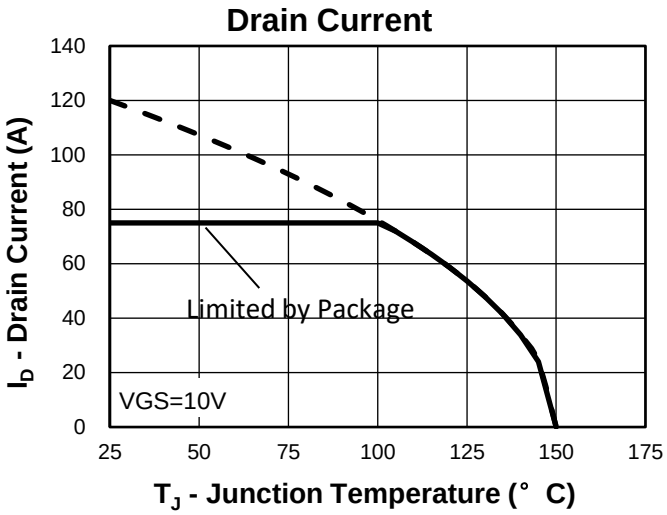
Device	Package	Packaging	Quantity	Reel Size	Tape width
KS1501CA	TO-220	Tube	50	-	-

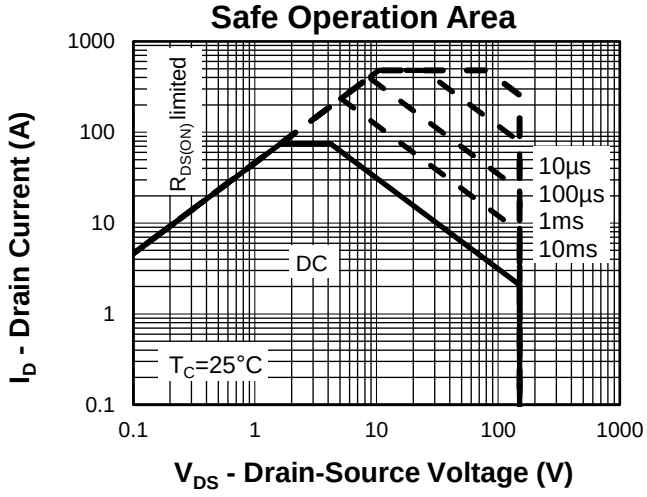


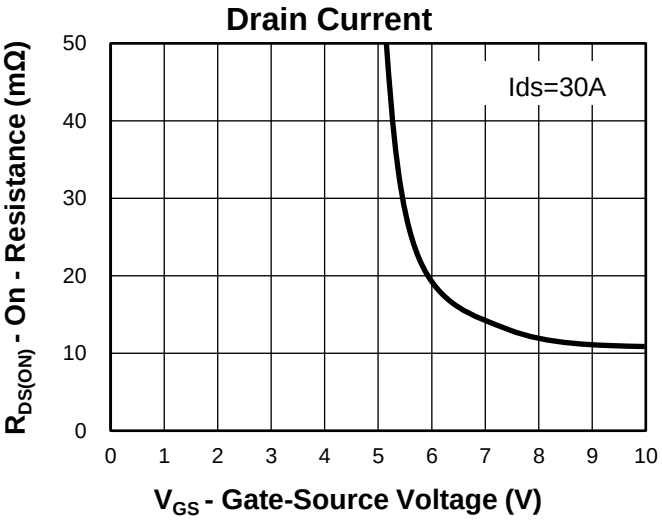
Y =Year,2017-A,2018-B,etc.
WW =Week.
XXX =Lot number.

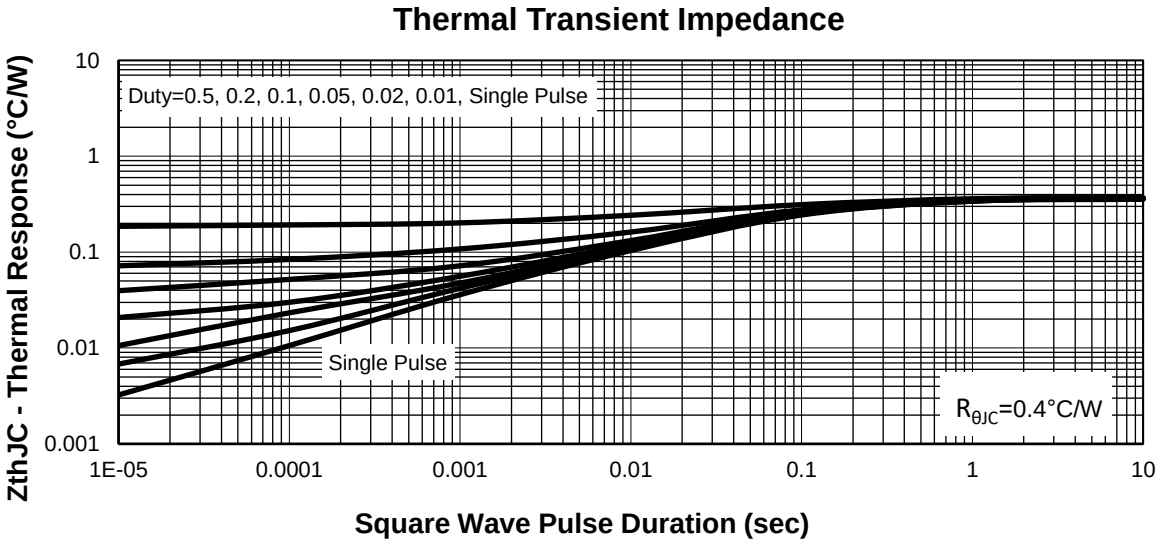
Typical Characteristics











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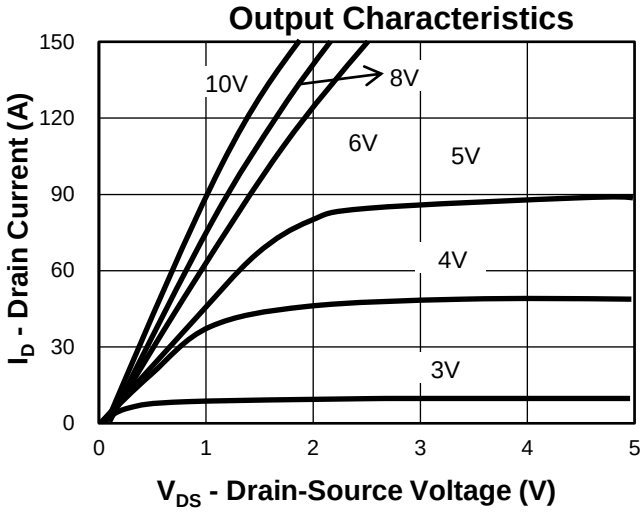
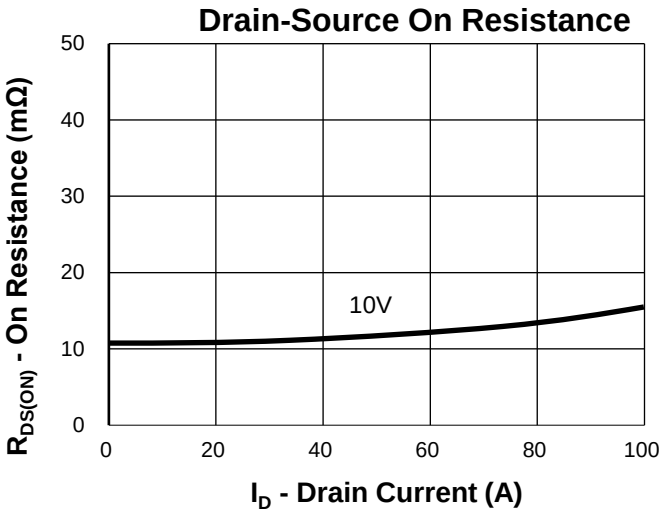
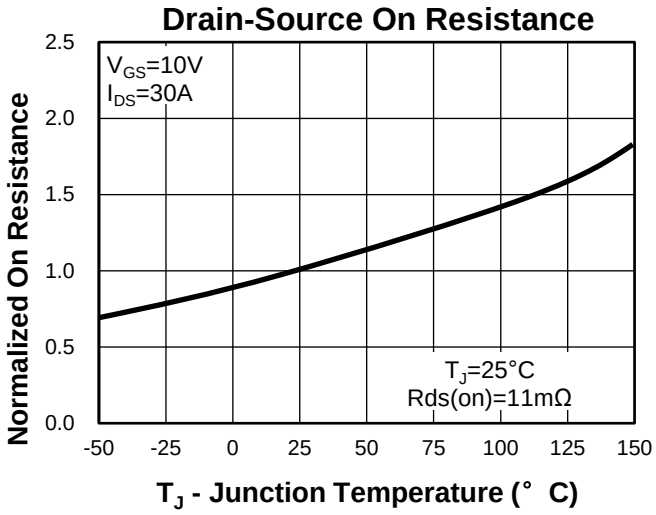
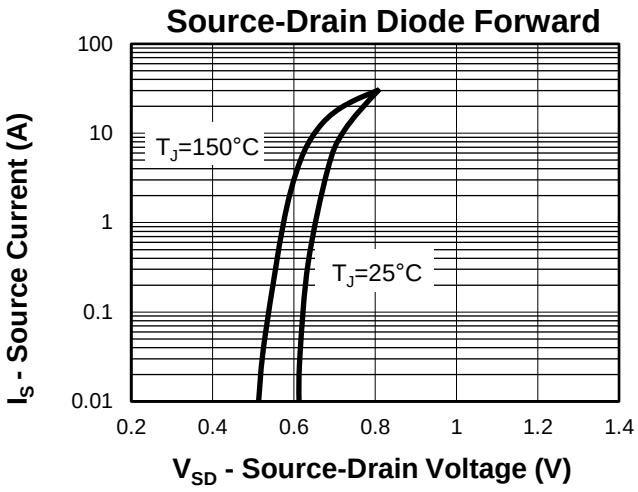
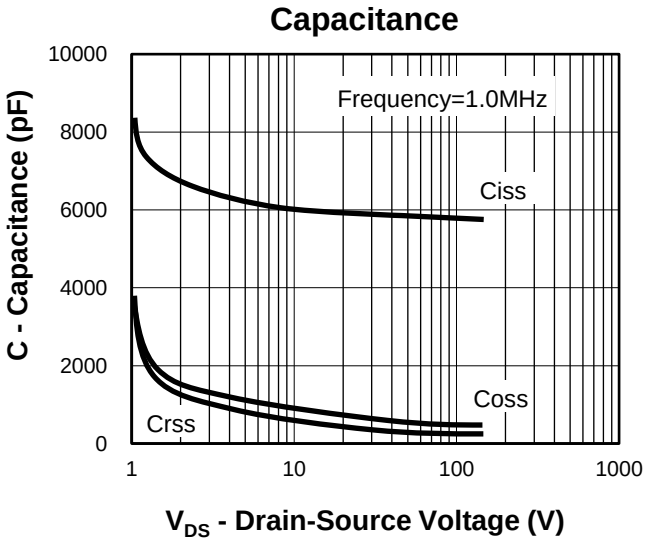
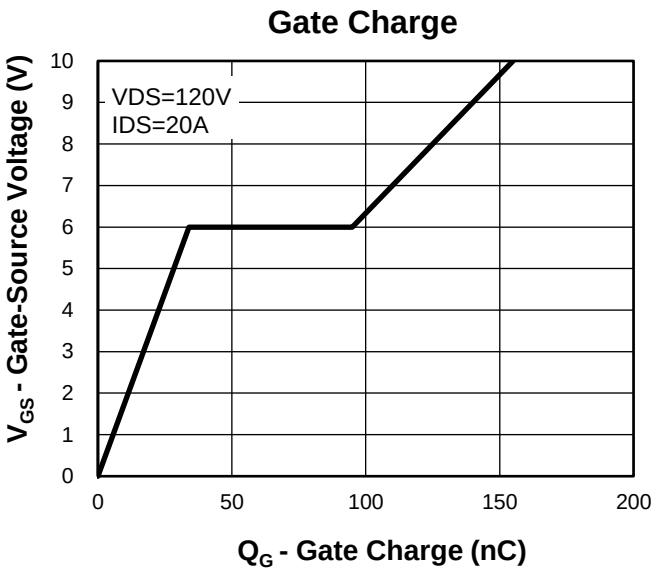






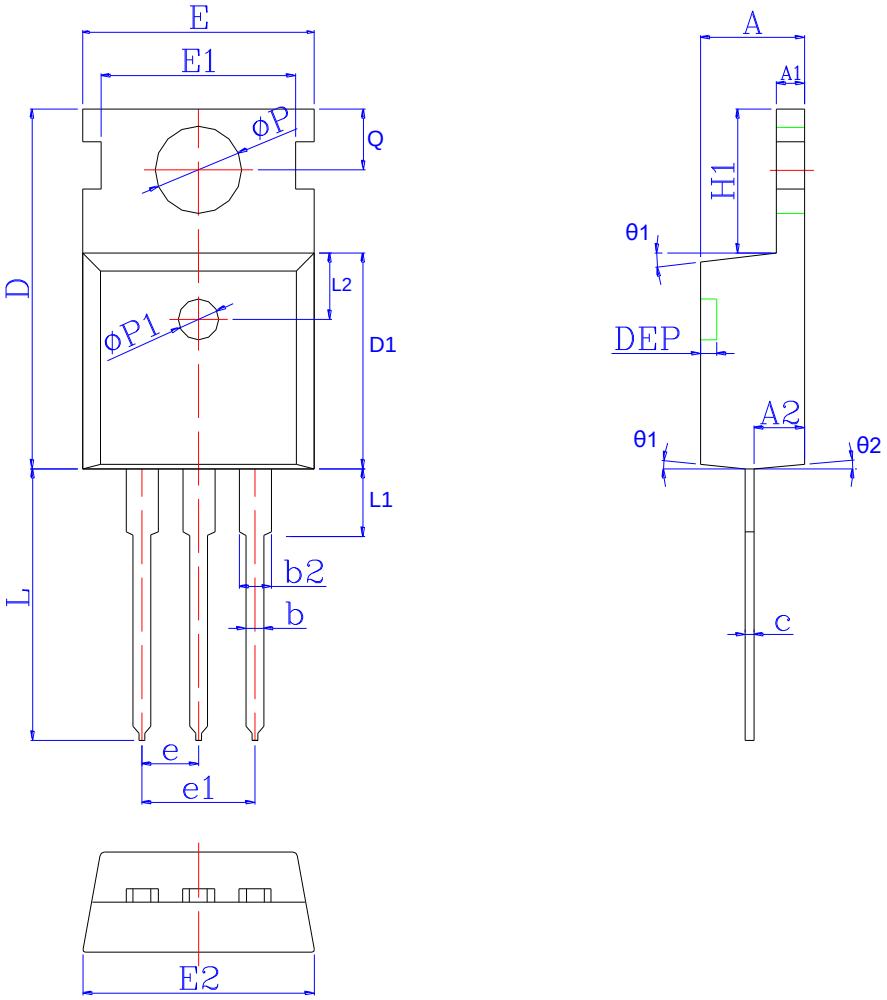






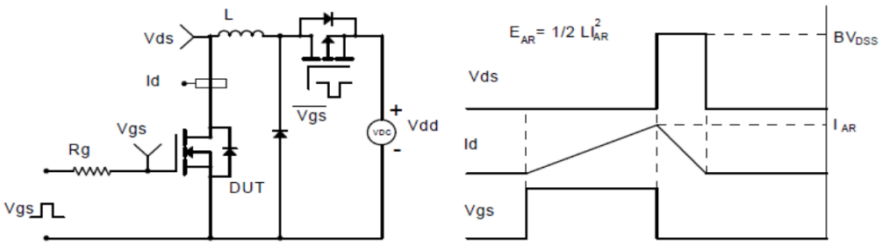
Package Information

TO-220

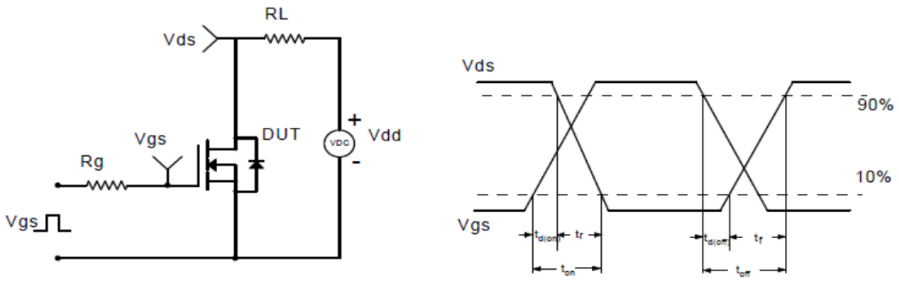


SYMBOL	MM			INCH			SYMBOL	MM			INCH		
	MIN	NOM	MAX	MIN	NOM	MAX		MIN	NOM	MAX	MIN	NOM	MAX
A	4.30	4.54	4.77	0.169	0.179	0.188	Φp1	1.40	1.50	1.60	0.055	0.059	0.063
A1	1.15	1.30	1.40	0.045	0.051	0.055	e	2.54 BSC			0.10 BSC		
A2	1.90	2.25	2.60	0.075	0.089	0.102	e1	5.08 BSC			0.20 BSC		
b	0.60	0.80	1.00	0.024	0.031	0.039	H1	6.30	6.50	6.80	0.248	0.256	0.268
b2	1.17	1.28	1.72	0.046	0.050	0.068	L	12.70	13.18	13.65	0.500	0.519	0.537
c	0.40	0.50	0.60	0.016	0.020	0.024	L1	*	*	3.95	*	*	0.156
D	15.40	15.70	16.00	0.606	0.618	0.630	L2	2.50 REF			0.098 REF		
D1	8.96	9.21	9.46	0.353	0.363	0.372	Φp	3.50	3.60	3.75	0.138	0.142	0.148
DEP	*	*	0.30	*	*	0.012	Q	2.70	2.80	3.20	0.106	0.110	0.126
E	9.66	9.97	10.28	0.380	0.393	0.405	θ1	5°	7°	9°	5°	7°	9°
E1	*	8.70	*	*	0.343	*	θ2	1°	3°	5°	1°	3°	5°
E2	9.80	10.00	10.20	0.386	0.394	0.402							

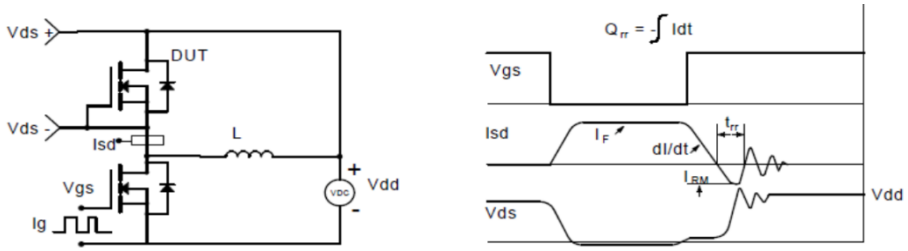
Avalanche Test Circuit and Waveforms



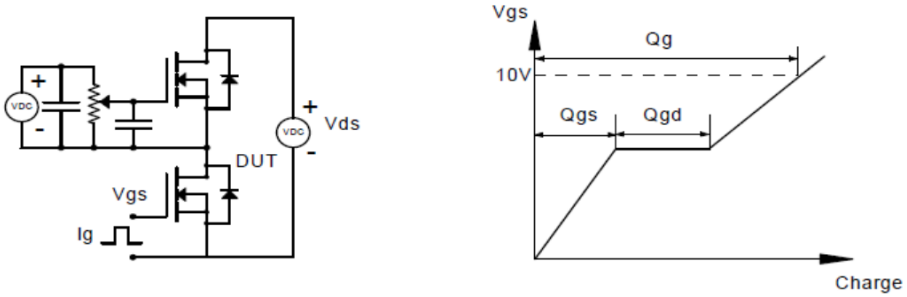
Switching Time Test Circuit and Waveforms



Diode Recovery Test Circuit and Waveforms



Gate Charge Test Circuit and Waveform



Customer Service

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