

Features

- -40V/-90A,
 $R_{DS(ON)} = 7m\Omega(Typ.)@V_{GS} = -10V$
 $R_{DS(ON)} = 10m\Omega(Typ.)@V_{GS} = -4.5V$
- Low $R_{DS(ON)}$
- Super High Dense Cell Design
- Reliable and Rugged

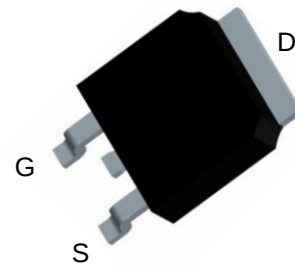
Applications

- Power Switching Appliaction
- Load Switching

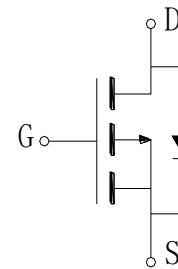


Halogen-Free

Pin Description



TO-252



Single P-Channel MOSFET

Absolute Maximum Ratings

Symbol	Parameter		Rating	Unit
Common Ratings (T _C =25°C Unless Otherwise Noted)				
V _{DSS}	Drain-Source Voltage		-40	V
V _{GSS}	Gate-Source Voltage		±20	
T _J	Maximum Junction Temperature		175	°C
T _{STG}	Storage Temperature Range		-55 to 175	°C
I _S	Diode Continuous Forward Current	T _C =25°C	-90	A
Mounted on Large Heat Sink				
I _{DP} ^①	300μs Pulse Drain Current Tested	T _C =25°C	-360	A
I _D ^②	Continuous Drain Current(V _{GS} =-10V)	T _C =25°C	-90	A
		T _C =100°C	-63	
P _D	Maximum Power Dissipation	T _C =25°C	100	W
		T _C =100°C	50	
R _{θJC}	Thermal Resistance-Junction to Case		1.5	°C/W
R _{θJA} ^③	Thermal Resistance-Junction to Ambient		100	°C/W
Drain-Source Avalanche Ratings				
E _{AS} ^④	Avalanche Energy, Single Pulsed		156	mJ

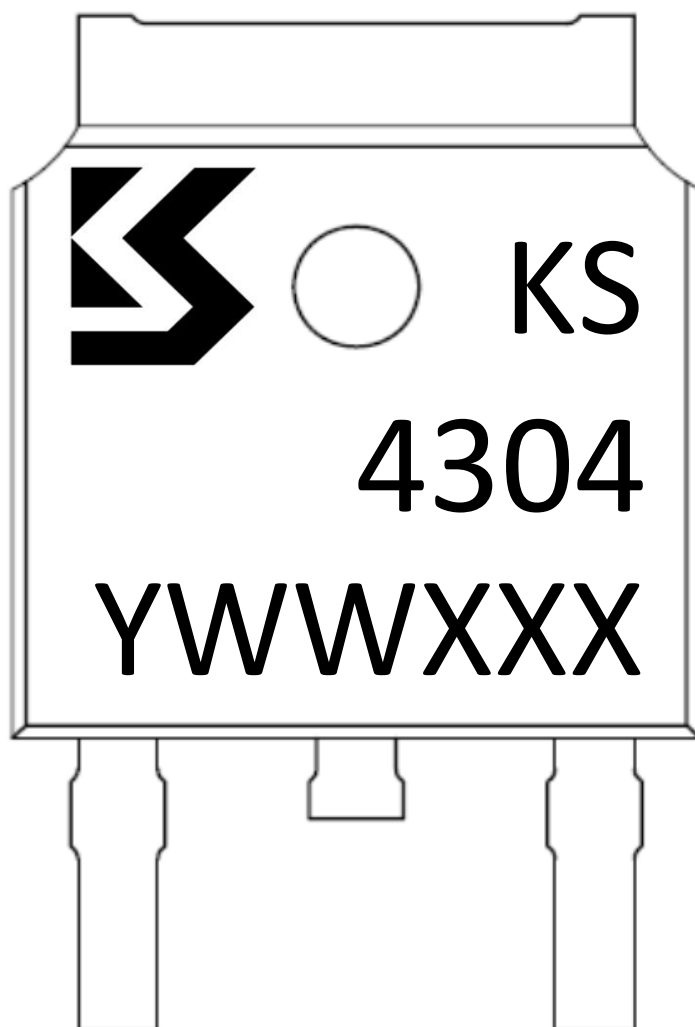
Electrical Characteristics ($T_C=25^{\circ}\text{C}$ Unless Otherwise Noted)

Symbol	Parameter	Test Condition	KS4304DB			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	-1.2	-1.6	-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		7	9	mΩ
		V _{GS} =-4.5V, I _{DS} =-15A		10	13	mΩ
Diode Characteristics						
V _{SD} ^⑤	Diode Forward Voltage	I _{SD} =-20A, V _{GS} =0V		-0.8	-1.2	V
t _{rr}	Reverse Recovery Time	I _{SD} =-20A, dI _{SD} /dt=-100A/μs		38		ns
Q _{rr}	Reverse Recovery Charge			99		nC
Dynamic Characteristics ^⑥						
R _G	Gate Resistance	V _{GS} =0V, V _{DS} =0V, F=1MHz		6		Ω
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =-20V, Frequency=1.0MHz		5000		pF
C _{oss}	Output Capacitance			505		
C _{rss}	Reverse Transfer Capacitance			380		
t _{d(ON)}	Turn-on Delay Time	V _{DD} =-20V, I _{DS} =-20A, V _{GEN} =-10V, R _G =3Ω		18		ns
t _r	Turn-on Rise Time			35		
t _{d(OFF)}	Turn-off Delay Time			77		
t _f	Turn-off Fall Time			26		
Gate Charge Characteristics ^⑥						
Q _g	Total Gate Charge	V _{DS} =-20V, V _{GS} =-10V, I _{DS} =-20A		79		nC
Q _{gs}	Gate-Source Charge			15		
Q _{gd}	Gate-Drain Charge			18		

- Notes:
- ① Pulse width limited by safe operating area.
 - ② Calculated continuous current based on maximum allowable junction temperature. The package limitation current is -60A.
 - 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} , $I_{AS} = -25A$, $L = 0.5mH$, $V_{DD} = -20V$, $R_G = 25\Omega$, Starting $T_J = 25^{\circ}\text{C}$.
 - 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
KS4304DB	TO-252	Tape&Reel	2500	13"	16mm

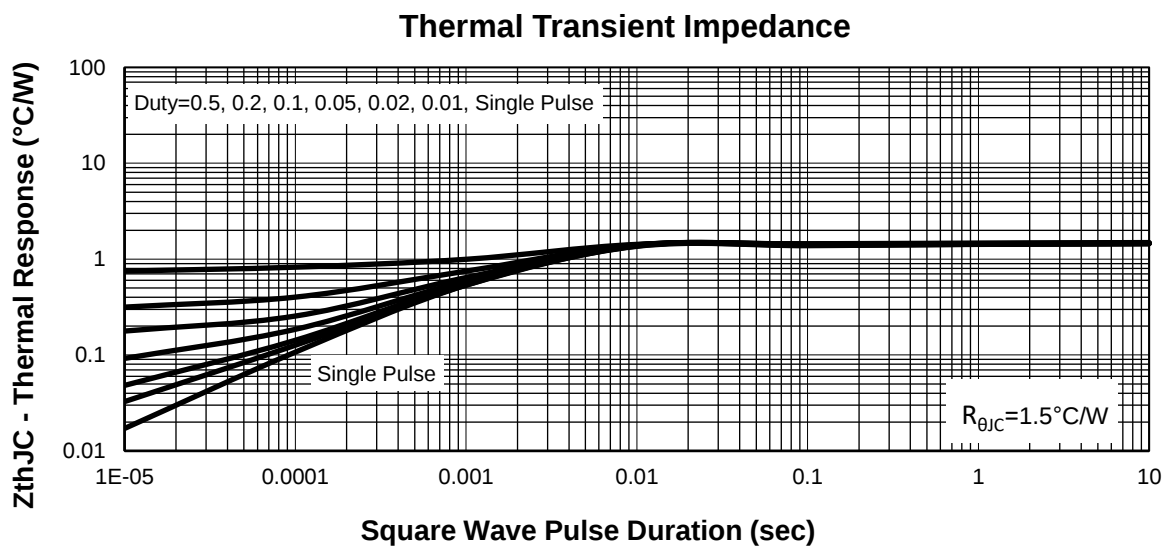
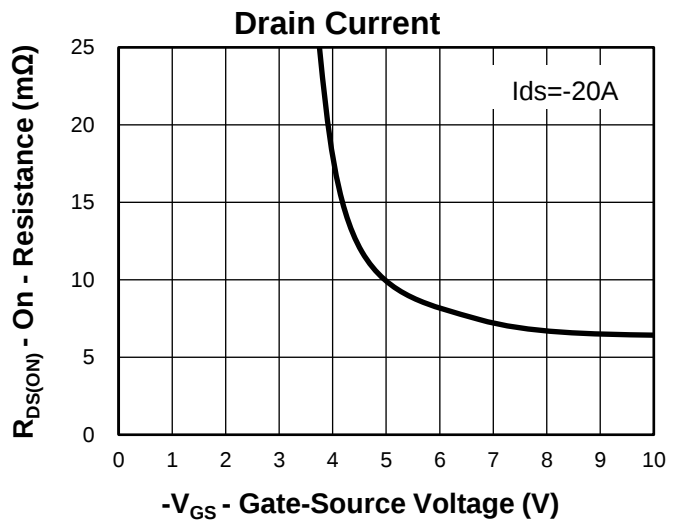
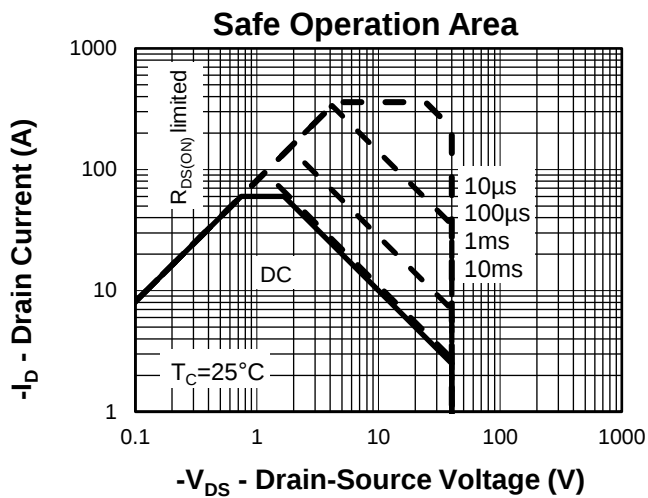
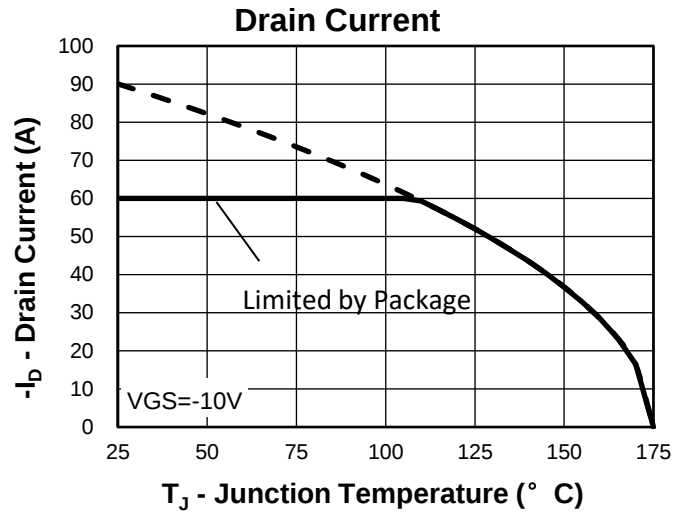
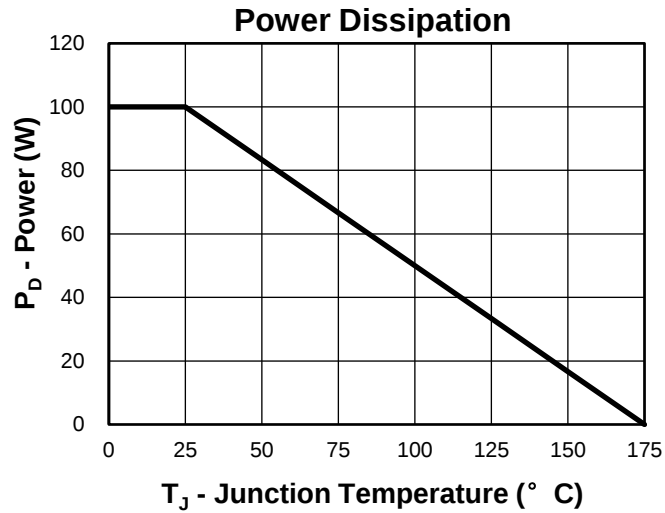


Y =Year,2017-A,2018-B,etc.

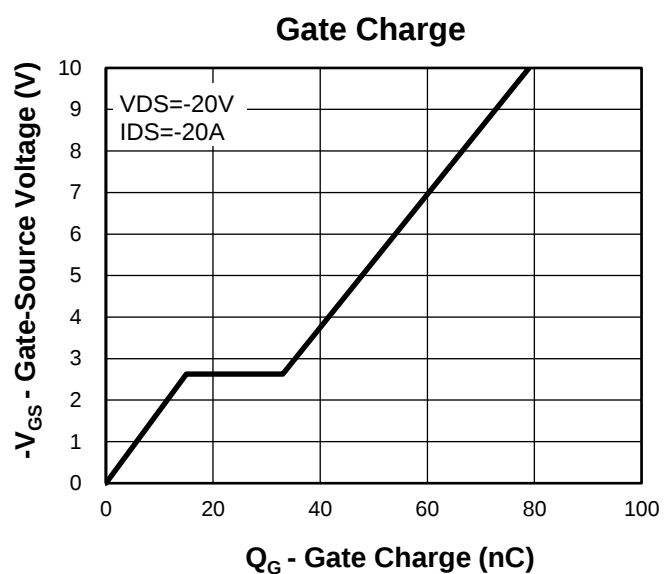
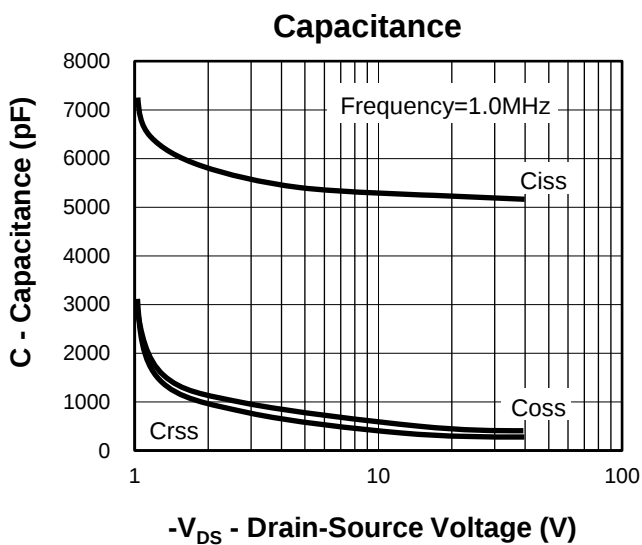
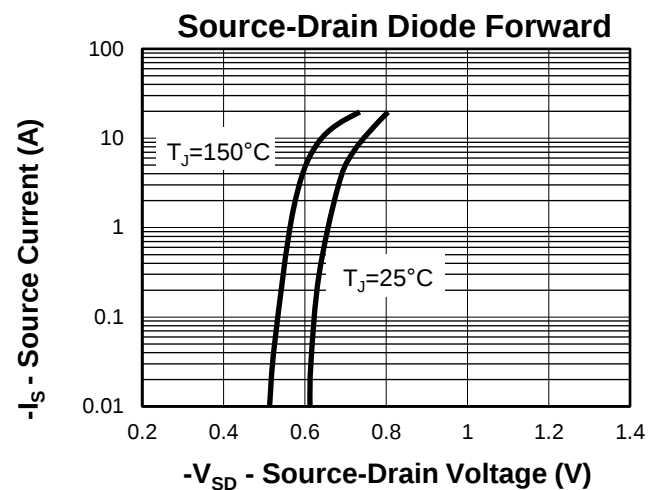
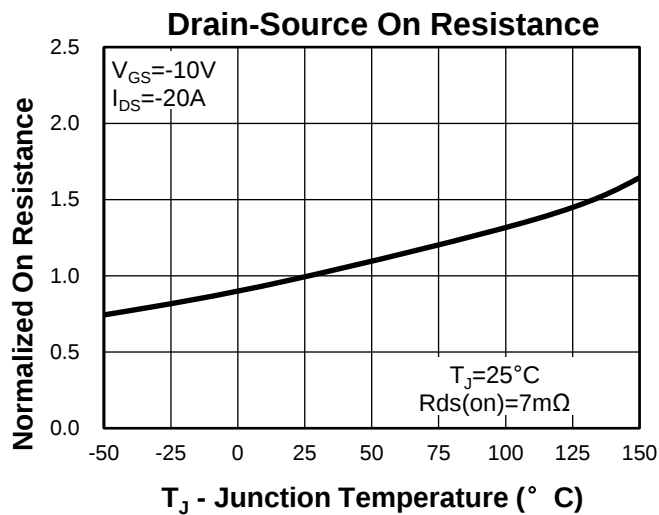
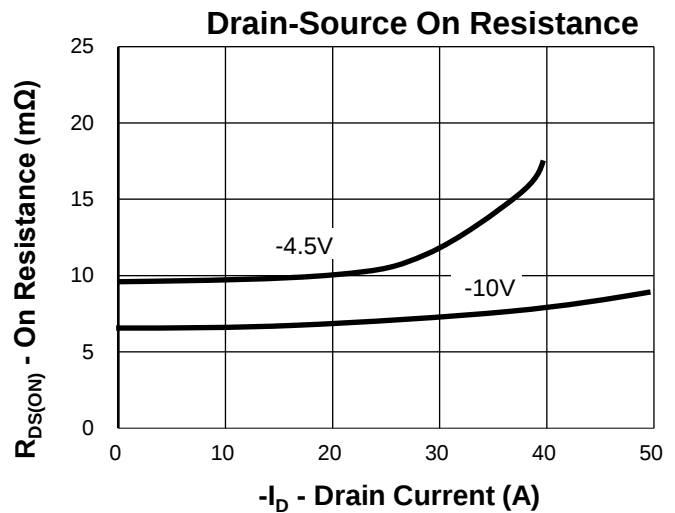
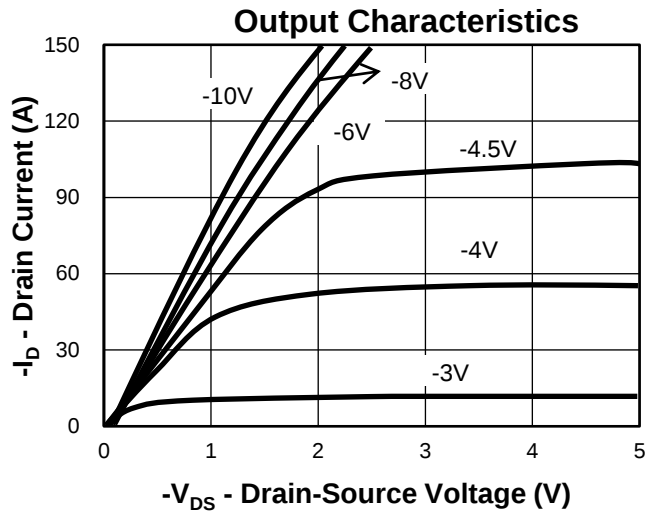
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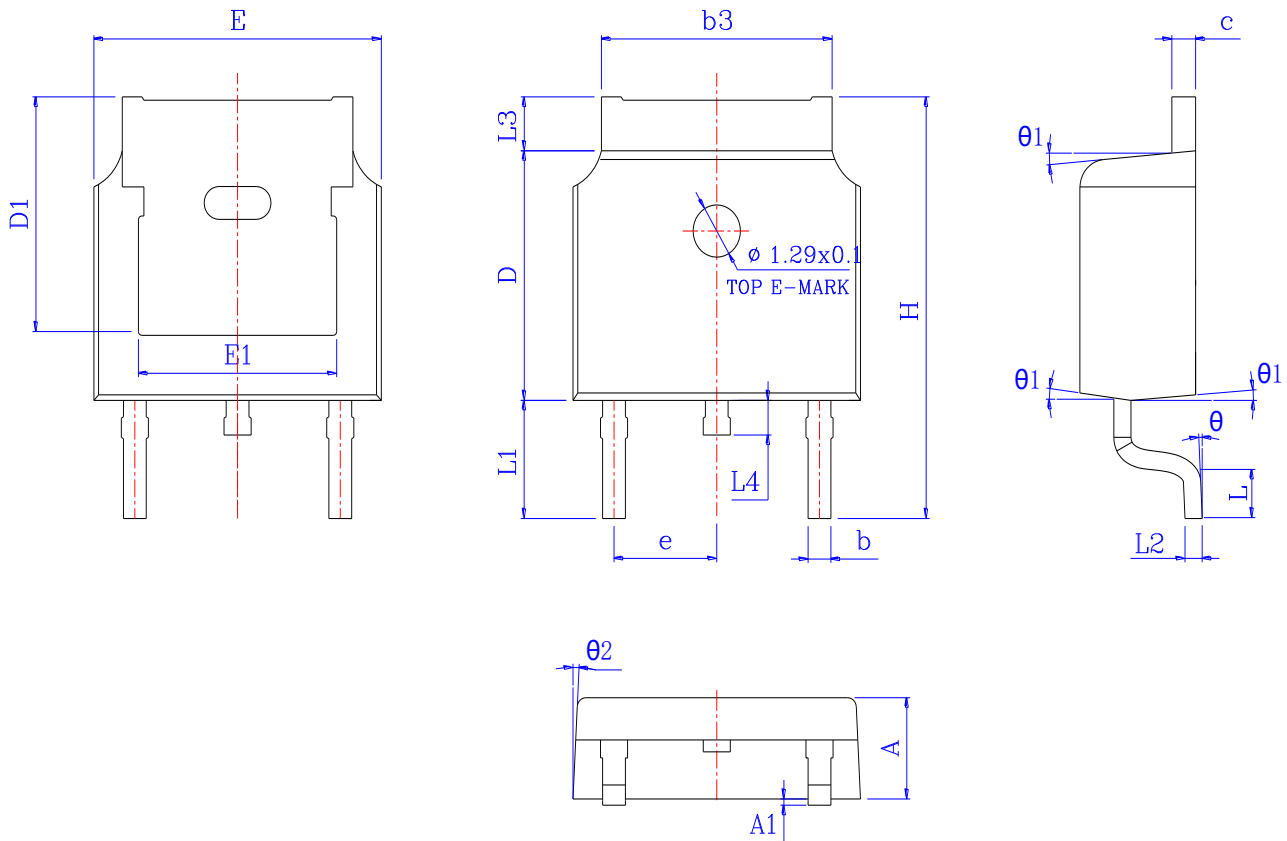
XXX =Lot number.

Typical Characteristics



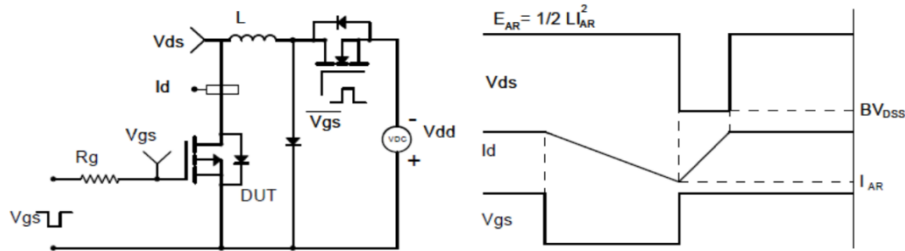
Typical Characteristics



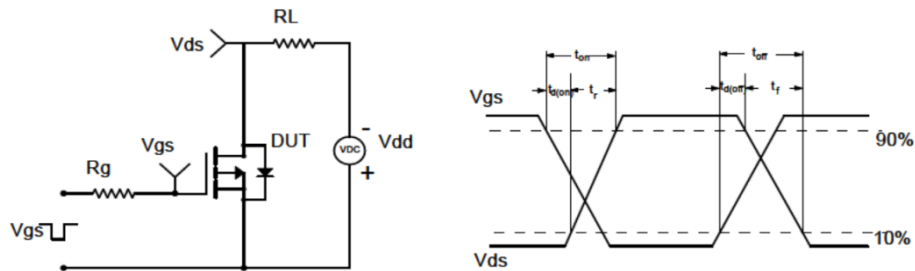
Package Information
TO-252


SYMBOL	MM			INCH		
	MIN	NOM	MAX	MIN	NOM	MAX
A	2.200	2.300	2.400	0.087	0.091	0.094
A1	*	*	0.100	*	*	0.004
b	0.660	0.760	0.860	0.026	0.030	0.034
b3	5.130	5.295	5.460	0.202	0.208	0.215
c	0.470	0.535	0.600	0.019	0.021	0.024
D	6.000	6.100	6.200	0.236	0.240	0.244
D1	5.30 REF			0.20 REF		
E	6.500	6.600	6.700	0.256	0.260	0.264
E1	4.700	4.810	4.920	0.185	0.189	0.194
e	2.28 REF			0.09 REF		
H	9.800	10.100	10.400	0.386	0.398	0.409
L	1.400	1.550	1.700	0.055	0.061	0.067
L1	2.743 REF			0.108 REF		
L2	0.510 BSC			0.020 BSC		
L3	0.900	1.075	1.250	0.035	0.042	0.049
L4	0.600	0.800	1.000	0.024	0.031	0.039
θ	0°	*	8°	0°	*	8°
$\theta 1$	5°	7°	9°	5°	7°	9°
$\theta 2$	5°	7°	9°	5°	7°	9°

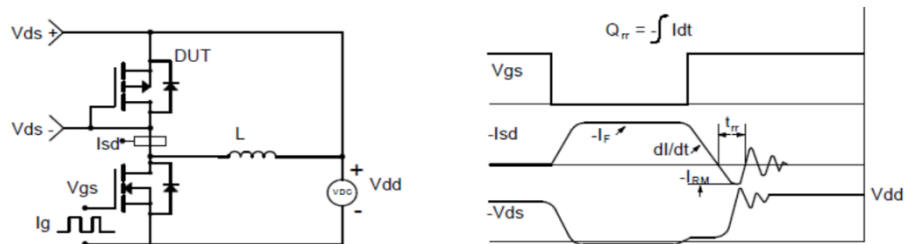
Avalanche Test Circuit and Waveforms



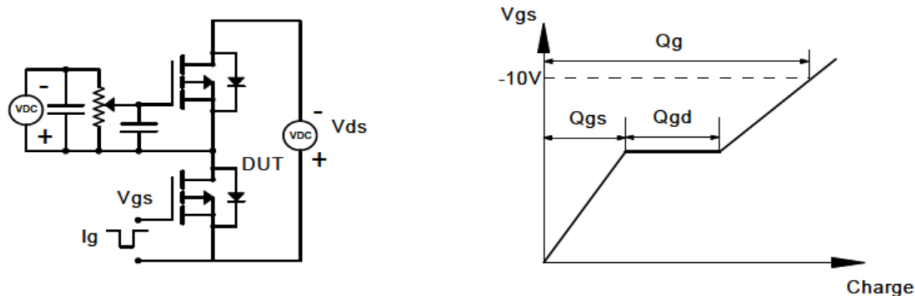
Switching Time Test Circuit and Waveforms



Diode Recovery Test Circuit and Waveforms



Gate Charge Test Circuit and Waveform



Customer Service

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