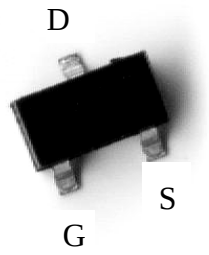
30V N-Channel Enhancement Mode MOSFET

Features:

- Simple drive requirement
- Small package outline
- ESD protected gate
- Pb-free lead plating and halogen-free package

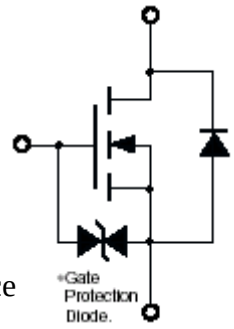
Outline

SOT-23



Symbol

KWB020N03KN3



G：Gate
S：Source
D：Drain

	30V
I @V_{GS}=10V, T_A=25°C	5.9A
R_{DSON}@V_{GS}=10V, I_D=5A	17.1mΩ(typ)
R_{DSON}@V_{GS}=4.5V, I_D=4A	21.1mΩ(typ)

Ordering Information

Device	Package	Shipping
KWB020N03KN3	SOT-23 (Pb-free lead plating and halogen-free package)	3000 pcs / Tape & Reel

Absolute Maximum Ratings (Ta=25°C)

Parameter	Symbol	Limits	Unit
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	±20	
Continuous Drain Current @ T_A=25°C, V_{GS}=10V (Note 3)	I_D	5.9	A
Continuous Drain Current @ T_A=70°C, V_{GS}=10V (Note 3)		4.7	
Pulsed Drain Current (Notes 1, 2)	I_{DM}	34	
Maximum Power Dissipation@ T_A=25℃ (Note 3)	P_D	1.38	W
Linear Derating Factor		0.01	W/°C
Operating Junction and Storage Temperature Range	Tj ; Tstg	-55~+150	°C

Note : 1. Pulse width limited by maximum junction temperature.
2. Pulse width≤ 300μs, duty cycle≤2%.
3. Surface mounted on 1 in² copper pad of FR-4 board; 270°C/W when mounted on minimum copper pad

Thermal Performance

Parameter	Symbol	Limit	Unit
Thermal Resistance, Junction-to-Ambient, max (Note)	$R_{\theta JA}$	90	°C/W
Thermal Resistance, Junction-to-Case, max	$R_{\theta JC}$	60	

Note : Surface mounted on 1 in² copper pad of FR-4 board; 270°C/W when mounted on minimum copper pad

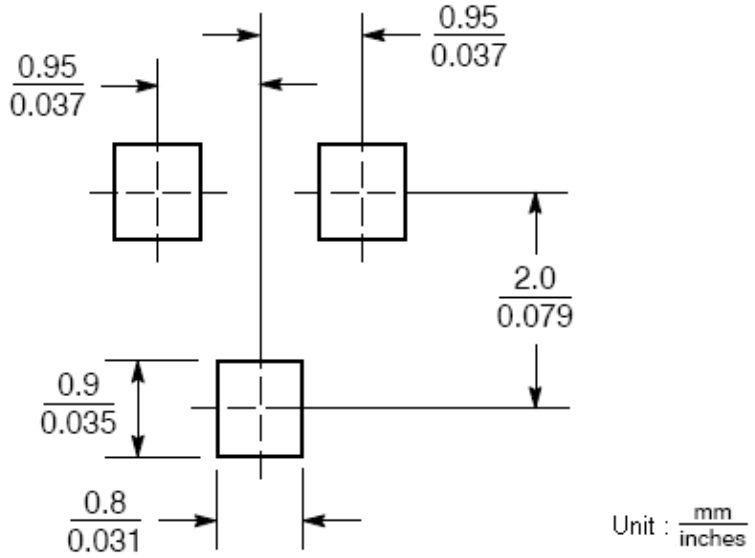
Electrical Characteristics (Tj=25°C, unless otherwise noted)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
BV_{DSS}	30	-	-	V	V_{GS}=0V, I_D=250μA
$V_{GS(th)}$	1	-	2.5		V_{DS}=V_{GS}, I_D=250μA
I_{GSS}	-	-	±10	μA	V_{GS}=±16V, V_{DS}=0V
I_{DSS}	-	-	1		V_{DS}=30V, V_{GS}=0V
	-	-	25		V_{DS}=24V, V_{GS}=0V(Tj=70°C)
*$R_{DS(ON)}$	-	17.1	23	mΩ	V_{GS}=10V, I_D=5A
	-	21.1	28		V_{GS}=4.5V, I_D=4A
*G_{FS}	-	4.5	-	S	V_{DS}=10V, I_D=4A
Dynamic					
Ciss	-	450	-	pF	V_{DS}=15V, V_{GS}=0V, f=1MHz
Coss	-	79	-		
Crss	-	60	-		
$t_{d(ON)}$	-	5.8	-	ns	V_{DS}=15V, I_D=1A, V_{GS}=10V, R_G=6Ω
t_r	-	18.6	-		
$t_{d(OFF)}$	-	33.8	-		
t_f	-	11.8	-		

Qg	-	12	-	nC	V_{DS}=15V, I_D=5A, V_{GS}=10V
Qgs	-	1.2	-		
Qgd	-	3.8	-		
Source-Drain Diode					
*I_S	-	-	1.8	A	
*I_{SM}	-	-	7.2		
*V_{SD}	-	0.78	1.2	V	V_{GS}=0V, I_S=1.5A
Trr	-	10.5	-	ns	V_{GS}=0V, I_F=2.3A, dI_F/dt=100A/μs
Qrr	-	3.8	-	nC	

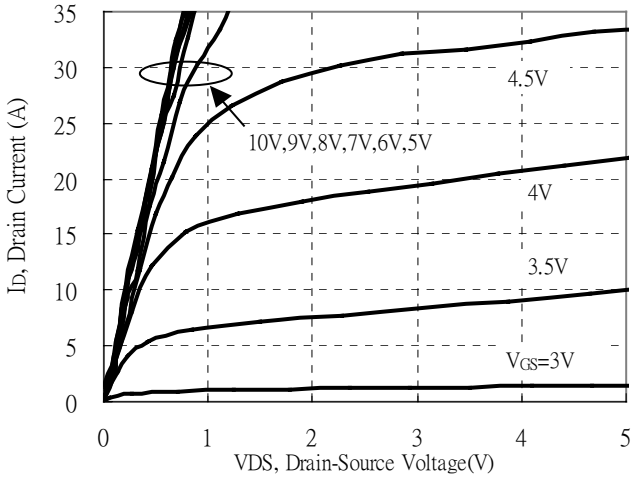
*Pulse Test : Pulse Width ≤300μs, Duty Cycle≤2%

Recommended Soldering Footprint

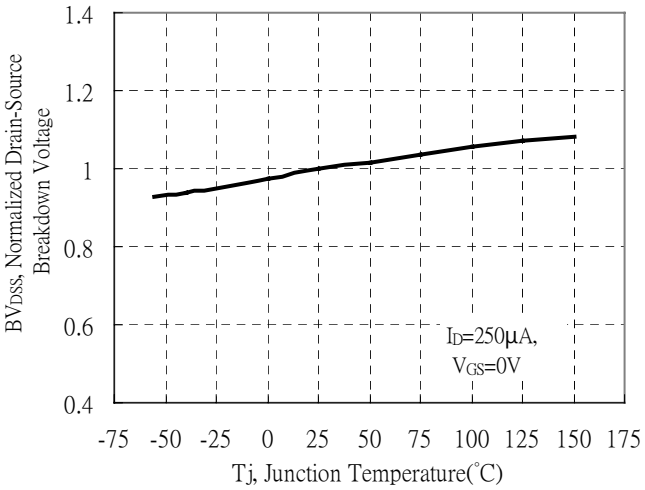


Typical Characteristics

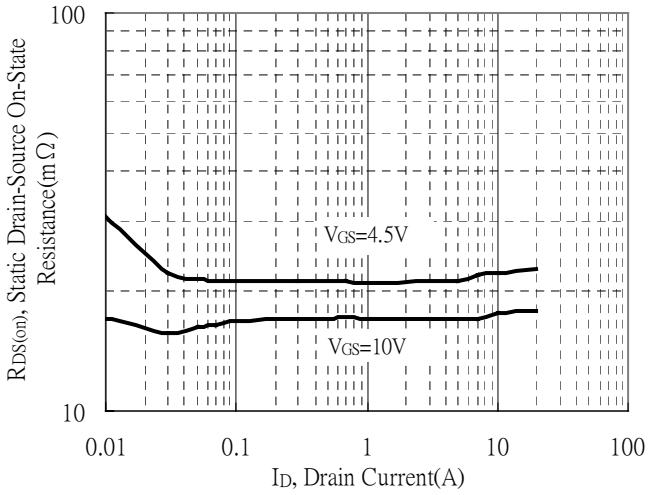
Typical Output Characteristics



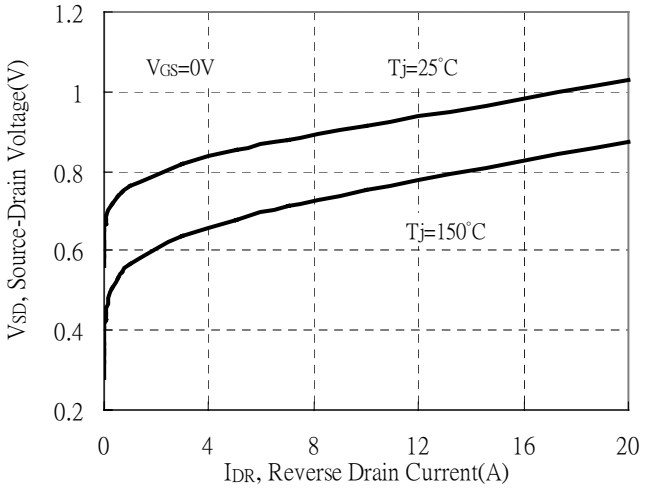
Brekdown Voltage vs Junction Temperature



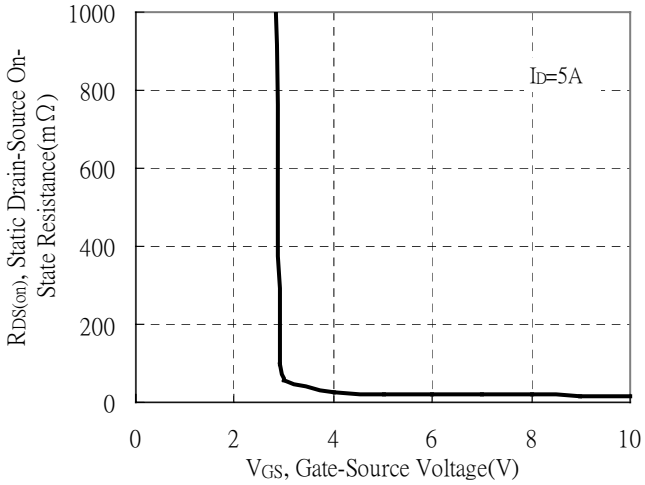
Static Drain-Source On-State resistance vs Drain Current



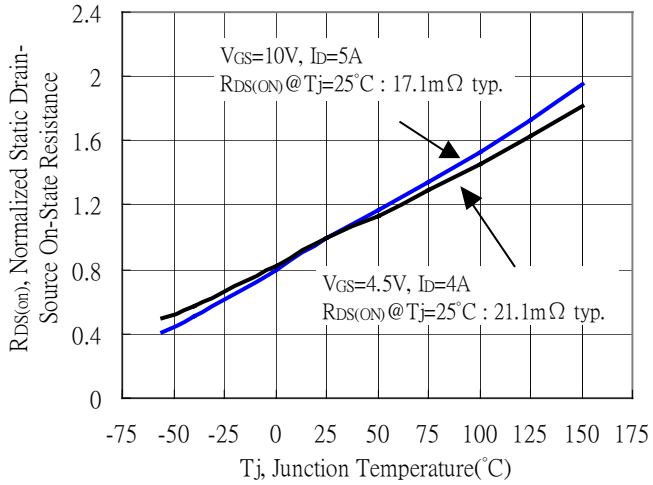
Reverse Drain Current vs Source-Drain Voltage



Static Drain-Source On-State Resistance vs Gate-Source Voltage

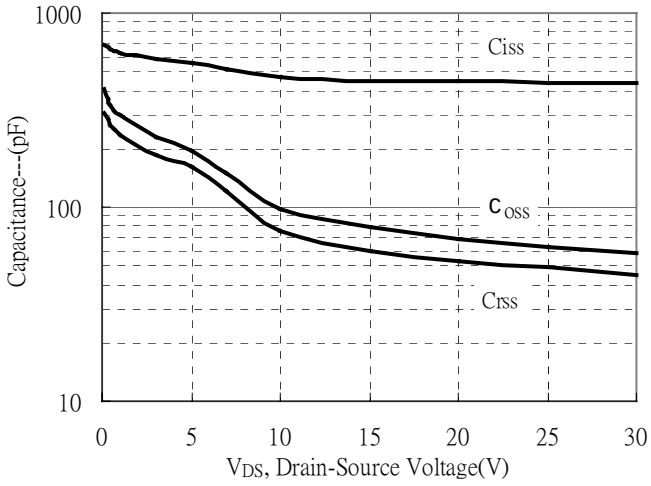


Drain-Source On-State Resistance vs Junction Tempearture

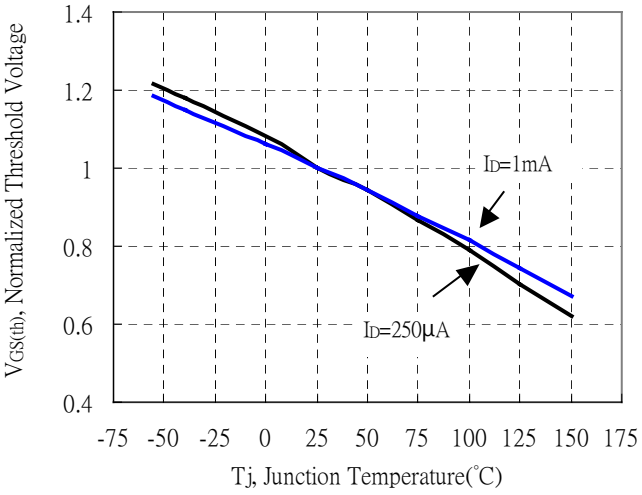


Typical Characteristics(Cont.)

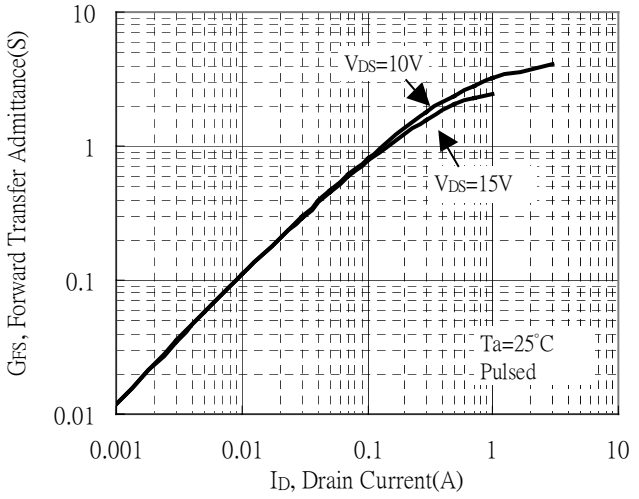
Capacitance vs Drain-to-Source Voltage



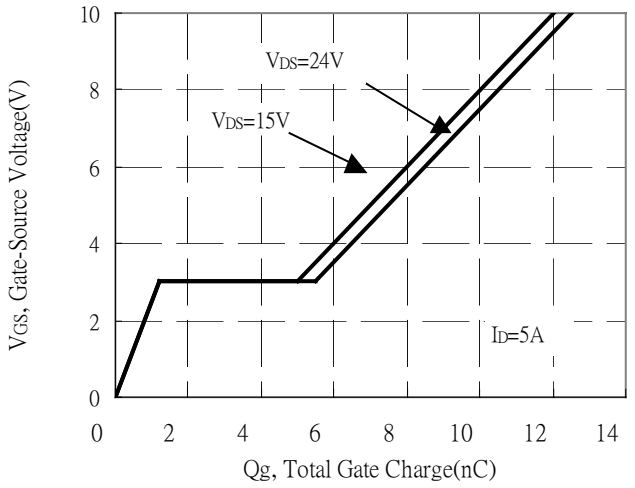
Threshold Voltage vs Junction Tempearture



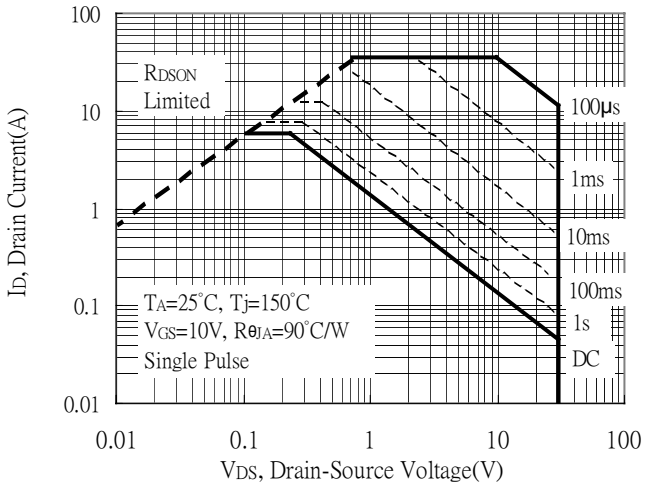
Forward Transfer Admittance vs Drain Current



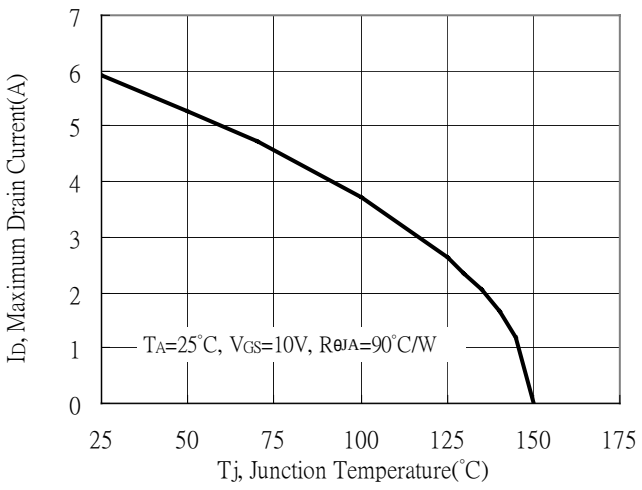
Gate Charge Characteristics



Maximum Safe Operating Area

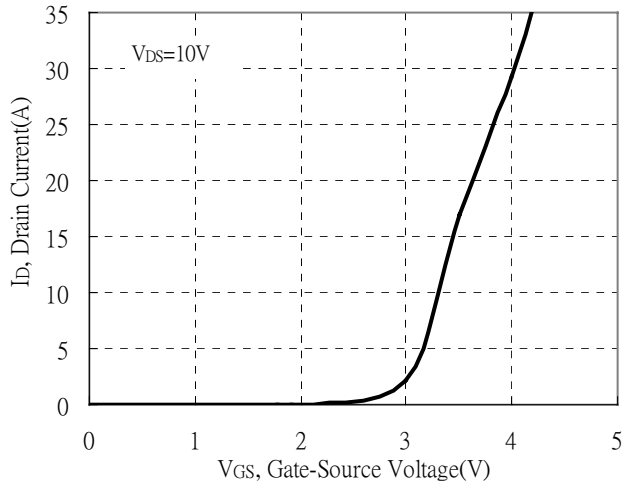


Maximum Drain Current vs Junction Temperature

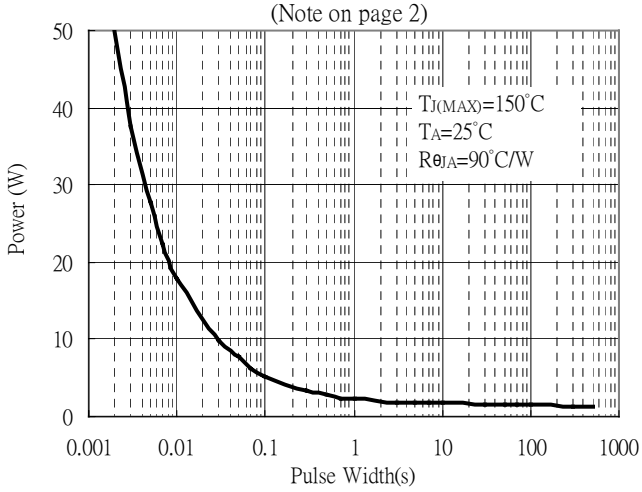


Typical Characteristics(Cont.)

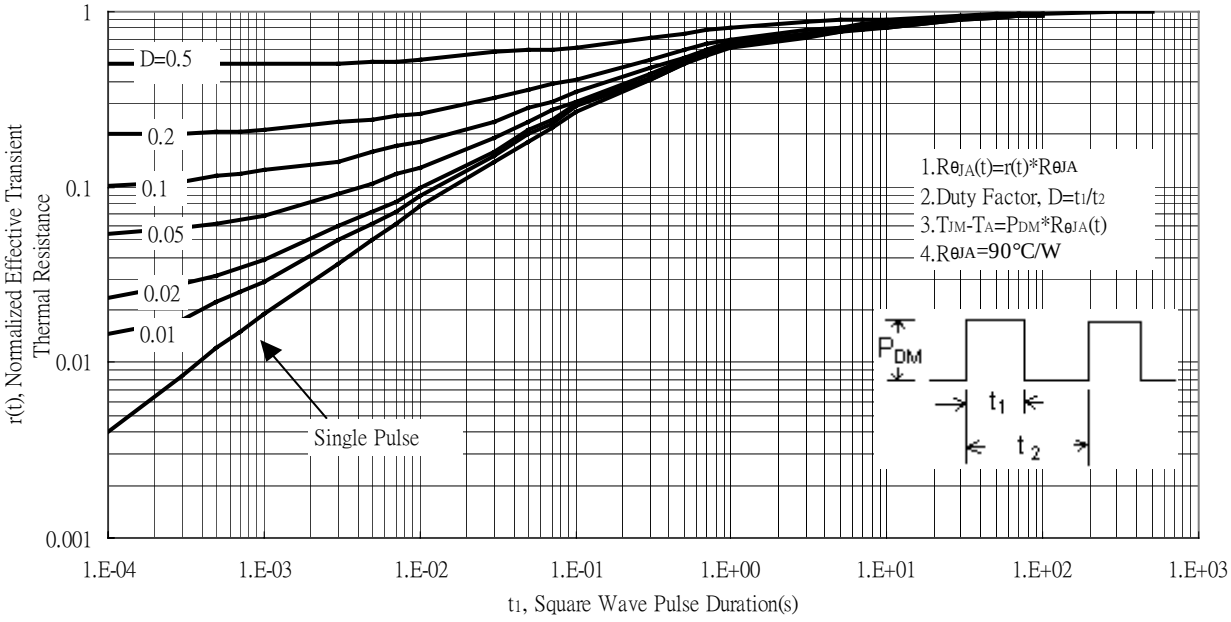
Typical Transfer Characteristics



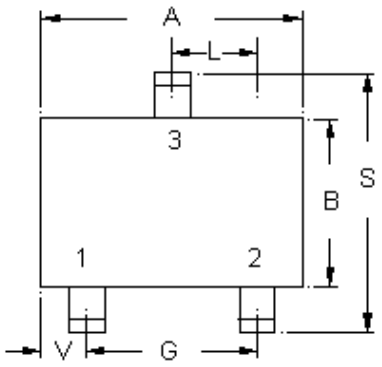
Single Pulse Power Rating, Junction to Ambient
(Note on page 2)

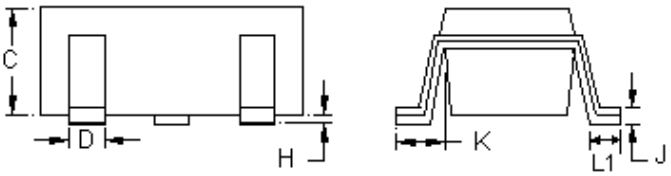


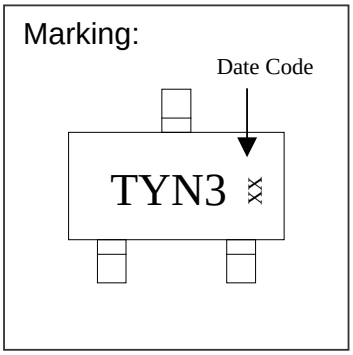
Transient Thermal Response Curves



SOT-23 Dimension







3-Lead SOT-23 Plastic
Surface Mounted Package
Code: N3

Style: Pin 1.Gate 2.Source 3.Drain

DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.1102	0.1204	2.80	3.04	J	0.0032	0.0079	0.08	0.20
B	0.0472	0.0669	1.20	1.70	K	0.0118	0.0266	0.30	0.67
C	0.0335	0.0512	0.89	1.30	L	0.0335	0.0453	0.85	1.15
D	0.0118	0.0197	0.30	0.50	S	0.0830	0.1161	2.10	2.95
G	0.0669	0.0910	1.70	2.30	V	0.0098	0.0256	0.25	0.65
H	0.0000	0.0040	0.00	0.10	L1	0.0118	0.0197	0.30	0.50