

P-Ch Trench MOSFET

KU170P04DT2

This Trench MOSFET has better characteristics, such as fast switching time, low on resistance, low gate charge and excellent avalanche characteristics. It is mainly suitable for inverters, a load switch and general purpose applications.

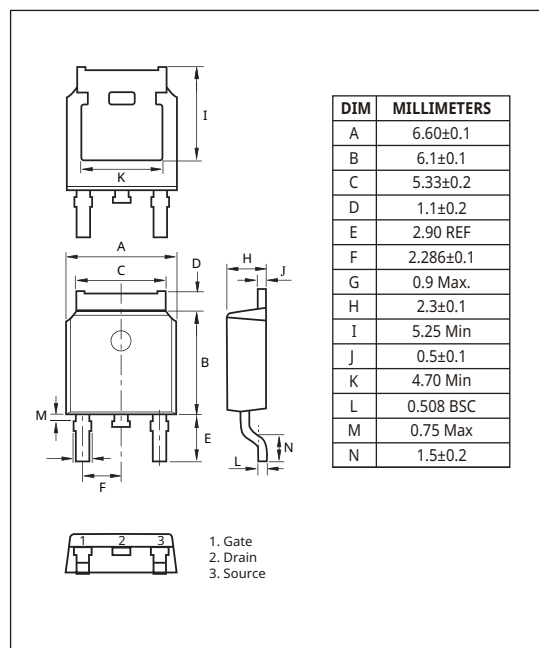
FEATURES

- $V_{DS} = -40V$, $I_D = -48A$
- Drain-Source ON Resistance :
 $R_{DS(ON)}(Max) = 17m\Omega @ V_{GS} = -10V$
 $R_{DS(ON)}(Max) = 25m\Omega @ V_{GS} = -4.5V$
- $Q_g(typ.) = 51nC$

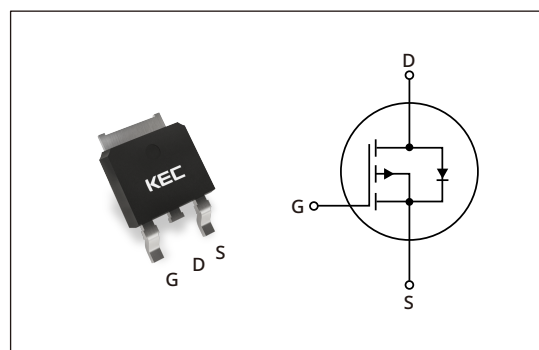
APPLICATION

- Inverters
- Load Switch
- General purpose applications

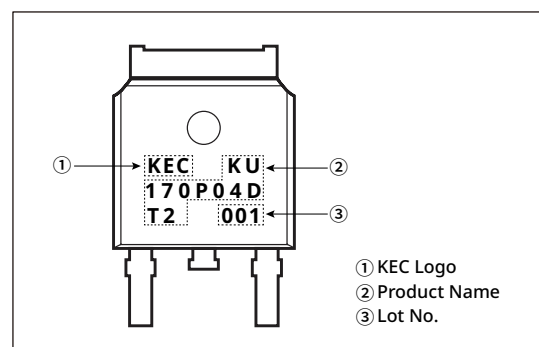
PACKAGE DIMENSION(DPAK(3))



PIN CONFIGURATION



MARKING CODE



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P-Ch Trench MOSFET - KU170P04DT2

MAXIMUM RATING (T_J=25°C)

CHARACTERISTIC		SYMBOL	RATING	UNIT
Drain-Source Voltage		V _{DSS}	-40	V
Gate-Source Voltage		V _{GSS}	±20	V
Drain Current	T _C = 25°C	I _D	-48*	A
	T _C = 100°C		-30*	
	Pulsed (Note 1)	I _{DP}	-192*	
Single Pulsed Avalanche Energy (Note 2)		E _{AS}	159	mJ
Repetitive Avalanche Energy (Note 1)		E _{AR}	4.2	mJ
Peak Diode Recovery dv/dt (Note 3)		dv/dt	4.5	V/ns
Drain Power Dissipation	T _C = 25°C	P _D	65.8	W
	T _A = 25°C		1.14	W
Maximum Junction Temperature		T _J	150	°C
Storage Temperature Range		T _{stg}	-55 ~ 150	°C
Thermal Characteristics				
Thermal Resistance, Junction-to-Case	T _C = 25°C	R _{thJC}	1.9	°C/W
Thermal Resistance, Junction-to-Ambient	T _A = 25°C	R _{thJA}	110	°C/W

* : Drain current limited by maximum junction temperature.

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ELECTRICAL CHARACTERISTICS(T_J= 25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Static						
Drain-Source Breakdown Voltage	BV _{DSS}	I _D = -250μA, V _{GS} =0V	-40	-	-	V
Breakdown Voltage Temperature Coefficient	ΔBV _{DSS} /ΔT _J	I _D =-1 mA, Referenced to 25°C	-	-37	-	mV/°C
Drain Cut-off Current	I _{DSS}	V _{DS} =-40V, V _{GS} =0V	-	-	-1	μA
Gate Threshold Voltage	V _{th}	V _{DS} =V _{GS} , I _D =-250μA	-1.0	-2.0	-3.0	V
Gate Leakage Current	I _{GSS}	V _{GS} =±20V, V _{DS} =0V	-	-	±100	nA
Drain-Source ON Resistance	R _{DS(ON)}	V _{GS} =-10V, I _D =-20A	-	12	17	mΩ
		V _{GS} =-4.5V, I _D =-10A	-	17	25	
Dynamic						
Total Gate Charge	Q _g (10V)	V _{DD} =-20V, I _D =-20A V _{GS} =-10V (Note 4)	-	51	-	nC
Gate-Source Charge	Q _{gs}		-	8	-	
Gate-Drain Charge	Q _{gd}		-	11	-	
Turn-on Delay time	t _{d(on)}	V _{DD} =-20V, I _D =-20A V _{GS} =-10V, R _G =10Ω (Note 3, 4)	-	11	-	ns
Turn-on Rise time	t _r		-	3.3	-	
Turn-off Delay time	t _{d(off)}		-	102	-	
Turn-off Fall time	t _f		-	46	-	
Input Capacitance	C _{iss}	V _{DS} =-20V, V _{GS} =0V, f=1.0MHz	-	2600	-	pF
Output Capacitance	C _{oss}		-	440	-	
Reverse Transfer Capacitance	C _{rss}		-	240	-	
Source-Drain Diode Ratings						
Continuous Source Current	I _s	V _{GS} < V _{th}	-	-	-48	A
Diode Forward Voltage	V _{SD}	I _S =-20A, V _{GS} =0V	-	-	-1.2	V
Reverse Recovery Time	t _{rr}	I _S =-20A, V _{GS} =0V, V _{DD} =-20V	-	48	-	ns
Reverse Recovery Charge	Q _{rr}	dI _S /dt=-100A/μs	-	75	-	nC

Note 1) Repetivity rating: Pulse width limited by junction temperature.

Note 2) L=130μH, I_D = -39.5A, V_{DD} = -20V, R_G = 25Ω, Starting T_J = 25°C.

Note 3) Pulse Test: Pulse width ≤ 10μs, Duty Cycle ≤ 2%.

Note 4) Essentially independent of operating temperature.

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Fig1. $I_D - V_{DS}$

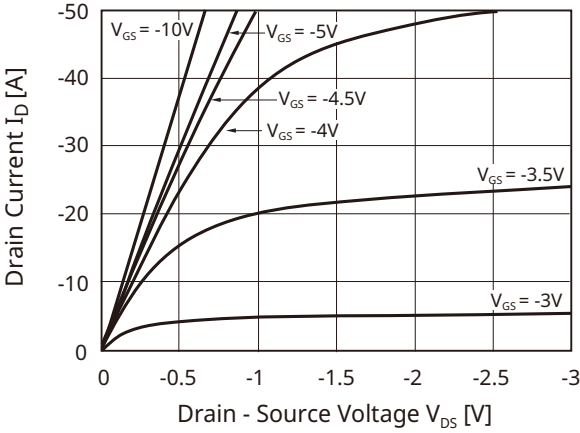


Fig2. $I_D - V_{DS}$

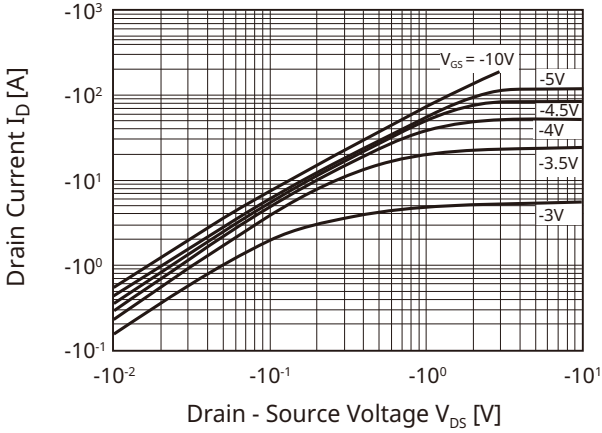


Fig3. $I_D - V_{GS}$

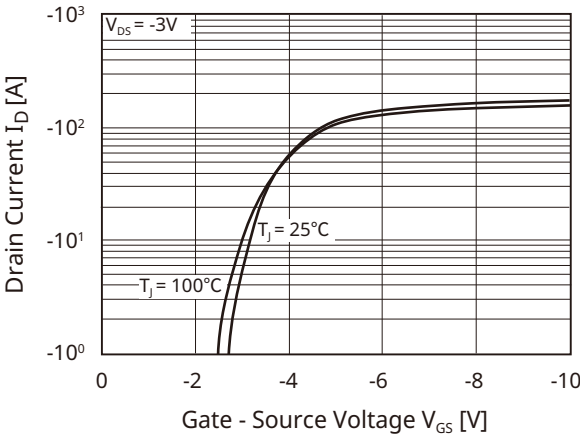


Fig4. $R_{DS(ON)} - I_D$

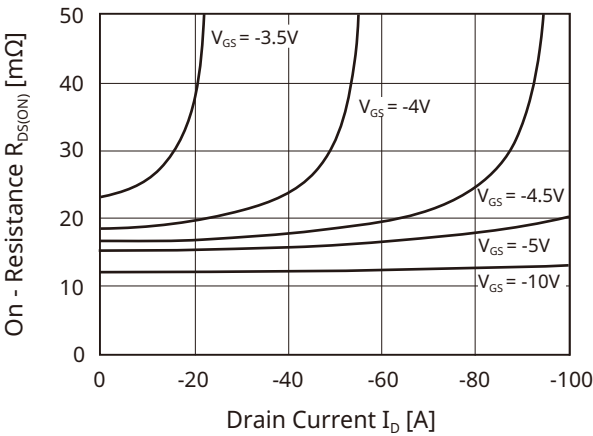


Fig5. $R_{DS(ON)} - V_{GS}$

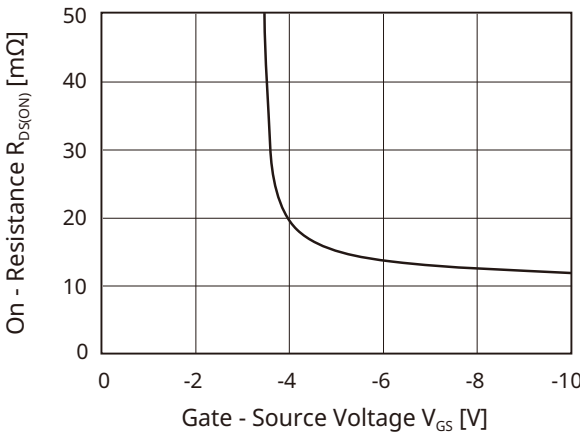
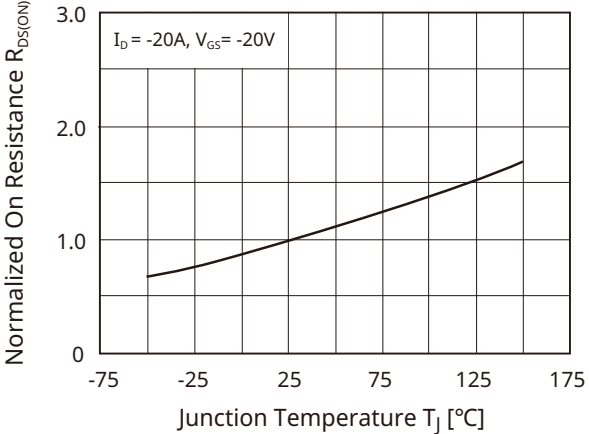


Fig6. $R_{DS(ON)} - T_J$



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Fig7. $BV_{DSS} - T_J$

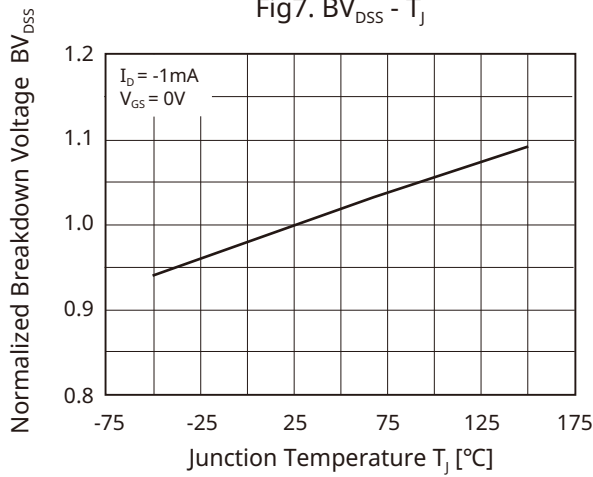


Fig8. $V_{th} - T_J$

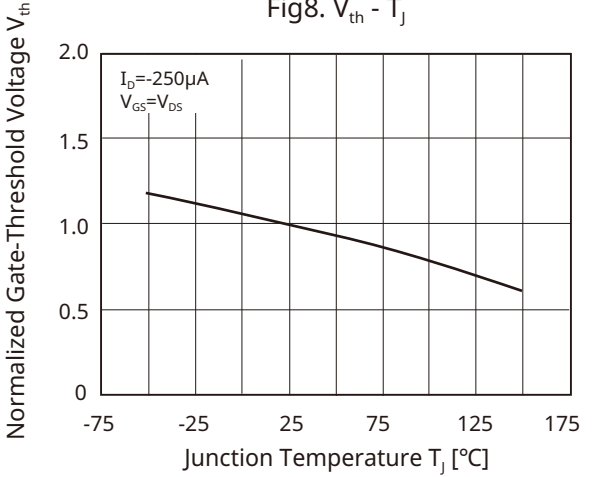


Fig9. $I_S - V_{SD}$

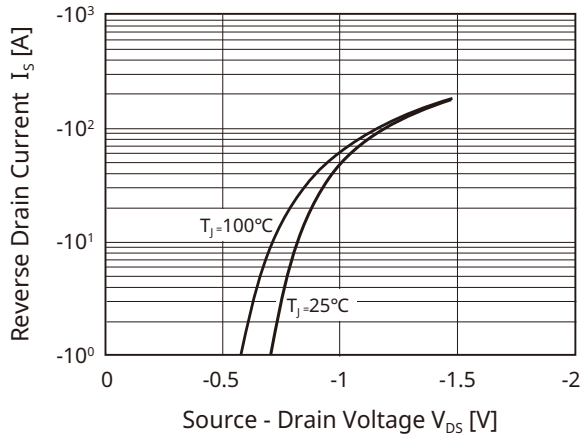


Fig10. Capacitance - V_{DS}

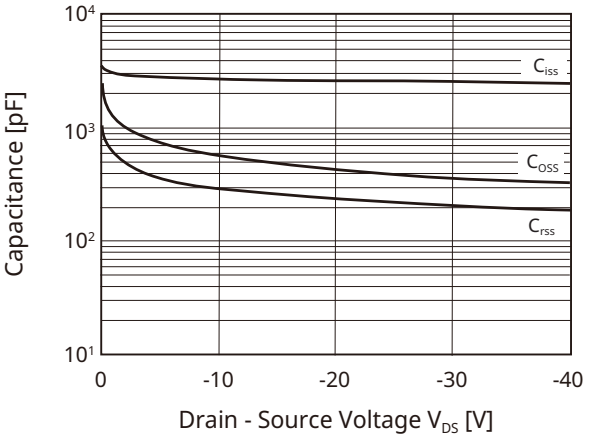


Fig11. $Q_g - V_{GS}$

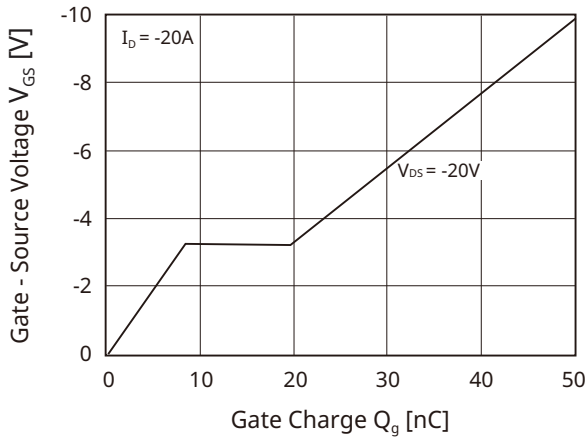
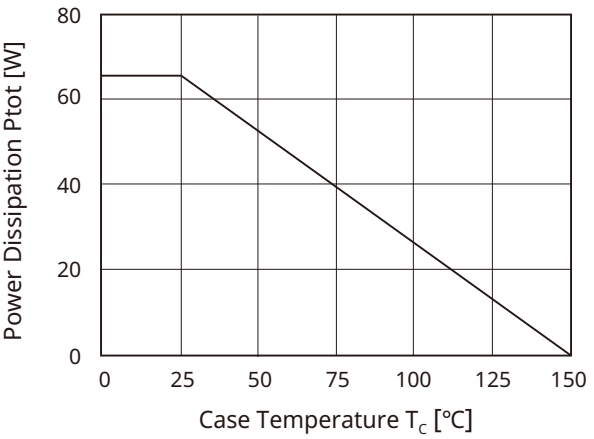


Fig12. $P_{tot} - T_C$



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Fig13. $I_D - T_J$

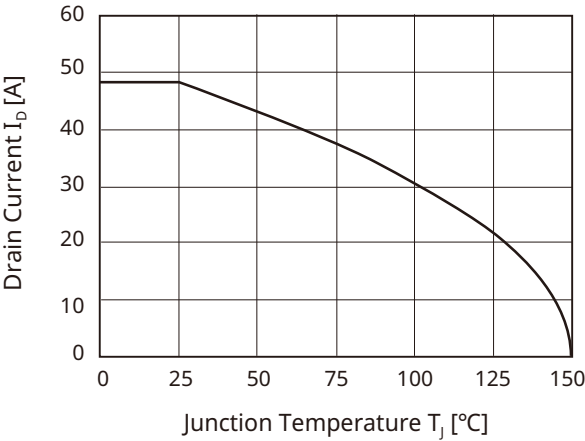


Fig14. Safe Operation Area

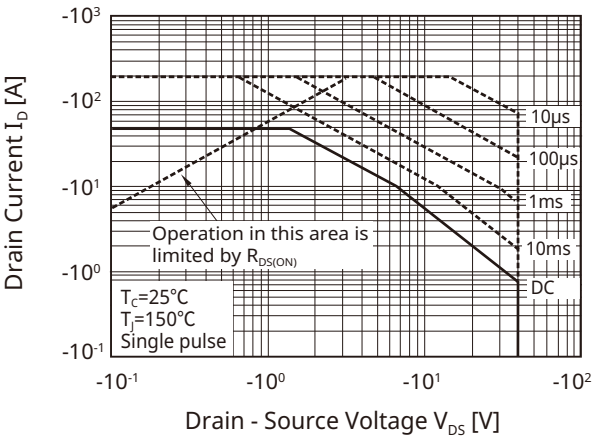
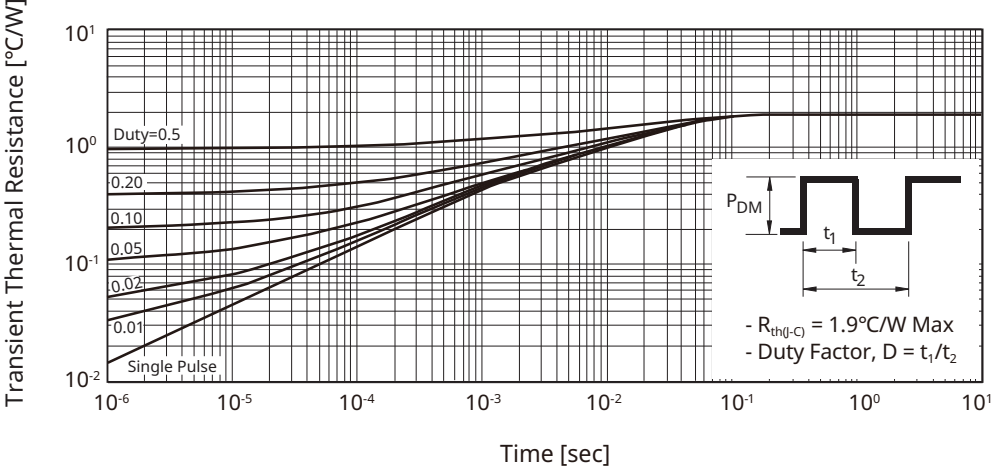


Fig15. Transient Thermal Response Curve (J-C)



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Fig16. Gate Charge

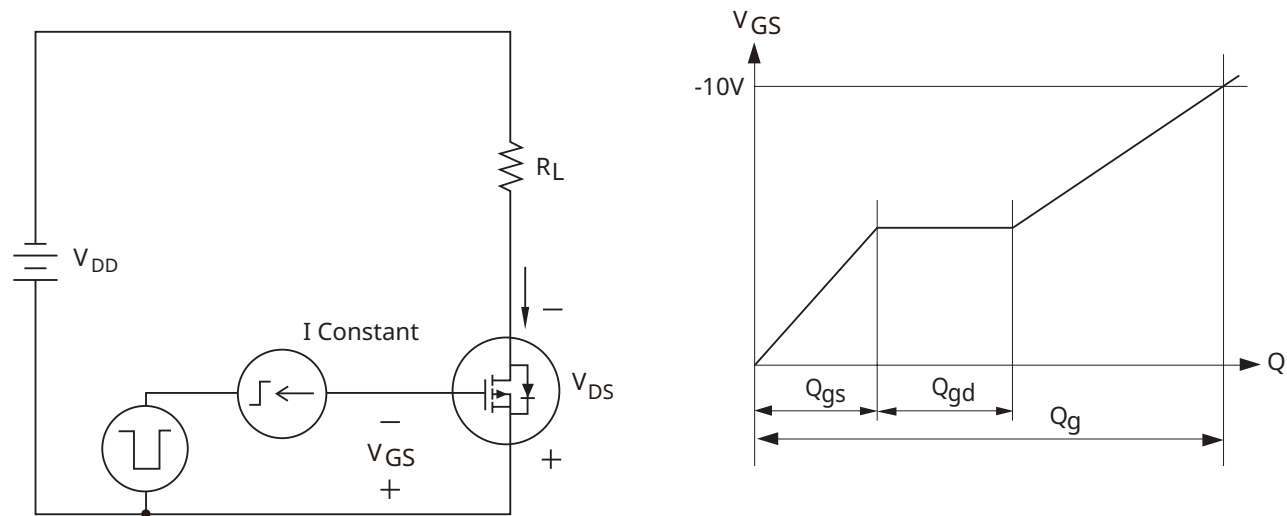


Fig17. Single Pulsed Avalanche Energy

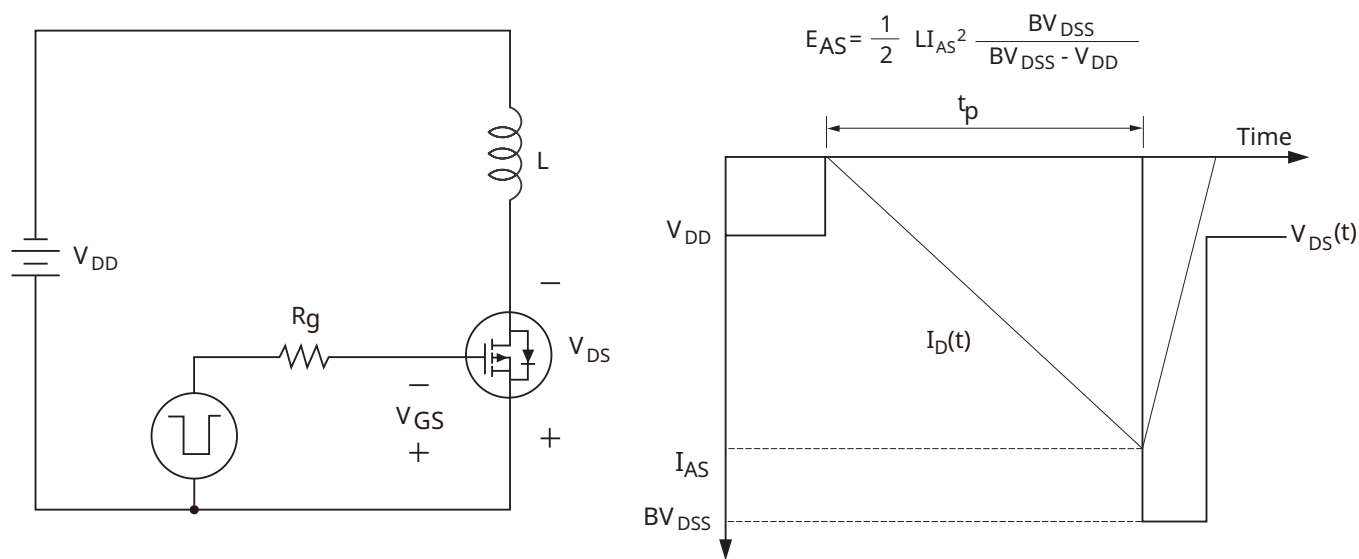
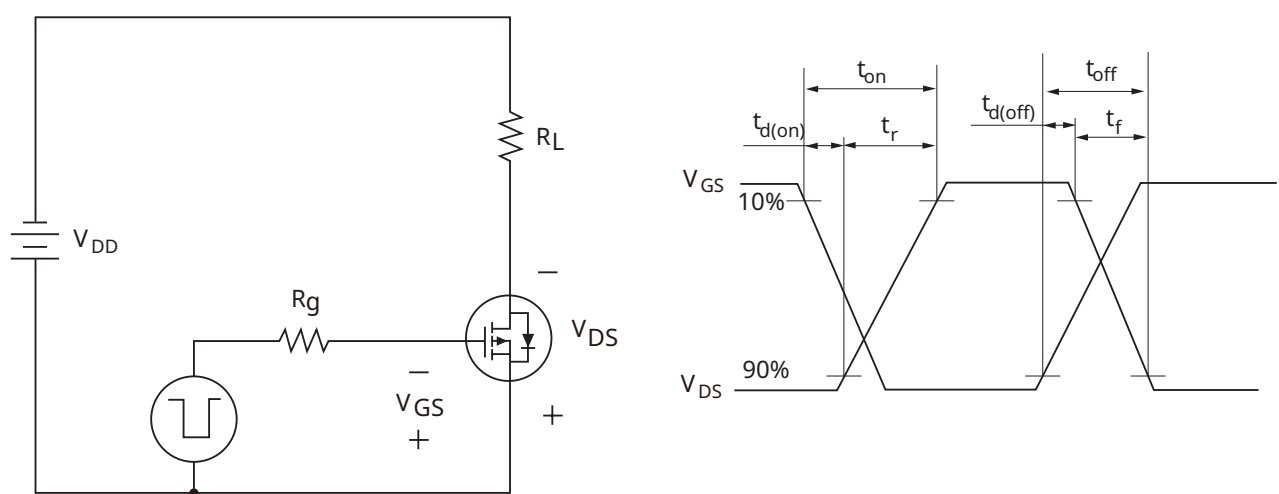


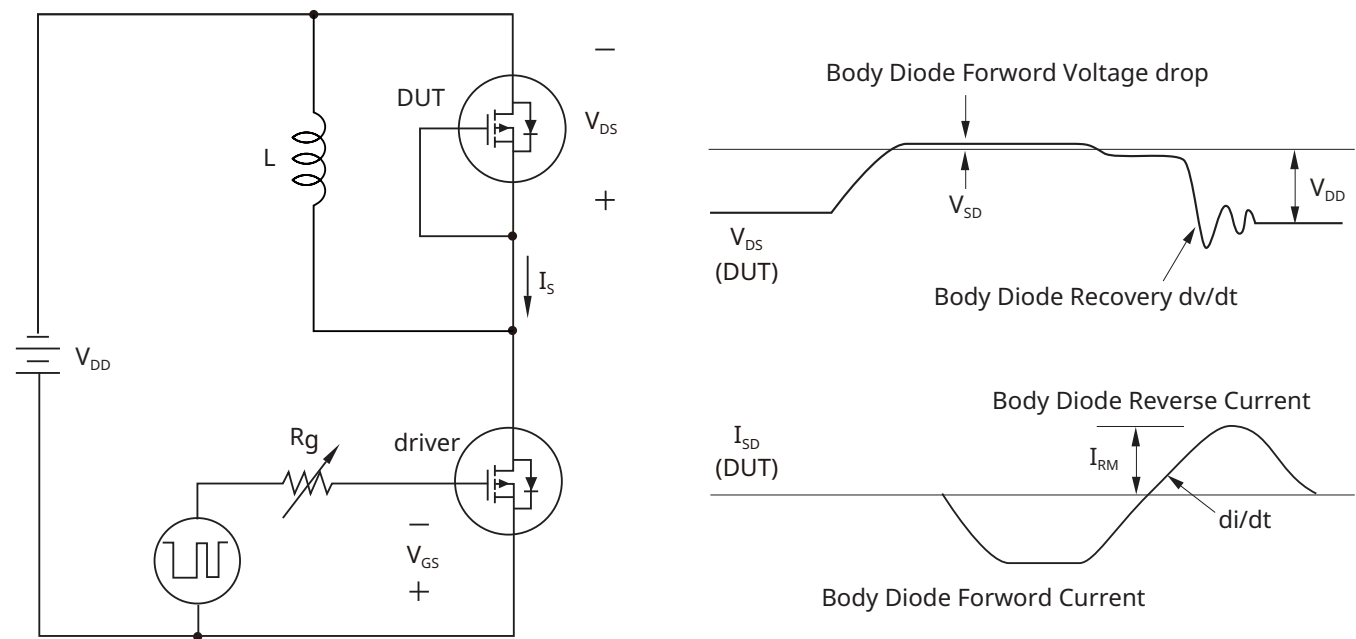
Fig18. Resistive Load Switching



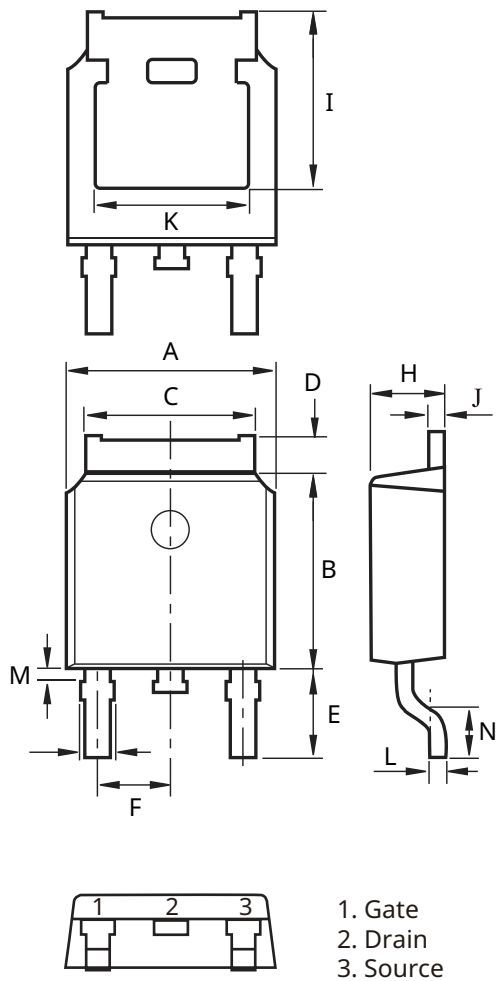
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Fig19. Source - Drain Diode Reverse Recovery and dv/dt



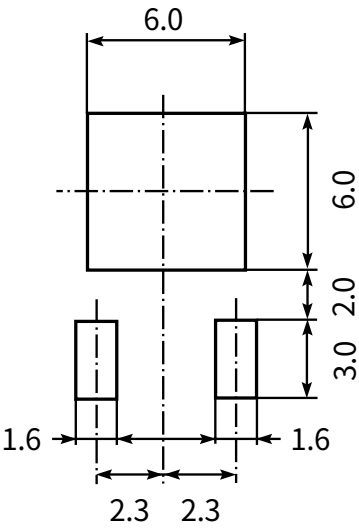
PACKAGE INFORMATION(DPAK(3))



DIM	MILLIMETERS
A	6.60±0.1
B	6.1±0.1
C	5.33±0.2
D	1.1±0.2
E	2.90 REF
F	2.286±0.1
G	0.9 Max.
H	2.3±0.1
I	5.25 Min
J	0.5±0.1
K	4.70 Min
L	0.508 BSC
M	0.75 Max
N	1.5±0.2

RECOMMENDED PAD DIMENSION

(Unit:mm)



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ORDERING INFORMATION

Part Number	Status	Compliance			Packing Type	Packing Qty
		AEC-Q	Pb-Free	Halogen Free		
KU170P04DT2-RTF/HQ	Active	-	Y	Y	Reel	3,000pcs

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1. The products described in this data are intended to be used in general-purpose electronic equipment.
(Office equipment, telecommunication equipment, measuring equipment, home appliances)
2. When you intend to use these products with equipment or device which require an extremely high of reliability and special applications (such as automobile, air travel aerospace, transportation equipment, life support, system and safety devices) in which special quality and reliability and the failure or malfunction of products may directly jeopardize or harm the human body or damage to property and any application other than the standard application intended, please be sure to consult with our sales representative in advance.
3. On designing your application, please use product within the ranges guaranteed by KEC for maximum rating, operating supply voltage range, heat radiation characteristics and other characteristics. User shall be responsible for failure or damage when used beyond the guaranteed ranges.
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