KS3640DB4

Complementary Advanced Power MOSFET

Features

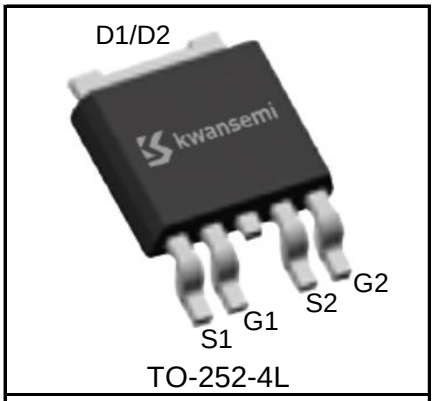
• N-Channel
30V/25A,
$R_{DS\ (ON)}$ =15mΩ(Typ.) @ V_{GS}=10V
$R_{DS\ (ON)}$ =20mΩ(Typ.) @ V_{GS}=4.5V
• P-Channel
-30V/-28A,
$R_{DS\ (ON)}$ =18mΩ (Typ.) @ V_{GS}=-10V
$R_{DS\ (ON)}$ =28mΩ (Typ.) @ V_{GS}=-4.5V
• Very low on-resistance
• Fast Switching

Applications

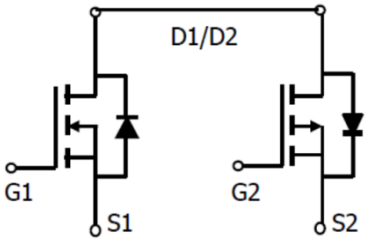
• DC Fan
• Motor Drive Applications

RoHS Pb HF Halogen-Free

Pin Description



TO-252-4L



Complementary MOSFET

Absolute Maximum Ratings

Symbol	Parameter		N-Channel	P-Channel	Unit
Common Ratings (T_A=25°C Unless Otherwise Noted)					
V_{DSS}	Drain-Source Voltage		30	-30	V
V_{GSS}	Gate-Source Voltage		±20	±20	
T_J	Maximum Junction Temperature		150	150	°C
T_{STG}	Storage Temperature Range		-55 to 150	-55 to 150	°C
I_S	Diode Continuous Forward Current	T_C=25°C	25	-28	A
Mounted on Large Heat Sink					
I_{DP} ①	300μs Pulse Drain Current Tested	T_C=25°C	100	-112	A
I_D ②	Continuous Drain Current(V_{GS}=±10V)	T_C=25°C	25	-28	A
		T_C=100°C	16	-18	
P_D	Maximum Power Dissipation	T_C=25°C	22	33	W
		T_C=100°C	9	13	
$R_{\theta JC}$	Thermal Resistance-Junction to Case		5.6	3.8	°C/W
$R_{\theta JA}$ ③	Thermal Resistance-Junction to Ambient		100	100	°C/W
Drain-Source Avalanche Ratings					
E_{AS} ④	Avalanche Energy, Single Pulsed		9	20	mJ

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

Symbol	Parameter	Test Condition		KS3640DB4 Min.	KS3640DB4 Typ.	KS3640DB4 Max.	Unit
Static Characteristics							
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_{DS}=250μA	N	30			V
		V_{GS}=0V, I_{DS}=-250μA	P	-30			
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=30V, V_{GS}=0V	N			1	μA
		T_J=125°C	N			30	
		V_{DS}=-30V, V_{GS}=0V	P			-1	
		T_J=125°C	P			-30	
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_{DS}=250μA	N	1.1	1.8	2.3	V
		V_{DS}=V_{GS}, I_{DS}=-250μA	P	-1.1	-1.5	-2.3	
I_{GSS}	Gate Leakage Current	V_{GS}=±20V, V_{DS}=0V	N			±100	nA
		V_{GS}=±20V, V_{DS}=0V	P			±100	
$R_{DS(ON)}$ ⑤	Drain-Source On-state Resistance	V_{GS}=10V, I_{DS}=10A	N		15	20	mΩ
		V_{GS}=-10V, I_{DS}=-10A	P		18	25	
		V_{GS}=4.5V, I_{DS}=6A	N		20	28	
		V_{GS}=-4.5V, I_{DS}=-6A	P		28	35	
Diode Characteristics							
V_{SD} ⑤	Diode Forward Voltage	I_{SD}=10A, V_{GS}=0V	N		0.86	1.2	V
		I_{SD}=-10A, V_{GS}=0V	P		-0.86	-1.2	
t_{rr}	Reverse Recovery Time	N-Channel I_{SD}=10A, dI_{SD}/dt=100A/μs	N		10		ns
			P		16		
Q_{rr}	Reverse Recovery Charge	P-Channel I_{SD}=-10A, dI_{SD}/dt=100A/μs	N		14		nC
			P		27		
Dynamic Characteristics ⑥							
R_G	Gate Resistance	V_{GS}=0V,V_{DS}=0V,F=1MHz	N		1.8		Ω
			P		4.5		
C_{iss}	Input Capacitance	N-Channel V_{GS}=0V,V_{DS}=15V, Frequency=1.0MHz	N		460		pF
			P		1190		
C_{oss}	Output Capacitance	P-Channel V_{GS}=0V,V_{DS}=-15V, Frequency=1.0MHz	N		70		
			P		175		
C_{rss}	Reverse Transfer Capacitance		N		45		
			P		120		

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

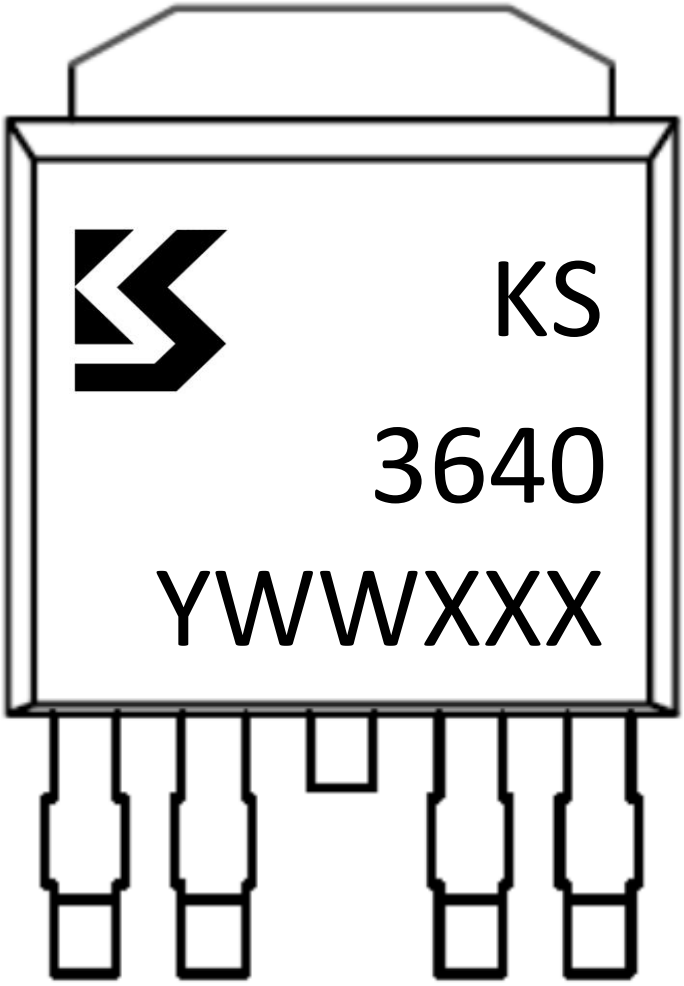
Symbol	Parameter	Test Condition		KS3640DB4			Unit
				Min.	Typ.	Max.	
Dynamic Characteristics⑥							
$t_{d(ON)}$	Turn-on Delay Time	N-Channel V_{DD}=15V, I_{DS}=10A, V_{GEN}=10V, R_G=3Ω P-Channel V_{DD}=-15V, I_{DS}=-10A, V_{GEN}= -10V, R_G=3Ω	N		8		ns
			P		14		
t_r	Turn-on Rise Time		N		12		
			P		25		
$t_{d(OFF)}$	Turn-off Delay Time		N		20		
			P		34		
t_f	Turn-off Fall Time		N		9		
			P		15		
Gate Charge Characteristics⑥							
Q_g	Total Gate Charge	N-Channel V_{DS}=15V, V_{GS}=10V, I_{DS}=10A P-Channel V_{DS}=-15V, V_{GS}= -10V, I_{DS}=-10A	N		11		nC
			P		24		
Q_{gs}	Gate-Source Charge		N		3.1		
			P		5.2		
Q_{gd}	Gate-Drain Charge		N		4.1		
			P		7.3		

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≤10sec. The value in any given application depends on the user's specific board design.
④Limited by $T_{Jmax.}$ Starting T_J = 25°C, N Chanel: L = 0.5mH,R_G = 25Ω, I_{AS} = 6A, V_{GS} =10V, P-Chanel: L = 0.5mH, R_G = 25Ω, I_{AS} = -9A, V_{GS} =-10V, Part not recommended for use above this value.
⑤Pulse test;Pulse width≤300μs, duty cycle≤2%.
⑥Guaranteed by design, not subject to production testing.

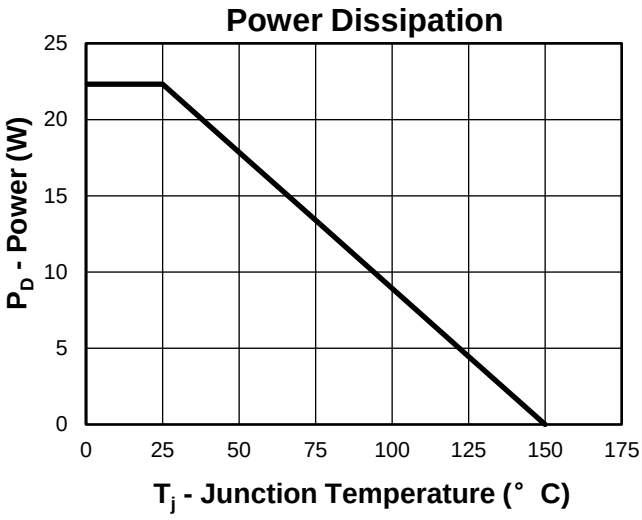
Ordering and Marking Information

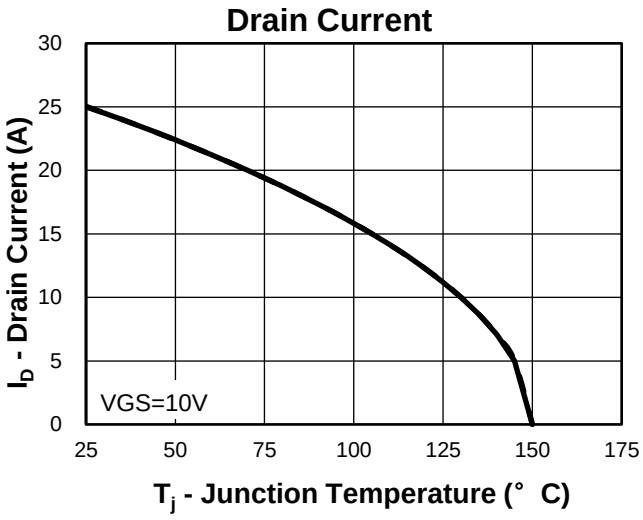
Device	Package	Packaging	Quantity	Reel Size	Tape width
KS3640DB4	TO-252-4L	Tape&Reel	2500	13''	16mm

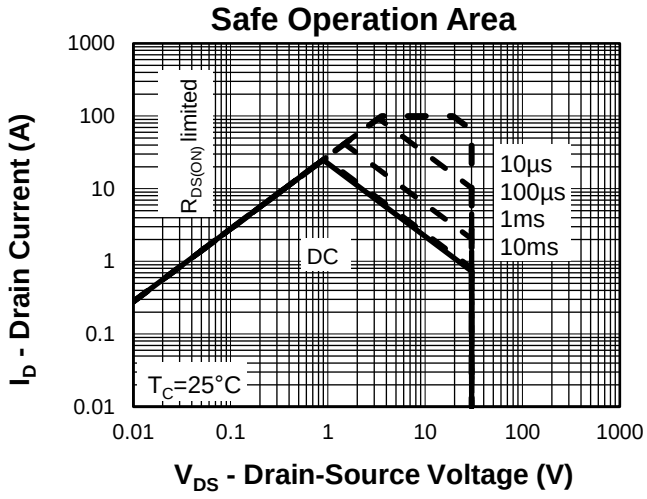


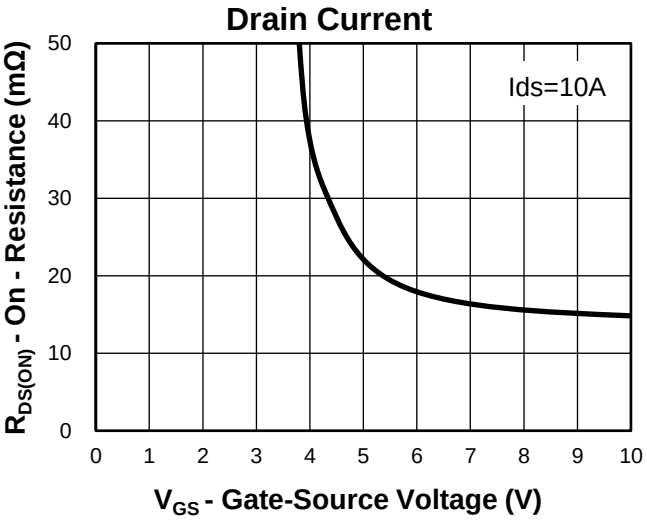
Y =Year,2017-A,2018-B,etc.
WW =Week.
XXX =Lot number.

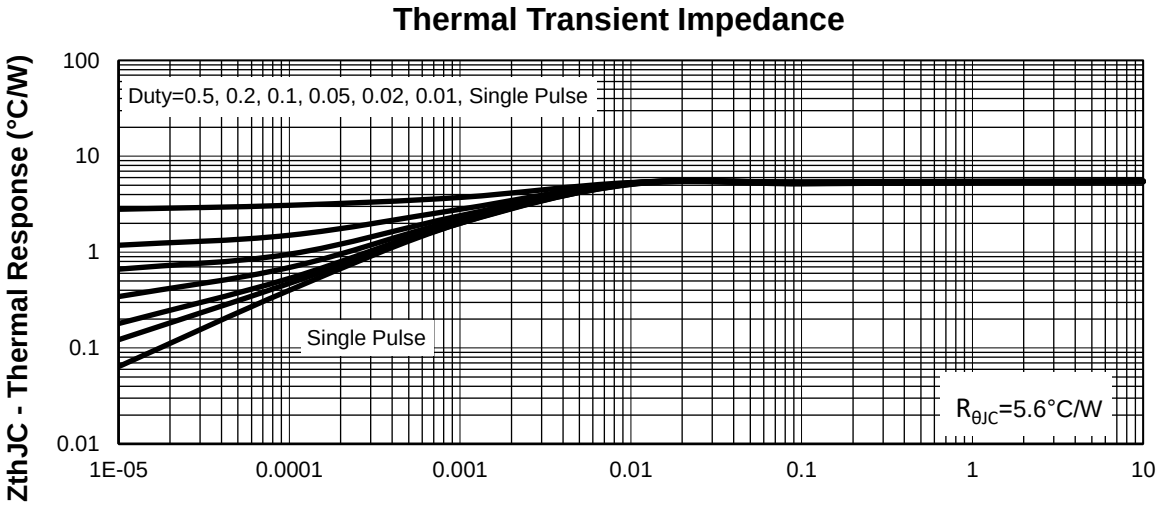
Typical Characteristics(N-Channel)



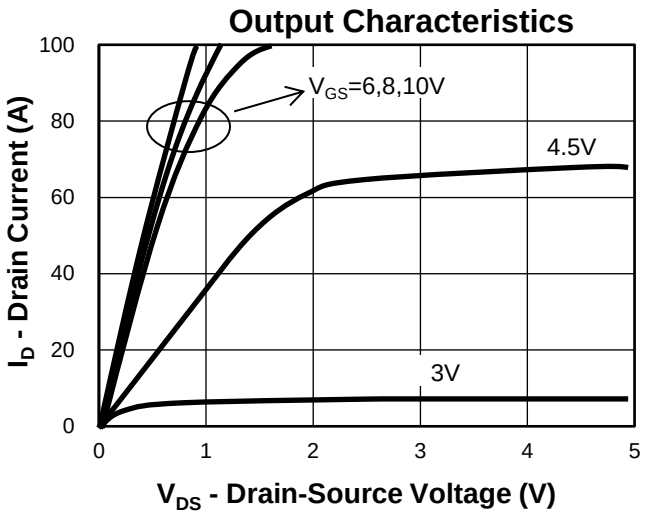


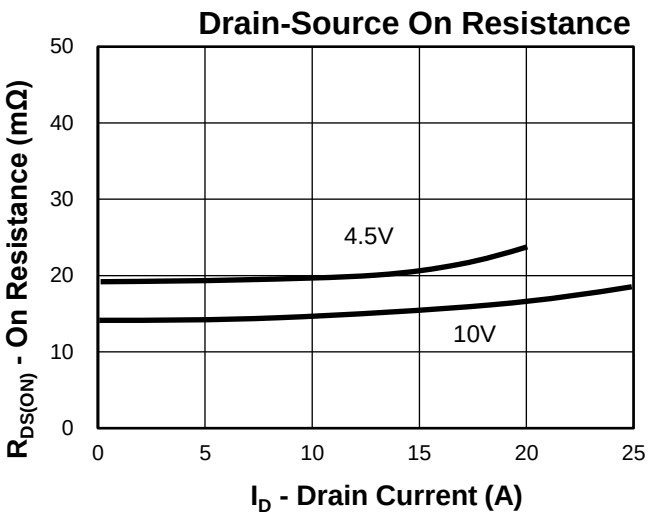


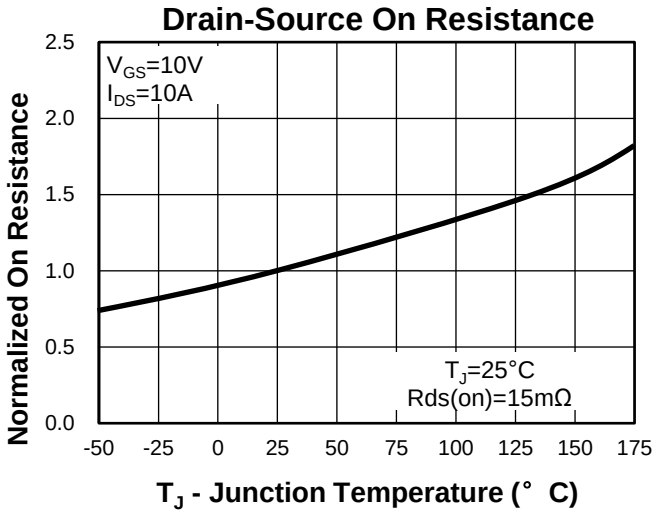


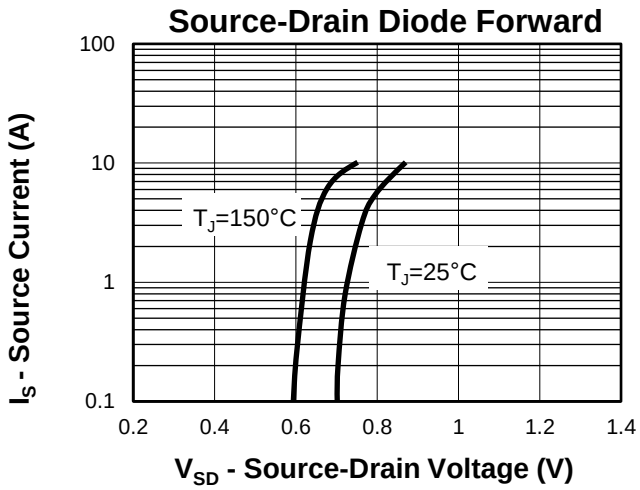


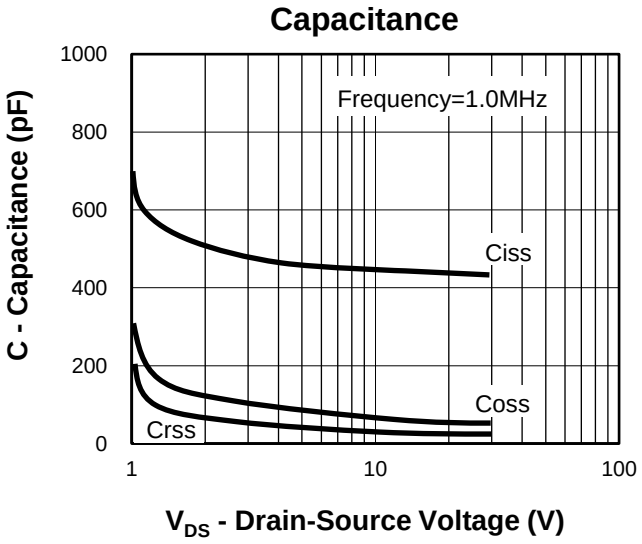
Typical Characteristics(N-Channel)

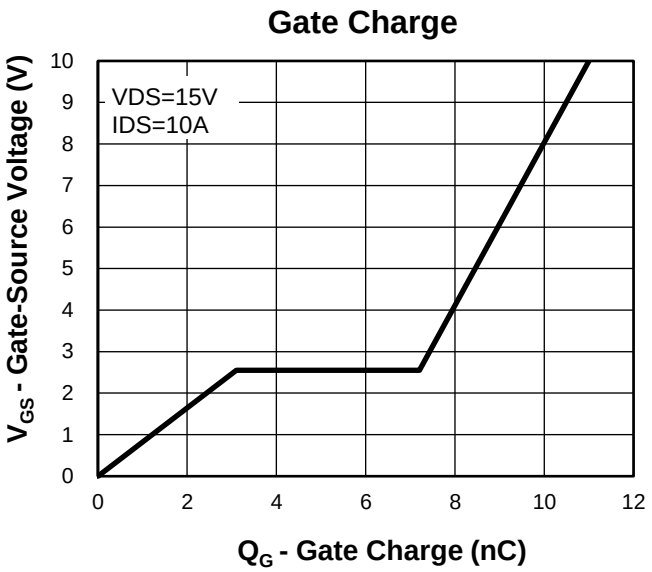




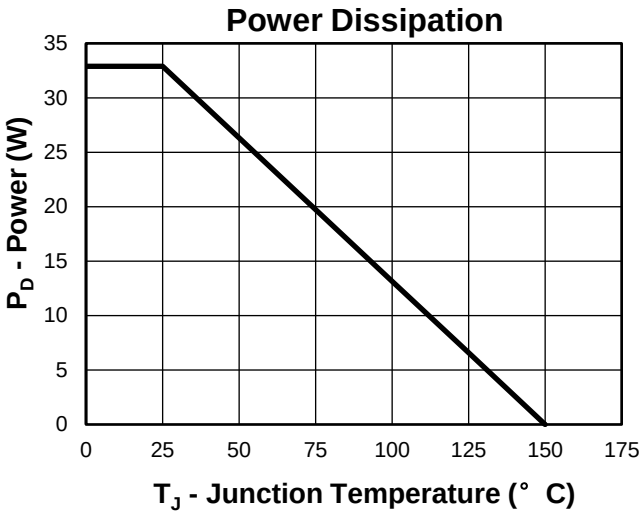


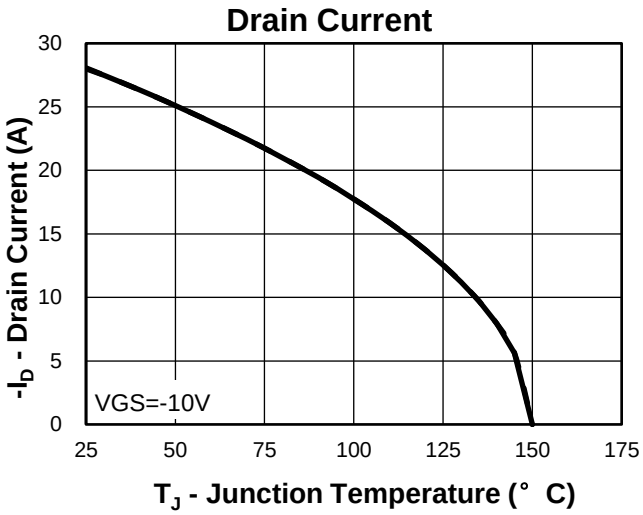


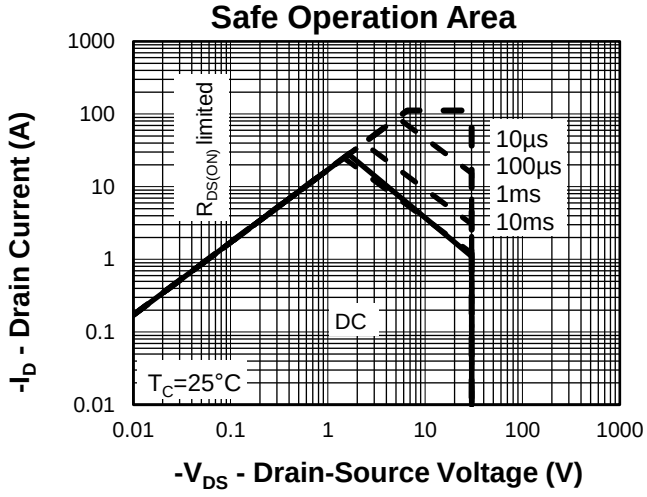


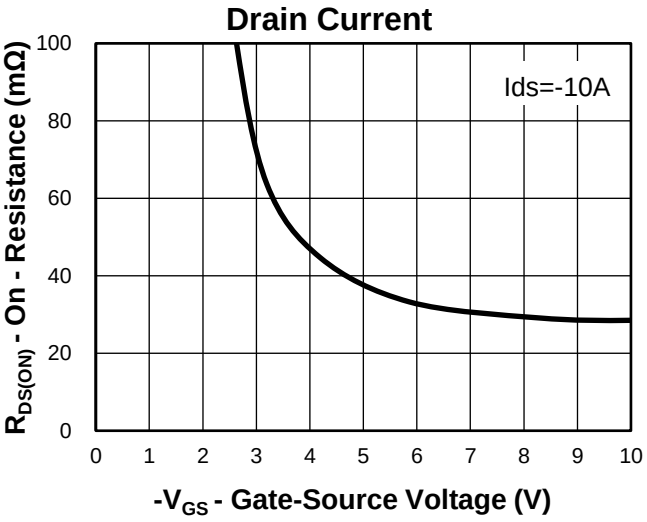


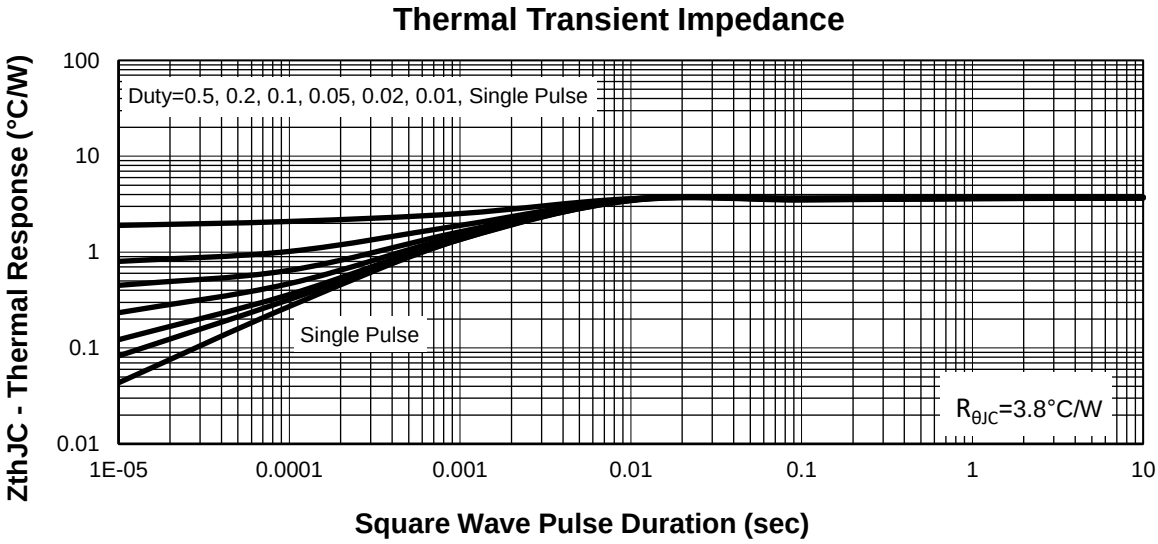
Typical Characteristics(P-Channel)



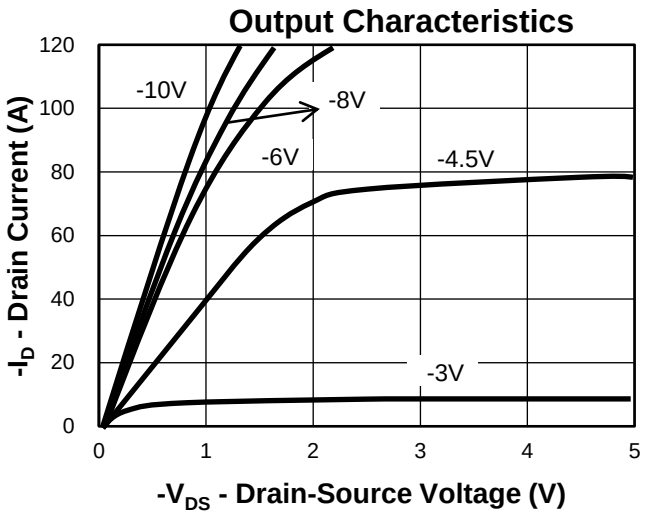


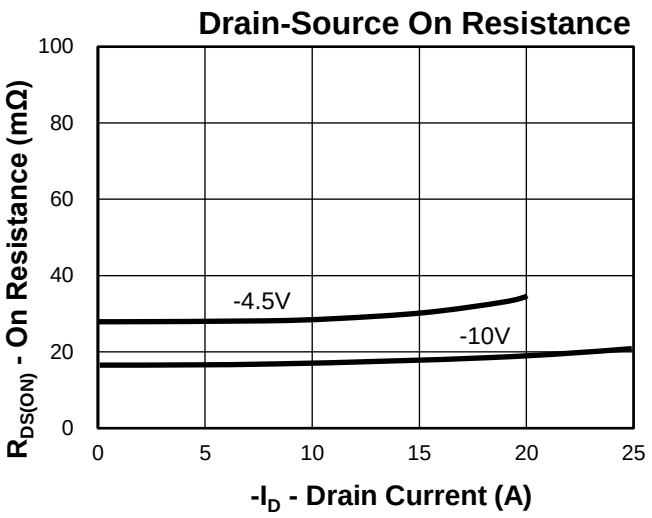


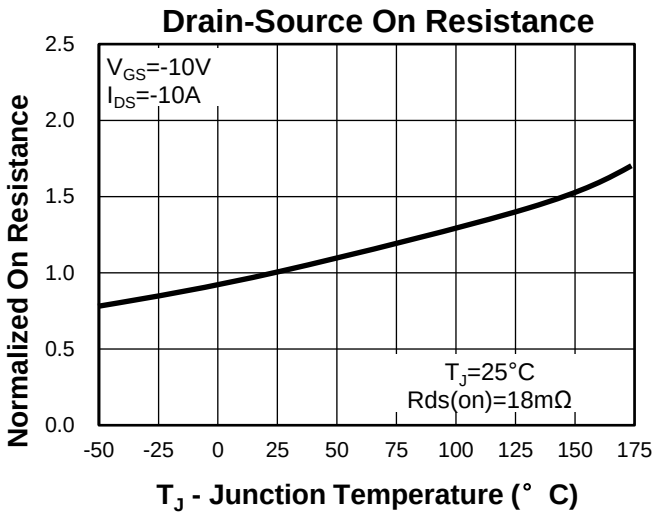


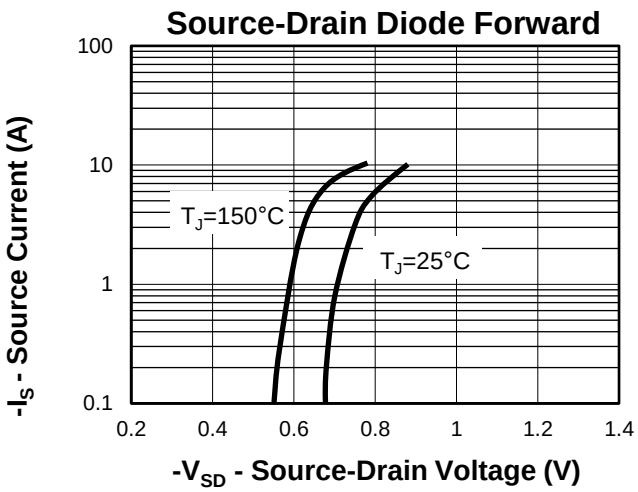


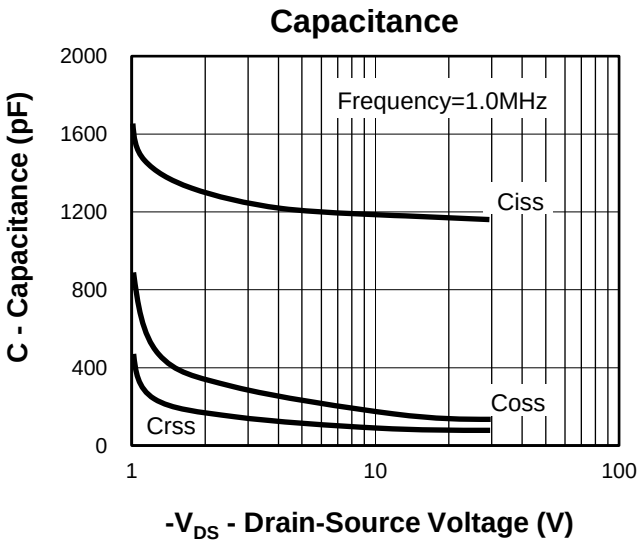
Typical Characteristics(P-Channel)

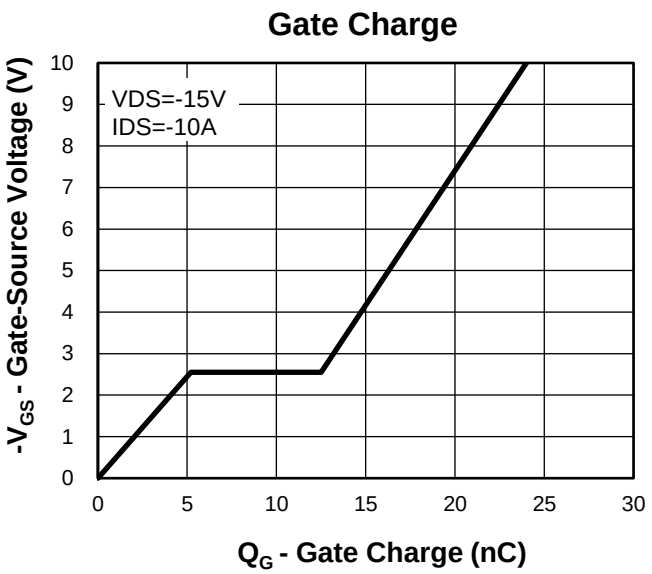






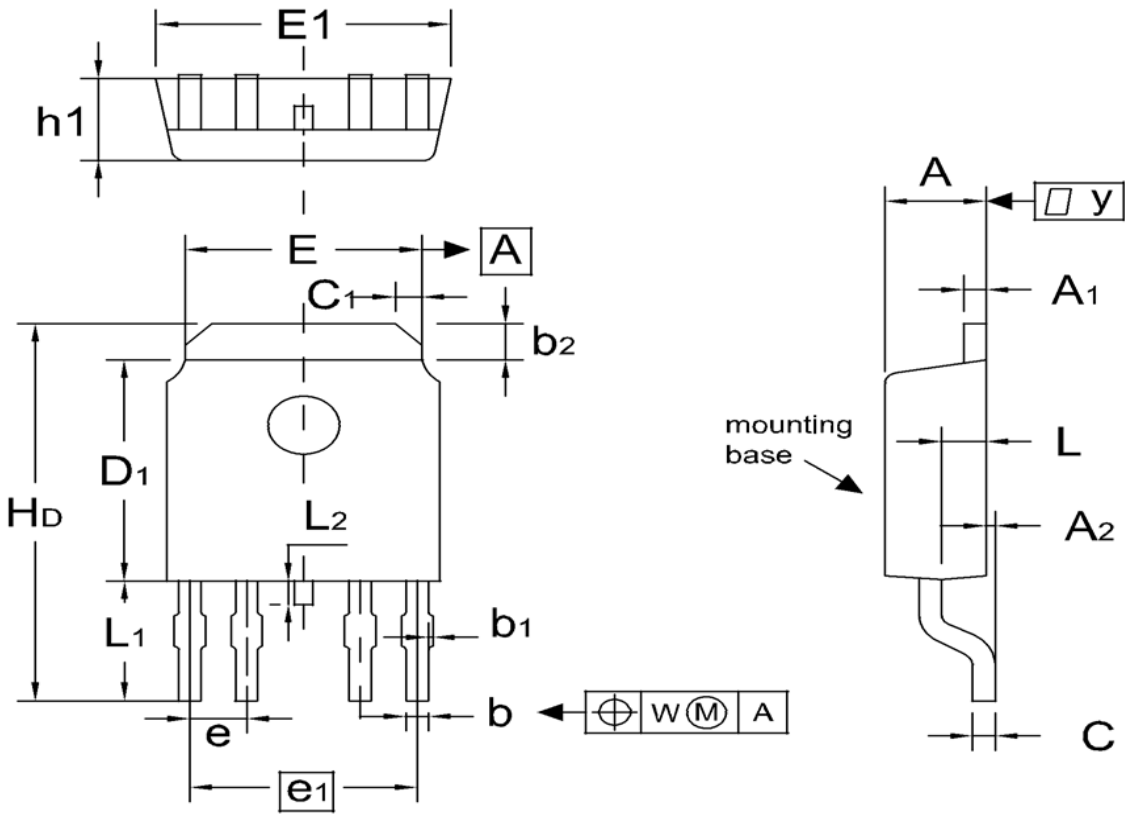






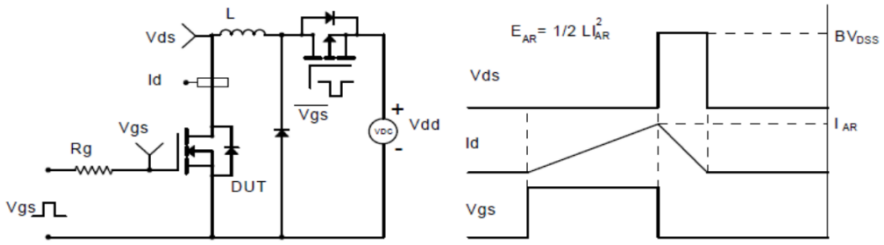
Package Information

TO-252-4L

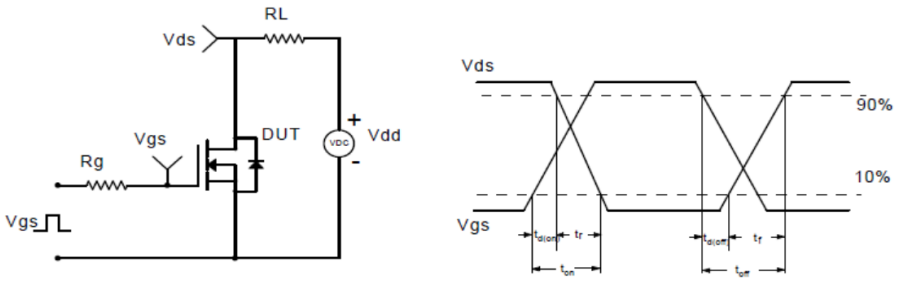


SYMBOL	MM			INCH		
	MIN	NOM	MAX	MIN	NOM	MAX
A	2.190	2.285	2.380	0.086	0.090	0.094
A1	0.460	0.650	0.880	0.018	0.026	0.035
A2	--	--	0.127	--	--	0.005
b	0.510	0.610	0.710	0.020	0.024	0.028
b1	--	--	0.100	--	--	0.004
b2	0.890	1.080	1.270	0.035	0.043	0.050
C	0.460	0.530	0.600	0.018	0.021	0.024
C1	0.400	0.600	0.800	0.016	0.024	0.031
D1	5.970	6.095	6.220	0.235	0.240	0.245
E	4.320	4.890	5.460	0.170	0.193	0.215
E1	6.350	6.540	6.730	0.250	0.257	0.265
e		1.270 BSC			0.05 BSC	
e1		5.080 BSC			0.20 BSC	
H_D	9.60	10.00	10.40	0.378	0.39	0.409
h1	2.19	2.29	2.38	0.086	0.09	0.094
L	0.80	1.00	1.20	0.031	0.04	0.047
L1	2.60	2.90	3.20	0.102	0.11	0.126
L2	0.350	0.650	0.950	0.014	0.026	0.037

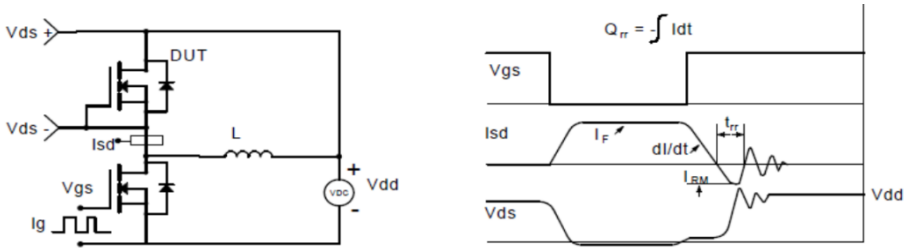
Avalanche Test Circuit and Waveforms(N-Channel)



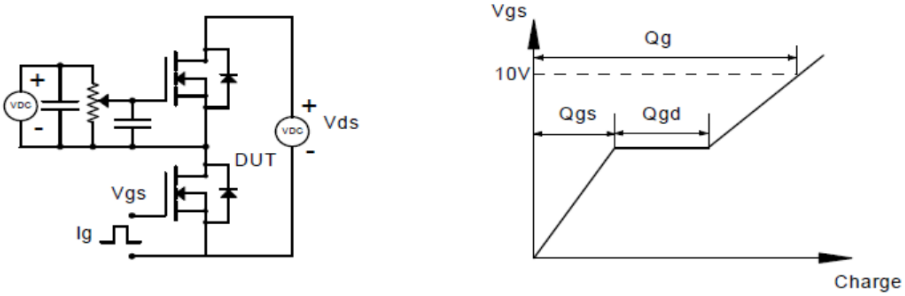
Switching Time Test Circuit and Waveforms(N-Channel)



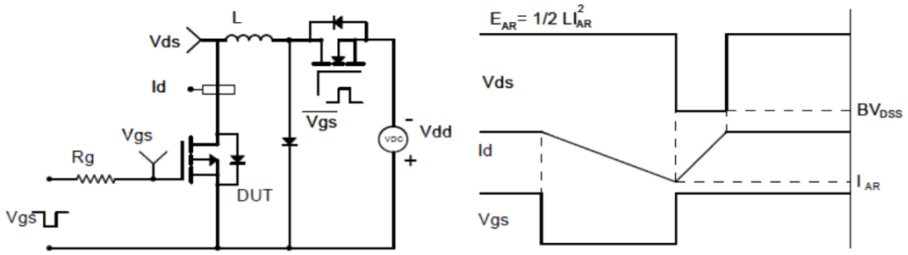
Diode Recovery Test Circuit and Waveforms(N-Channel)



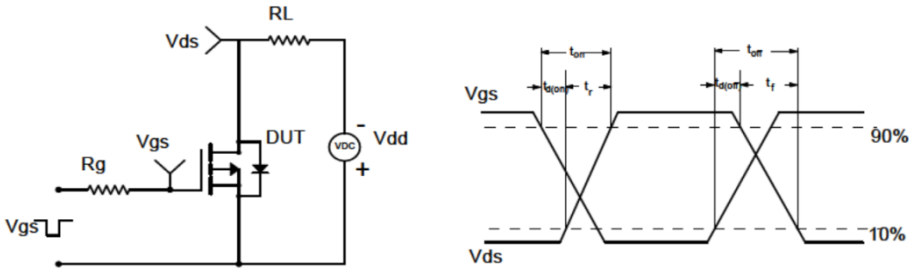
Gate Charge Test Circuit and Waveform(N-Channel)



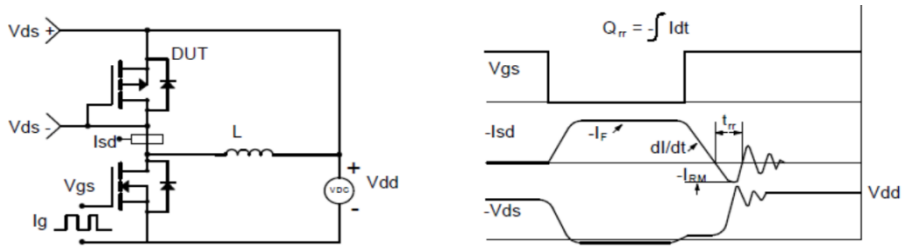
Avalanche Test Circuit and Waveforms(P-Channel)



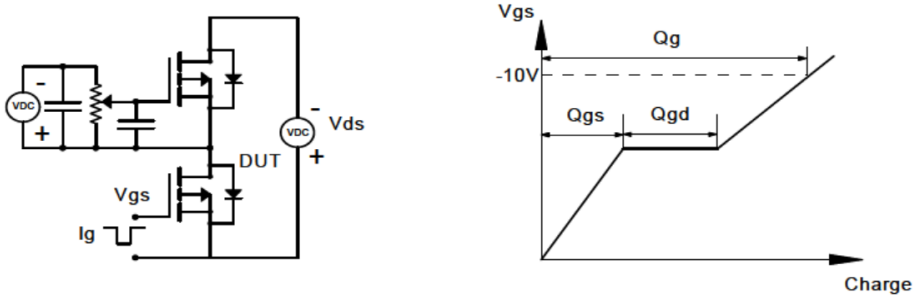
Switching Time Test Circuit and Waveforms(P-Channel)



Diode Recovery Test Circuit and Waveforms(P-Channel)



Gate Charge Test Circuit and Waveform(P-Channel)



Customer Service

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DISCLAIMER: