

Features

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

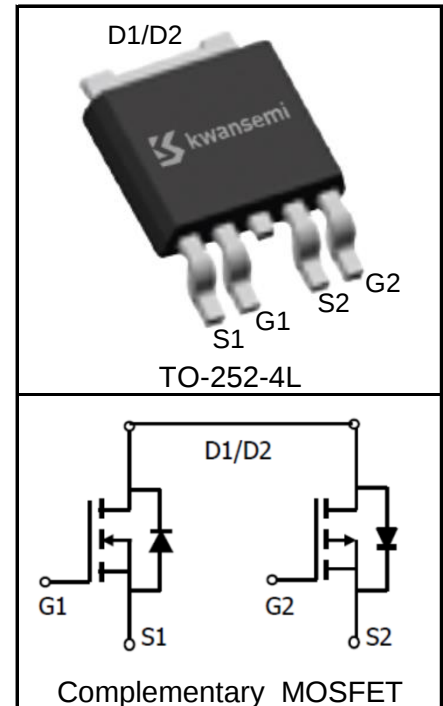
Applications

- DC Fan
- Motor Drive Applications



Halogen-Free

Pin Description



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 _{θJC}	Thermal Resistance-Junction to Case		5.6	3.8	°C/W
R _{θJA} ^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 ($T_C=25^{\circ}\text{C}$ Unless Otherwise Noted)

Symbol	Parameter	Test Condition	KS3640DB4			Unit	
			Min.	Typ.	Max.		
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			
		V _{DS} =-30V, V _{GS} =0V	P			-1	
				T _J =125°C			
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		N		70		
			P		175		
C _{rss}	Reverse Transfer Capacitance	P-Channel V _{GS} =0V, V _{DS} =-15V, Frequency=1.0MHz	N		45		
			P		120		

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

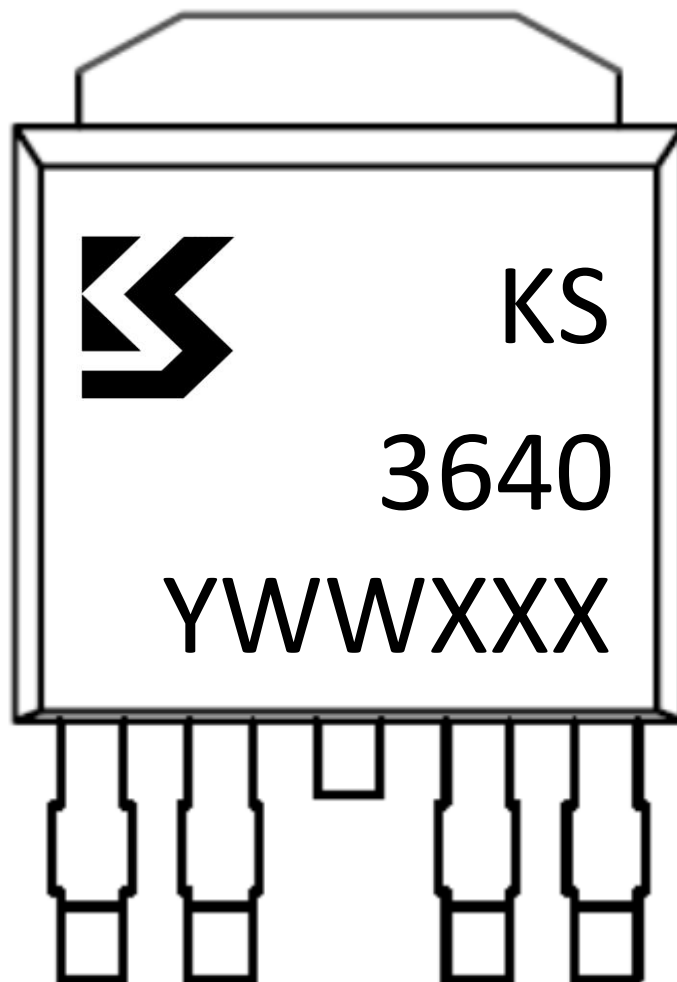
Symbol	Parameter	Test Condition	KS3640DB4			Unit	
			Min.	Typ.	Max.		
Dynamic Characteristics ^⑥							
t _{d(ON)}	Turn-on Delay Time	N-Channel V _{DD} =15V, I _{DS} =10A, V _{GEN} =10V, R _G =3Ω	N		8	ns	
t _r	Turn-on Rise Time		P		14		
			N		12		
			P		25		
		t _{d(OFF)}	Turn-off Delay Time	P-Channel V _{DD} =-15V, I _{DS} =-10A, V _{GEN} = -10V, R _G =3Ω	N		
t _f	Turn-off Fall Time	P			34		
		N			9		
		P			15		
		Gate Charge Characteristics ^⑥					
Q _g	Total Gate Charge	N-Channel V _{DS} =15V, V _{GS} =10V, I _{DS} =10A	N		11	nC	
Q _{gs}	Gate-Source Charge		P		24		
			N		3.1		
			P		5.2		
		Q _{gd}	Gate-Drain Charge	P-Channel V _{DS} =-15V, V _{GS} = -10V, I _{DS} =-10A	N		
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, $t \leq 10\text{sec}$. The value in any given application depends on the user's specific board design.
- ④Limited by T_{Jmax} . Starting $T_J = 25^{\circ}\text{C}$, N Channel: $L = 0.5\text{mH}$, $R_G = 25\Omega$, $I_{AS} = 6\text{A}$, $V_{GS} = 10\text{V}$, P-Chanel: $L = 0.5\text{mH}$, $R_G = 25\Omega$, $I_{AS} = -9\text{A}$, $V_{GS} = -10\text{V}$, Part not recommended for use above this value.
- ⑤Pulse test;Pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$.
- 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

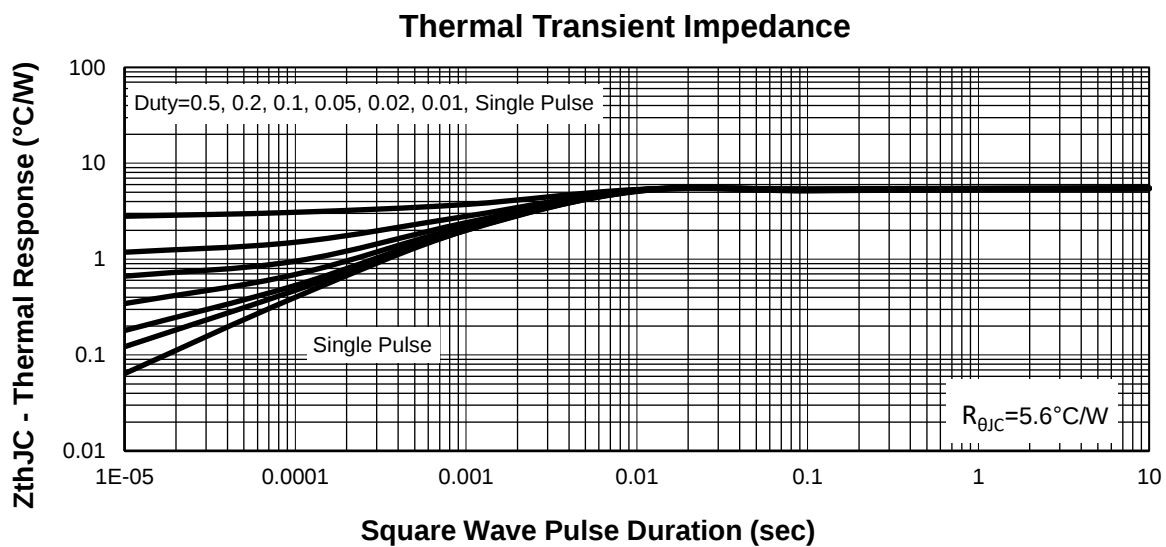
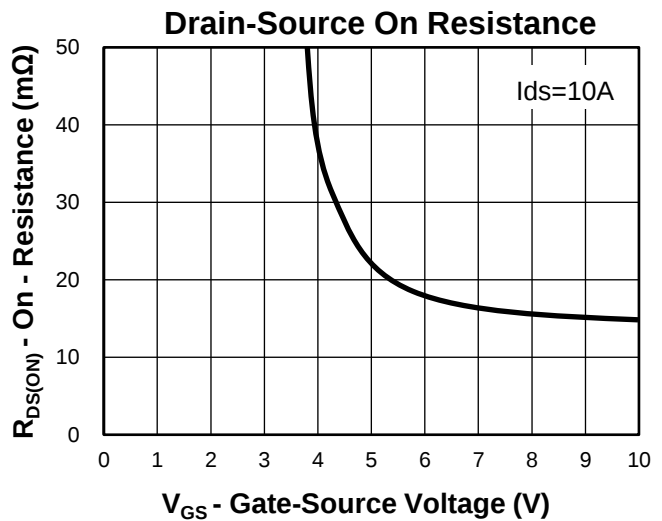
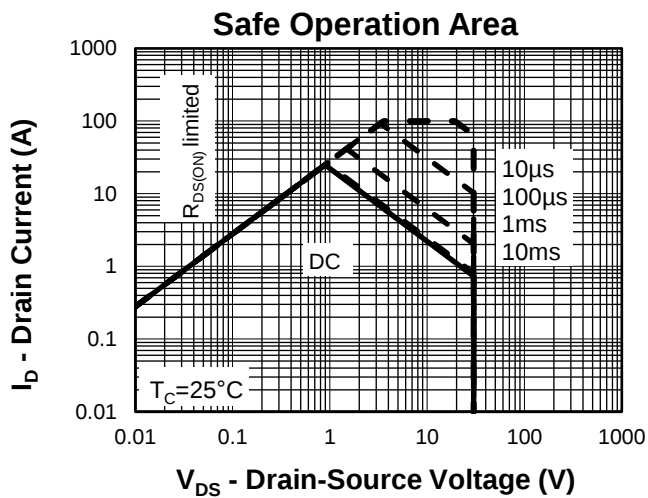
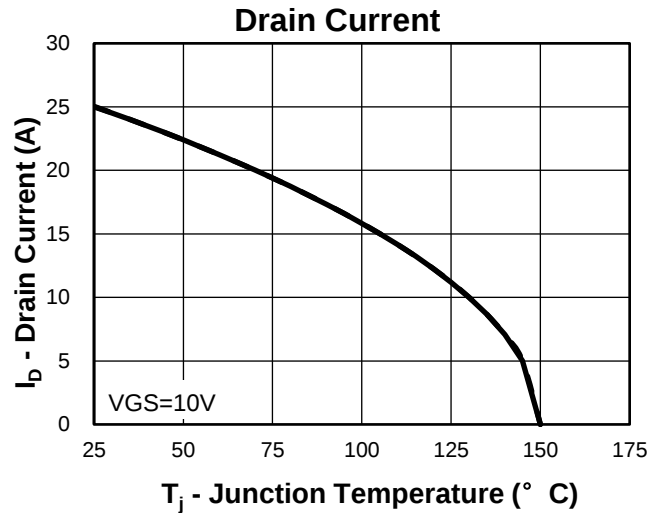
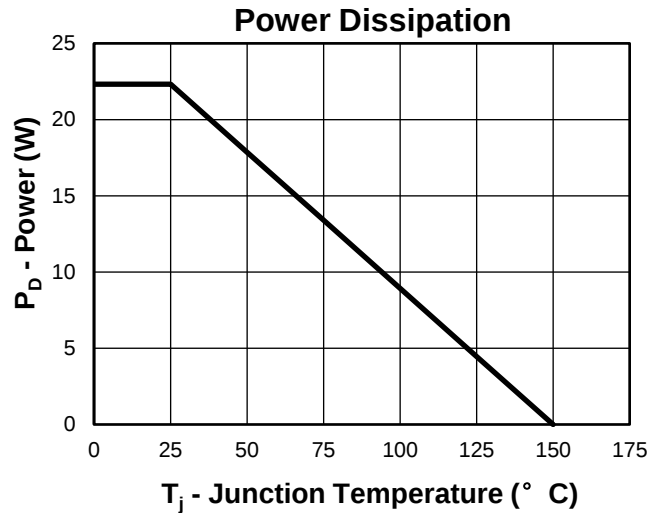


1st Line: Kwansemi LOGO, Kwansemi Code(KS)

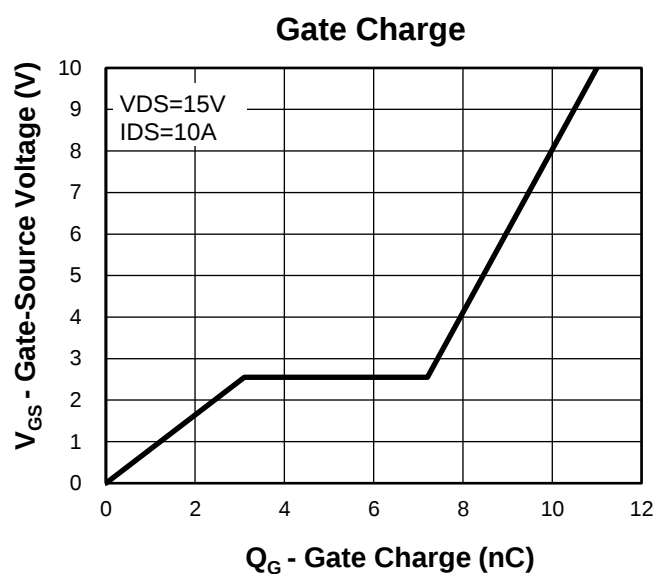
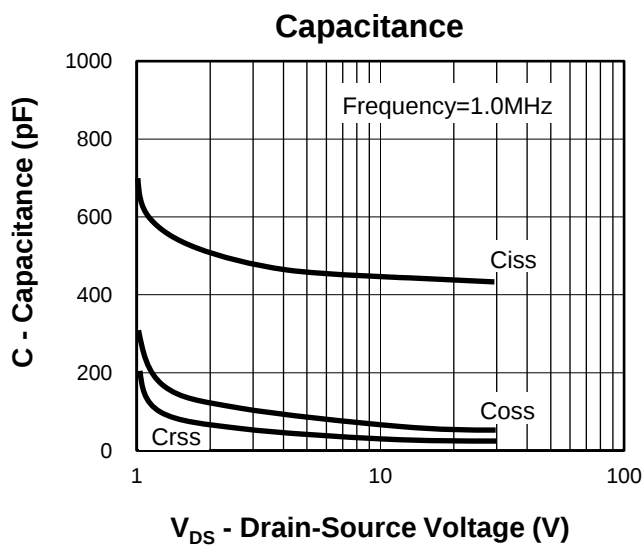
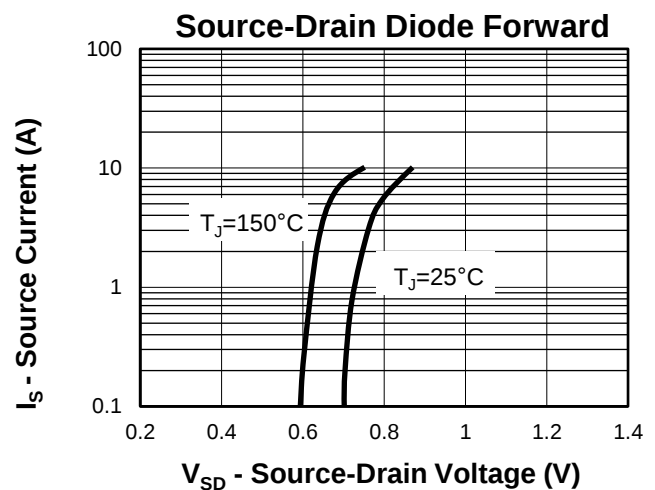
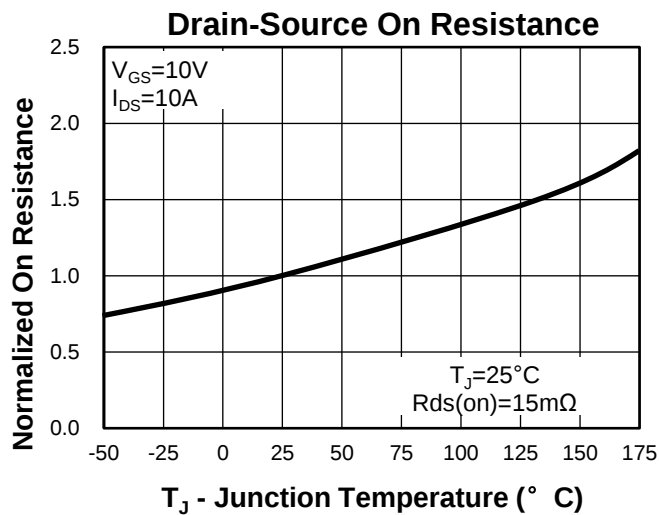
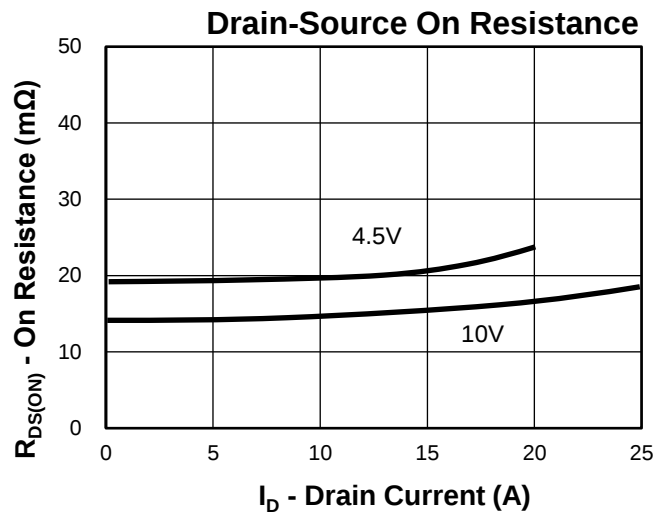
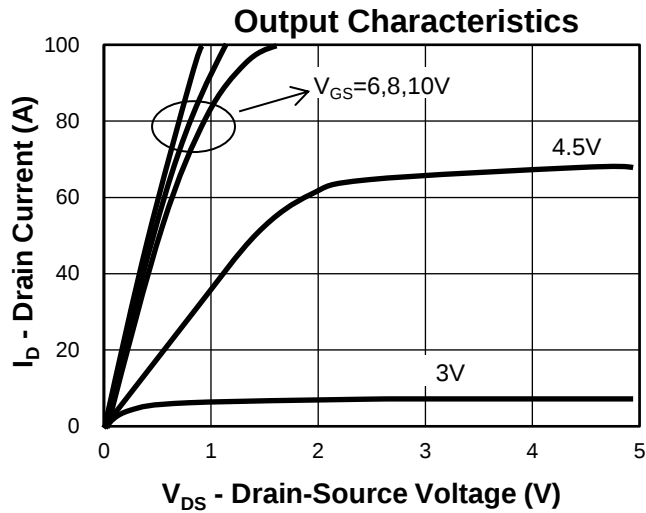
2nd Line: Part Number(3640)

3rd Line: Lot Number(YWWXXX)

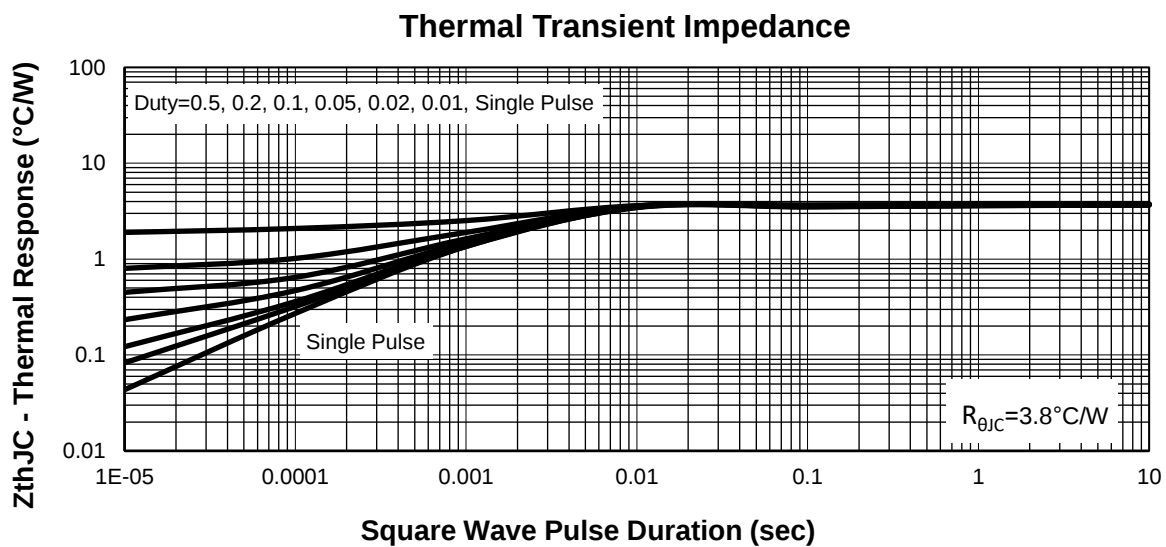
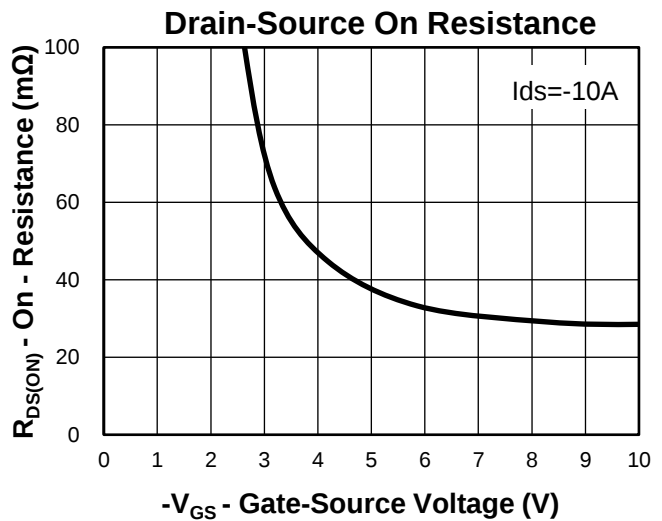
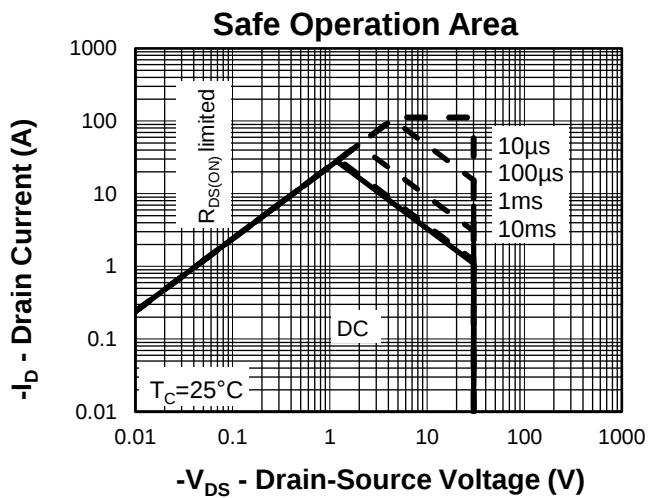
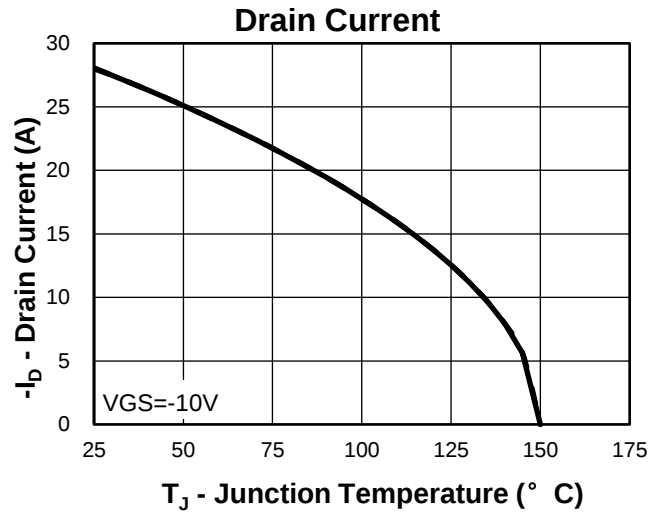
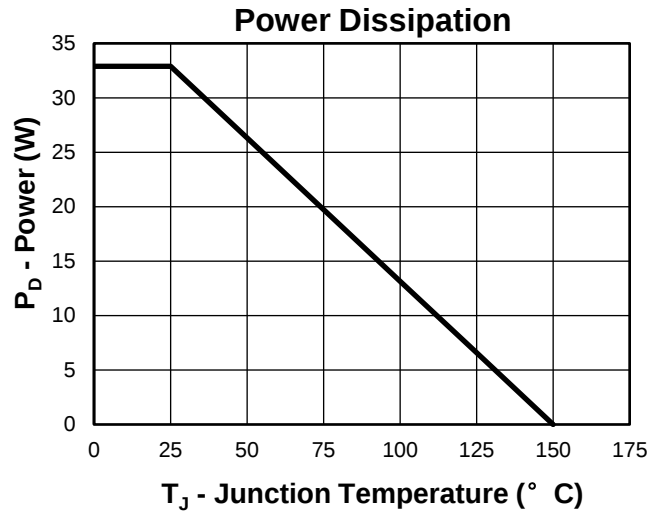
Typical Characteristics(N-Channel)



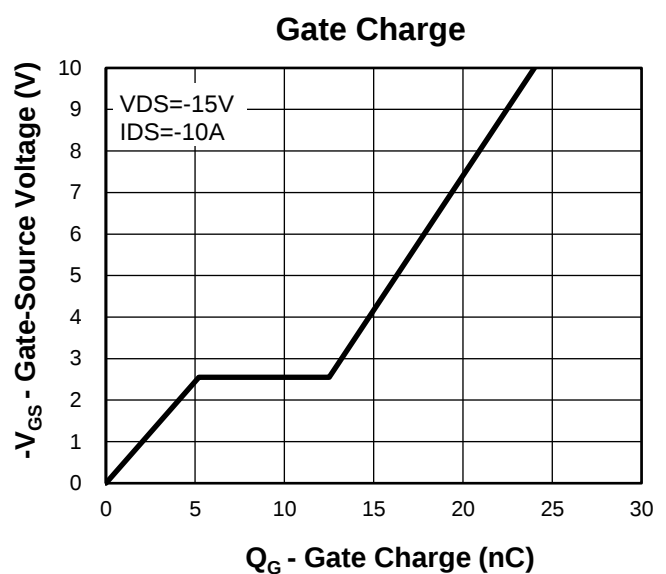
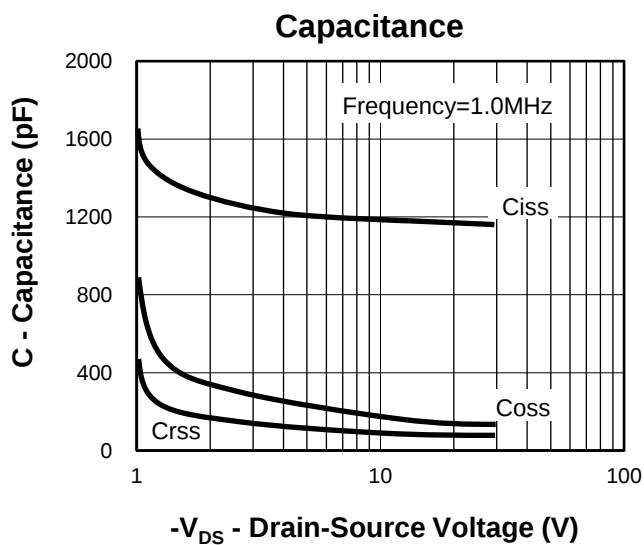
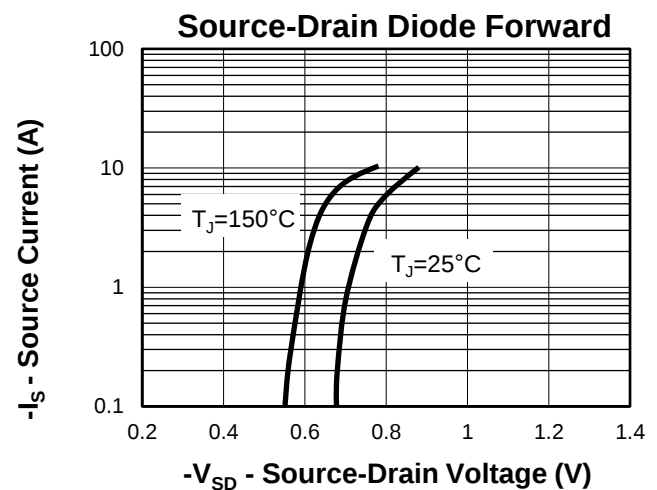
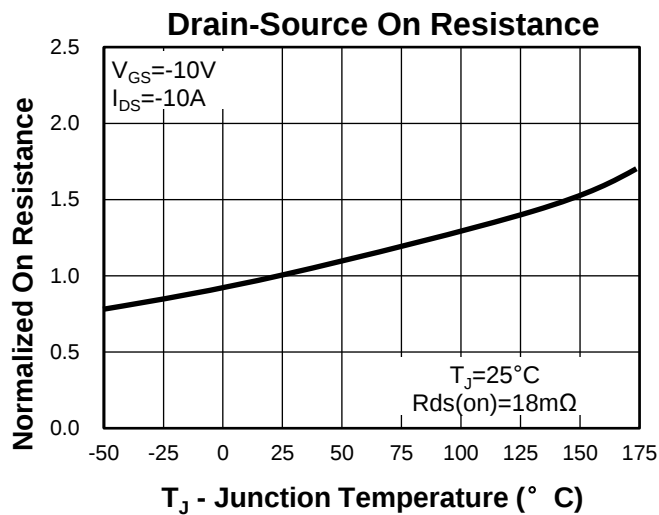
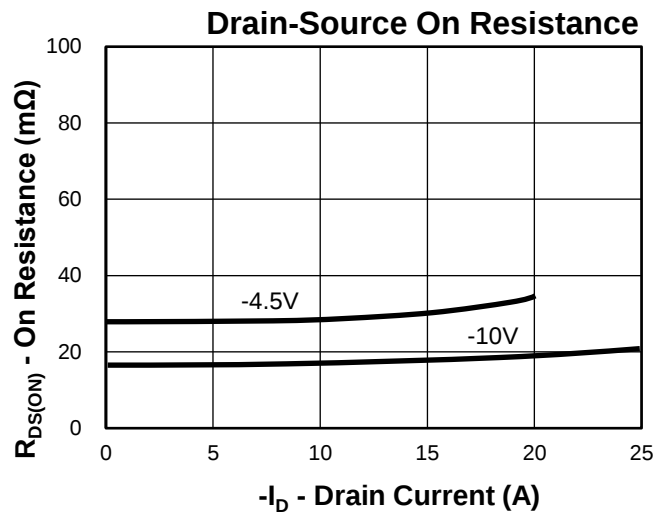
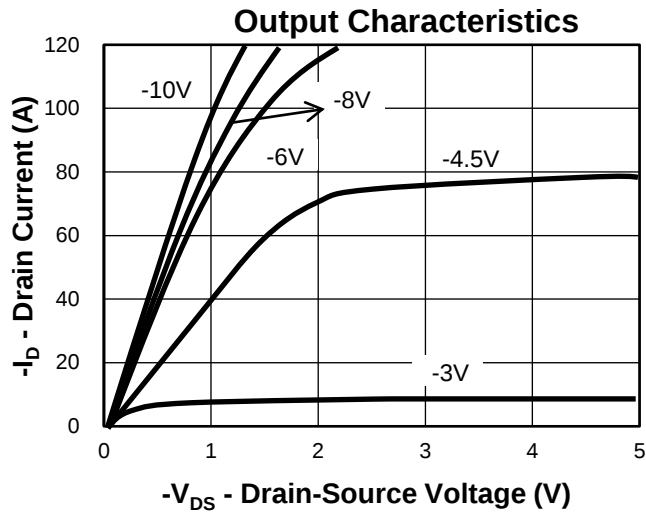
Typical Characteristics(N-Channel)

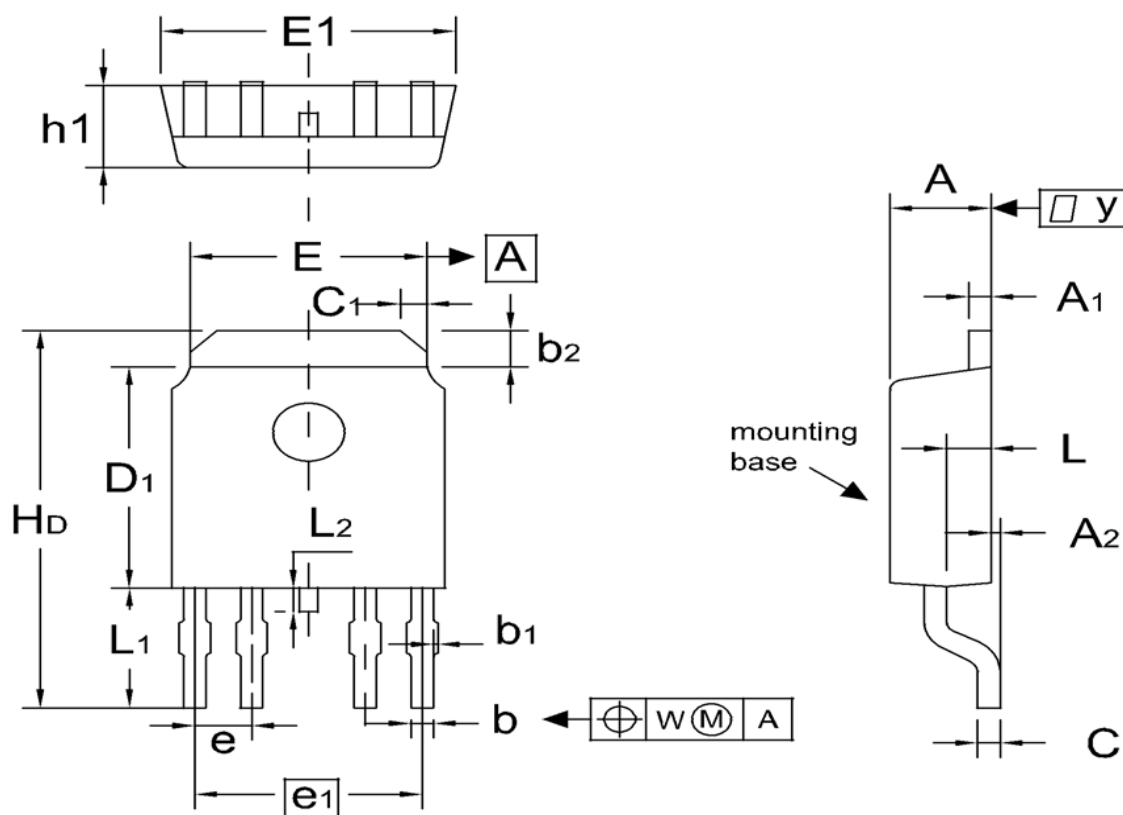


Typical Characteristics(P-Channel)



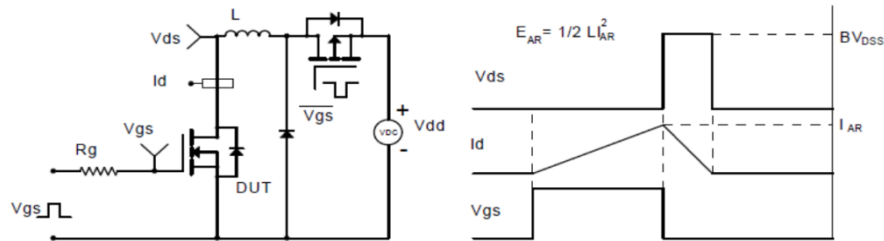
Typical Characteristics(P-Channel)



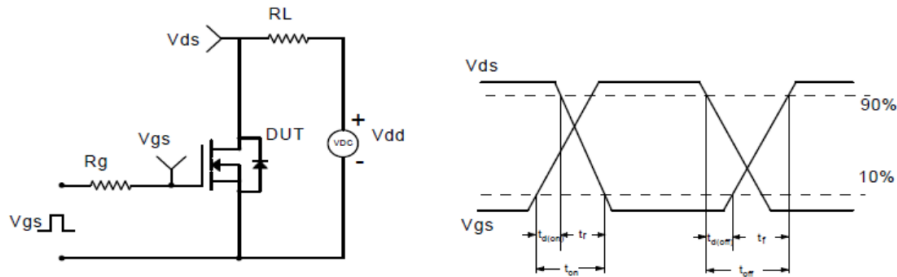
Package Information
TO-252-4L


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

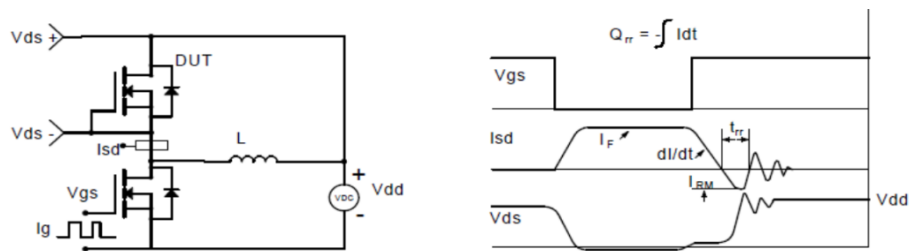
Avalanche Test Circuit and Waveforms(N-Channel)



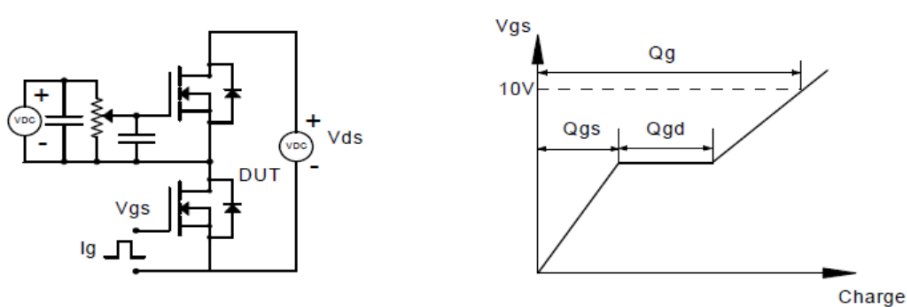
Switching Time Test Circuit and Waveforms(N-Channel)



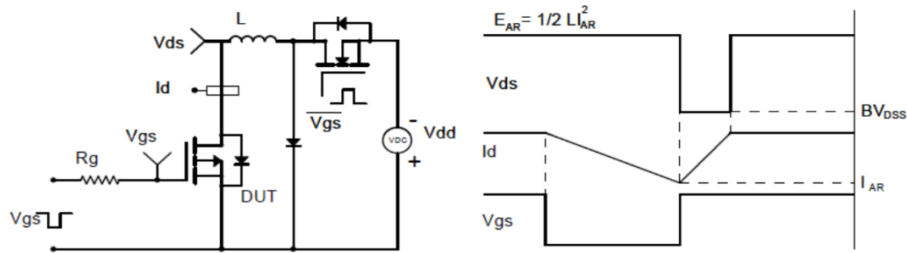
Diode Recovery Test Circuit and Waveforms(N-Channel)



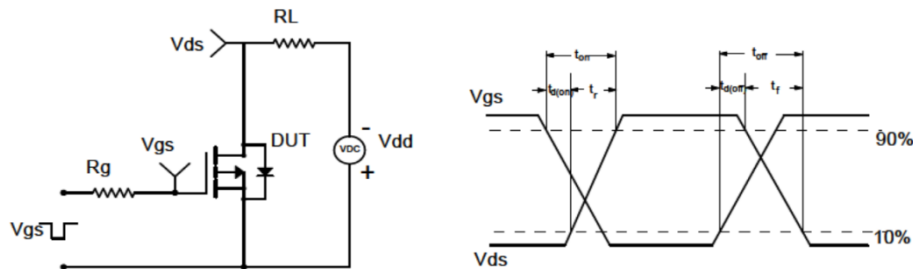
Gate Charge Test Circuit and Waveform(N-Channel)



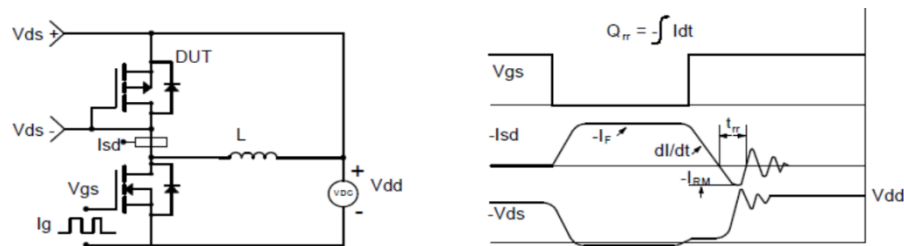
Avalanche Test Circuit and Waveforms(P-Channel)



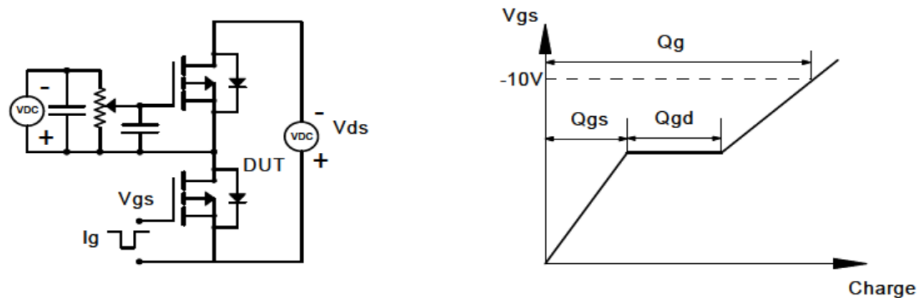
Switching Time Test Circuit and Waveforms(P-Channel)



Diode Recovery Test Circuit and Waveforms(P-Channel)



Gate Charge Test Circuit and Waveform(P-Channel)



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