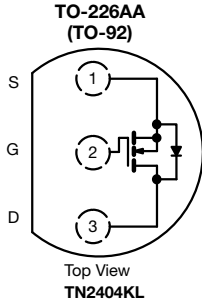


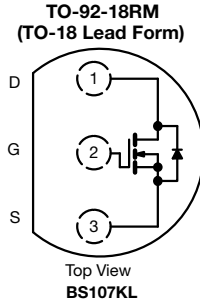
N-Channel 240 V (D-S) MOSFET



Device Marking Front View

"S" TN
2404KL
xxyy

"S" = Siliconix Logo
xxyy = Date Code



Device Marking Front View

"S" BS
107KL
xxyy

"S" = Siliconix Logo
xxyy = Date Code



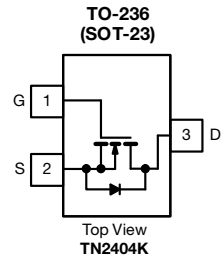
RoHS
COMPLIANT
HALOGEN
FREE

FEATURES

- Low on-resistance: 4 W
- Secondary breakdown free: 260 V
- Low power / voltage driven
- Low input and output leakage
- Excellent thermal stability
- Material categorization:
for definitions of compliance please see
www.vishay.com/doc?99912

APPLICATIONS

- High-voltage drivers: relays, solenoids, lamps, hammers, displays, transistors, etc.
- Telephone mute switches, ringer circuits
- Power Supply, Converters
- Motor Control



Marking Code: K1ywl
K1 = Part Number Code for TN2404K
y = Year Code
w = Week Code
l = Lot Traceability

BENEFITS

- Low offset voltage
- Full-voltage operation
- Easily driven without buffer
- Low error voltage
- No high-temperature "Run-Away"

PRODUCT SUMMARY

PART NUMBER	TN2404K	TN2404K, BS107KL
V_{DS} (V)	240	
$R_{DS(on)}$ max. (Ω) at $V_{GS} = 10$ V	4	
Q_g typ. (nC)	4.87	
I_D (A) ^{a, e}	0.2	0.3
Configuration	Single	

ORDERING INFORMATION

Package	TO-236 (SOT-23)	TO-226AA (TO-92)	TO-92-18RM (TO-18 Lead Form)
Lead (Pb)-free	TN2404K-T1-E3		
Lead (Pb)-free and halogen-free	TN2404K-T1-GE3		
Tape and Reel		TN2404KL-TR1-E3	BS107KL-TR1-E3
Alternate manufacturing location	TN2404K-T1-BE3		



ABSOLUTE MAXIMUM RATINGS ($T_A = 25\text{ }^\circ\text{C}$, unless otherwise noted)					
PARAMETER	SYMBOL	TN2404K	TN2404KL/BS107KL	SYMBOL	
Drain-source voltage	V_{DS}	240		V	
Gate-source voltage	V_{GS}	± 20			
Continuous drain current ($T_J = 150\text{ }^\circ\text{C}$)	$T_A = 25\text{ }^\circ\text{C}$	I_D	0.2	0.3	A
	$T_A = 70\text{ }^\circ\text{C}$		0.16	0.25	
Pulsed drain current ($t = 300\text{ }\mu\text{s}$)		I_{DM}	0.8	1.4	
Maximum power dissipation	$T_A = 25\text{ }^\circ\text{C}$	P_D	0.36	0.8	W
	$T_A = 70\text{ }^\circ\text{C}$		0.23	0.51	
Thermal resistance junction-to-ambient		R_{thJA}	350b	156	$^\circ\text{C/W}$
Operating junction and storage temperature range		T_J, T_{stg}	- 55 to 150		$^\circ\text{C}$

Notes

- Pulse width limited by maximum junction temperature
- Surface mounted on an FR4 board

SPECIFICATIONS ($T_A = 25\text{ }^\circ\text{C}$, unless otherwise noted)						
PARAMETER	SYMBOL	TEST CONDITIONS	LIMITS			
			MIN.	TYP. ^a	MAX.	UNIT
Static						
Drain-source breakdown voltage	V_{DS}	$V_{GS} = 0\text{ V}, I_D = 100\text{ }\mu\text{A}$	240	257	-	V
Gate-source threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$	0.8	1.65	2	
Gate-source leakage	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$	-	-	± 100	nA
Zero gate voltage drain current	I_{DSS}	$V_{DS} = 192\text{ V}, V_{GS} = 0\text{ V}$	-	-	1	μA
		$V_{DS} = 192\text{ V}, V_{GS} = 0\text{ V}, T_J = 55\text{ }^\circ\text{C}$	-	-	10	
On-state drain current ^a	$I_{D(on)}$	$V_{DS} = 10\text{ V}, V_{GS} = 10\text{ V}$	0.8	-	-	A
		$V_{DS} = 10\text{ V}, V_{GS} = 4.5\text{ V}$	0.5	-	-	
Drain-source on-state resistance ^a	$R_{DS(on)}$	$V_{GS} = 10\text{ V}, I_D = 0.3\text{ A}$	-	2.2	4	W
		$V_{GS} = 4.5\text{ V}, I_D = 0.2\text{ A}$	-	2.3	4	
		$V_{GS} = 2.5\text{ V}, I_D = 0.1\text{ A}$	-	2.4	6	
Forward transconductance ^a	g_{fs}	$V_{DS} = 10\text{ V}, I_D = 0.3\text{ A}$	-	1.6	-	S
Diode forward voltage	V_{SD}	$V_{GS} = 0\text{ V}, I_S = 0.3\text{ A}$	-	0.8	1.2	V
Dynamic ^b						
Total gate charge	Q_g	$V_{DS} = 192\text{ V}, V_{GS} = 10\text{ V}, I_D = 0.5\text{ A}$	-	4.87	8	nC
Gate-source charge	Q_{gs}		-	0.56	-	
Gate-drain charge	Q_{gd}		-	1.53	-	
Turn-on delay time	$t_{d(on)}$	$V_{DD} = 60\text{ V}, R_L = 200\text{ }\Omega$ $I_D \cong 0.3\text{ A}, V_{GEN} = 10\text{ V}, R_g = 25\text{ }\Omega$	-	5	10	ns
Rise time	t_r		-	12	20	
Turn-off delay time	$t_{d(off)}$		-	35	60	
Fall time	t_f		-	16	25	

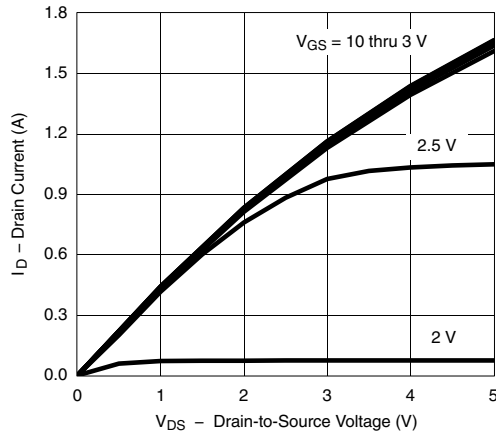
Notes

- Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$
- Guaranteed by design, not subject to production testing

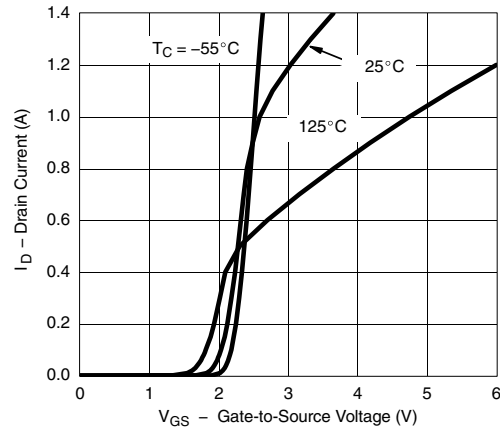
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.



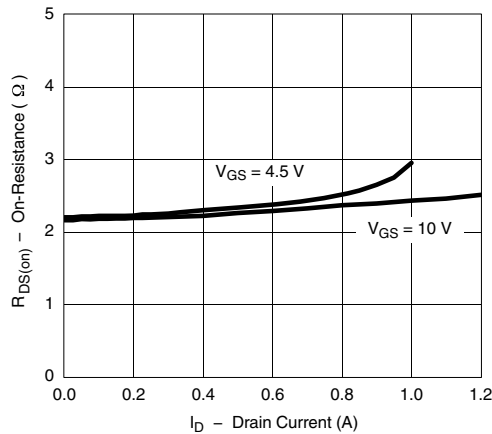
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



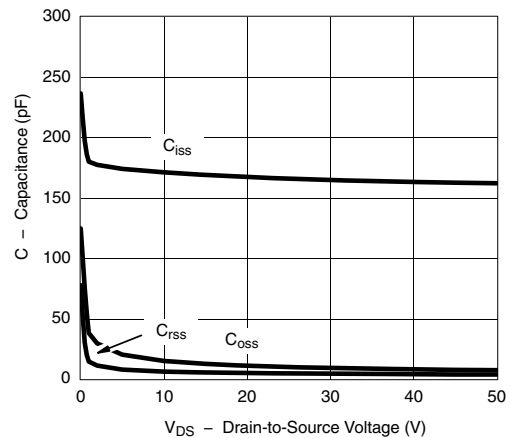
Output Characteristics



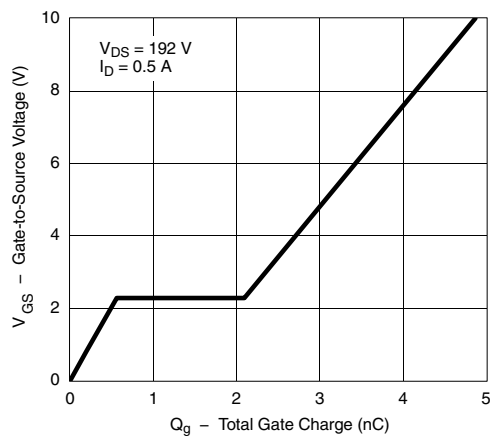
Transfer Characteristics



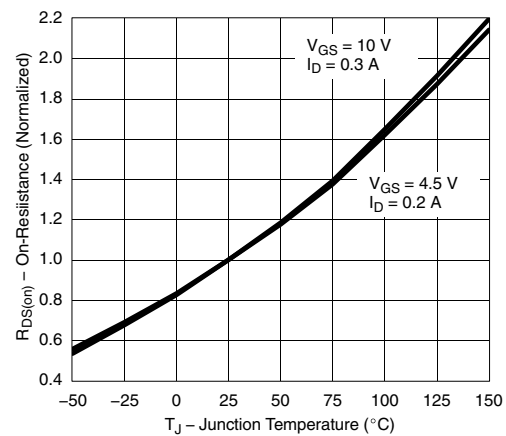
On-Resistance vs. Drain Current



Capacitance



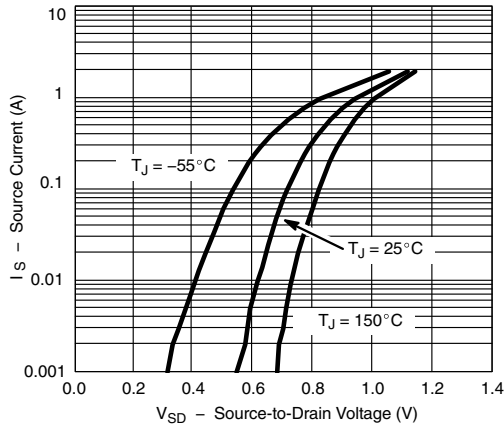
Gate Charge



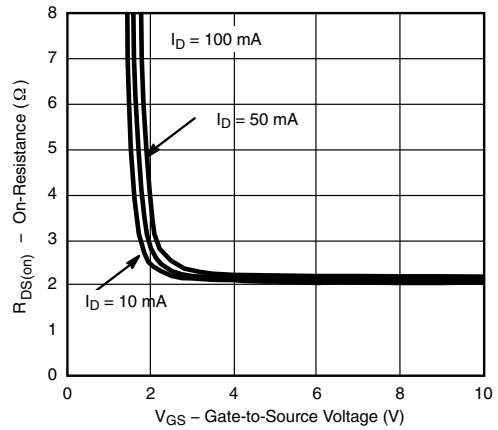
On-Resistance vs. Junction Temperature



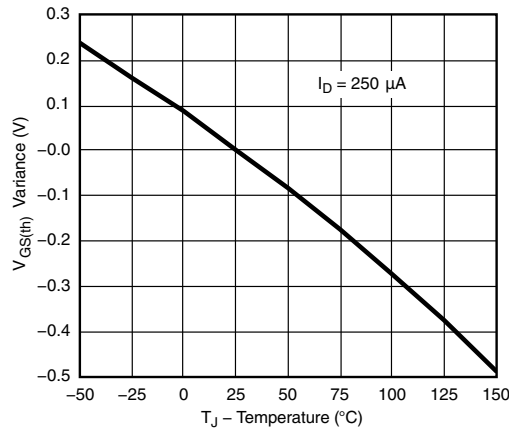
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



Source-Drain Diode Forward Voltage



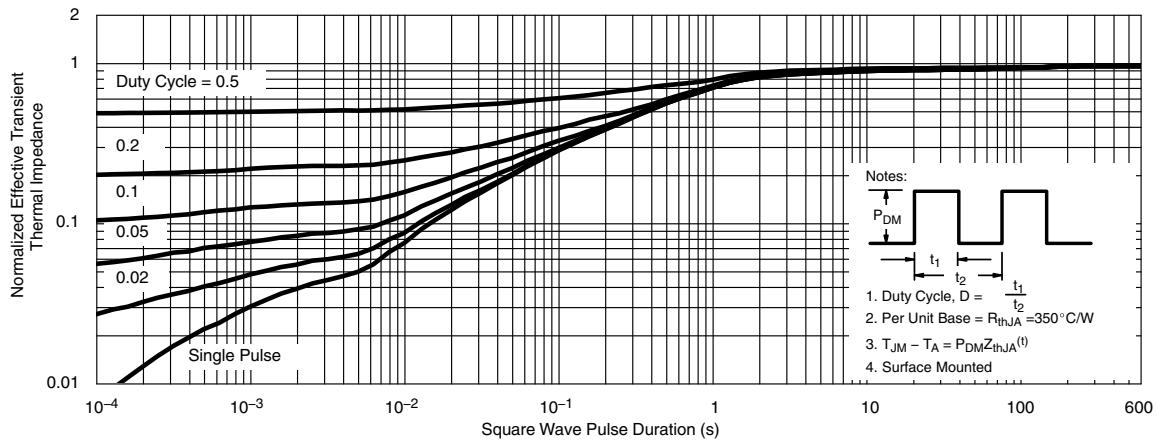
On-Resistance vs. Gate-to-Source Voltage



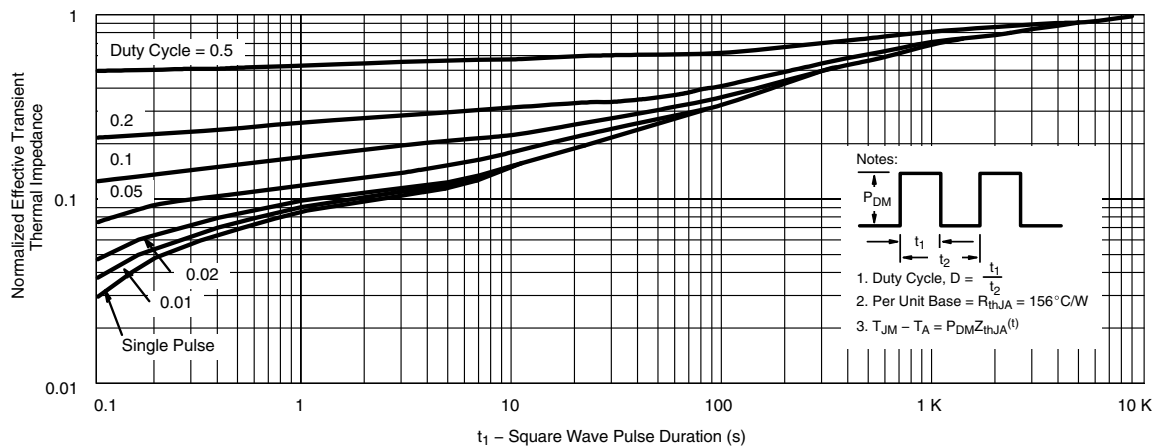
Threshold Voltage



TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



Normalized Thermal Transient Impedance, Junction-to-Ambient (TO-236, TN2404K only)



Normalized Thermal Transient Impedance, Junction-to-Ambient (TO-226AA, TN2404KL and TO-92-18RM, BS107KL only)

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SOT-23 (TO-236): 3-LEAD



Dim	MILLIMETERS		INCHES	
	Min	Max	Min	Max
A	0.89	1.12	0.035	0.044
A ₁	0.01	0.10	0.0004	0.004
A ₂	0.88	1.02	0.0346	0.040
b	0.35	0.50	0.014	0.020
c	0.085	0.18	0.003	0.007
D	2.80	3.04	0.110	0.120
E	2.10	2.64	0.083	0.104
E ₁	1.20	1.40	0.047	0.055
e	0.95 BSC		0.0374 Ref	
e ₁	1.90 BSC		0.0748 Ref	
L	0.40	0.60	0.016	0.024
L ₁	0.64 Ref		0.025 Ref	
S	0.50 Ref		0.020 Ref	
q	3°	8°	3°	8°

ECN: S-03946-Rev. K, 09-Jul-01
 DWG: 5479

RECOMMENDED MINIMUM PADS FOR SOT-23



Recommended Minimum Pads
Dimensions in Inches/(mm)

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