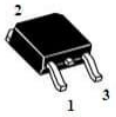
50N10

N-Channel Enhancement Mode MOSFET

V_{DSS}	100 V
I_D	50 A
$R_{DS(ON)}$	14 mΩ

FEATURES

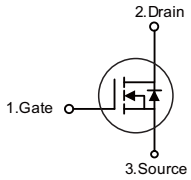
- Ultra-Low RDS(ON)
- Low Gate Charge
- High Current Capability

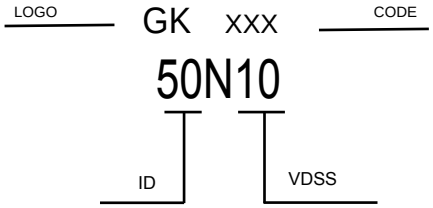




APPLICATION

- Power Management in Telecom.,Industrial Automation
- Motor Driving in Power Tool,E-vehicle,Robotics
- Current Switching in DC/DC&AC/DC(SR) Sub-systems





MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

Maximum Ratings at Tc=25°C unless otherwise specified

Characteristics	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	100	V
Gate-Source Voltage	V_{GS}	±20	V
Continue Drain Current	I_D	50	A
Pulsed Drain Current (Note1)	I_{DM}	200	A
Power Dissipation	P_D	82	W
Single Pulse Avalanche Energy (Note5)	E_{AS}	74	mJ
Operating Temperature Range	T_J	150	°C
Storage Temperature Range	T_{STG}	-55 to +150	°C
Thermal Resistance, Junction to Case(Note 2)	$R_{\theta JC}$	1.5	°C/W
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	39	°C/W

Electrical characteristics (T_J=25℃ unless otherwise noted)

Characteristics	Test Condition	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	V_{GS} = 0 V,I_D = 250 μA	BV_{DSS}	100	-	-	V
Drain-Source Leakage Current	V_{DS} = 100V, V_{GS} = 0 V	I_{DSS}	-	-	1	μA
	V_{DS}=100V,Tc=125°C		-	-	100	μA
Gate Leakage Current	V_{GS} = ± 20 V, V_{DS} = 0 V	I_{GSS}	-	-	±100	nA
Gate-Source Threshold Voltage	V_{DS} = V_{GS} , I_D = 250 μA	$V_{GS(th)}$	1.2	-	2.2	V
Drain-Source On-State Resistance (Note 3)	V_{GS} = 10 V, I_D =20A	$R_{DS(on)}$	-	14	20	mΩ
	V_{GS} = 4.5 V, I_D =15A		-	18.6	25	mΩ
Input Capacitance	V_{GS} = 0 V, V_{DS} = 50 V, f =1MHz	C_{iss}	-	992	-	pF
Output Capacitance		C_{oss}	-	330	-	pF
Reverse Transfer Capacitance		C_{rss}	-	19.2	-	pF
Turn-on Delay Time	VDS=50V, ID=20A VGS=10V,RG=6.2Ω (Note3,4)	$t_{d(ON)}$	-	7	-	ns
Rise Time		t_r	-	18	-	ns
Turn-Off Delay Time		$t_{d(OFF)}$	-	21	-	ns
Fall Time		t_f	-	9	-	ns
Total Gate Charge	VDS=50V,ID=20A, VGS=10V (Note3,4)	Q_G	-	19	-	nC
Gate to Source Charge		Q_{GS}	-	4	-	nC
Gate to Drain Charge		Q_{GD}	-	5	-	nC

Source-Drain Diode Characteristics at Ta=25°C unless otherwise specified

Characteristics	Test Condition	Symbo	Min.	Typ.	Max.	Unit
Maximun Body-Diode Continuous Current (Note 2)		I_S	-	-	50	A
Maximun Body-Diode Pulsed Current		I_{SM}	-	-	200	A
Drain-Source Diode Forward Voltage	I_{SD} = 20 A	V_{SD}	-	-	1.2	V
Reverse Recovery Time	I_S = I_F, ISD=20A,V_{GS} = 0 V, dI / dt = 100 A/μs (Note3)	trr	-	32	-	ns
Reverse Recovery Charge		Qrr	-	32	-	μC

Note2:Pulse test: 300 μs pulse width, 2 % duty cycle

RATING AND CHARACTERISTIC CURVES

Figure 1: Power De-rating

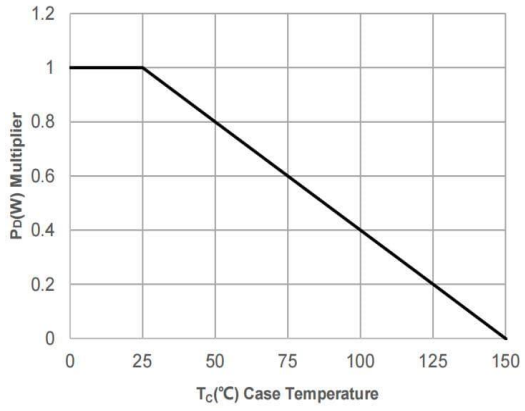


Figure 2: Current De-rating

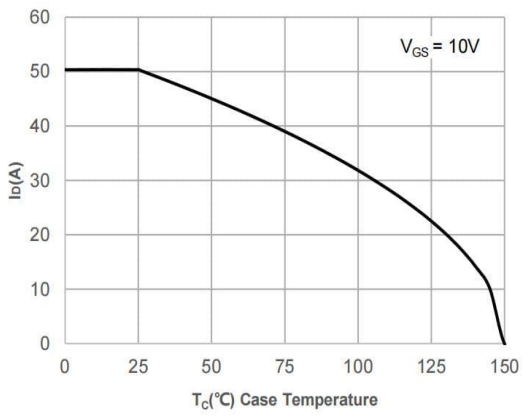


Figure 3: Normalized Maximum Transient Thermal Impedance

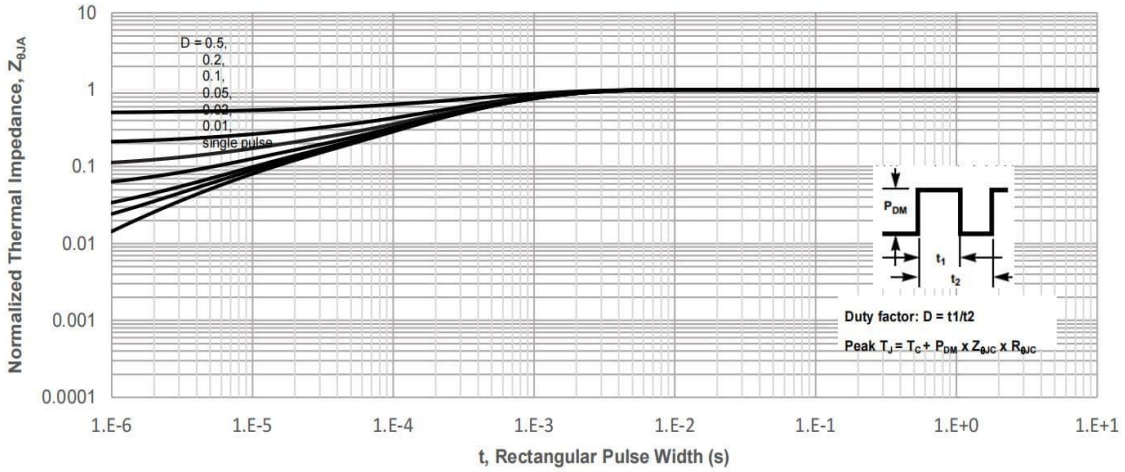
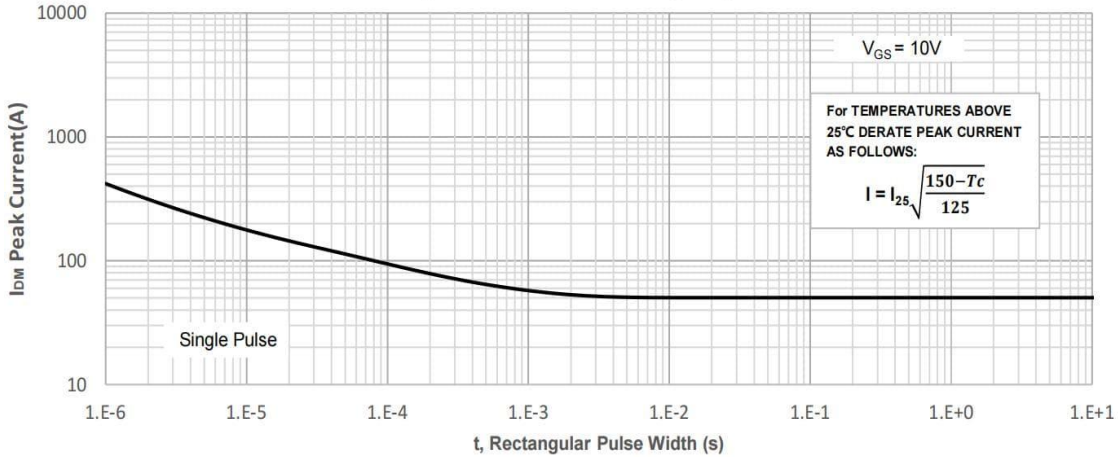


Figure 4: Peak Current Capacity



RATING AND CHARACTERISTIC CURVES

Figure 5: Output Characteristics

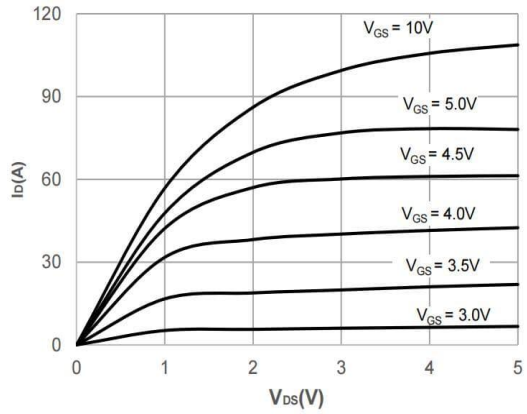


Figure 6: Typical Transfer Characteristics

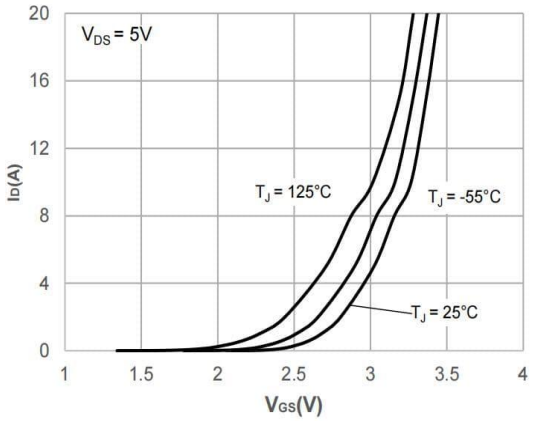


Figure 7: On-resistance vs. Drain Current

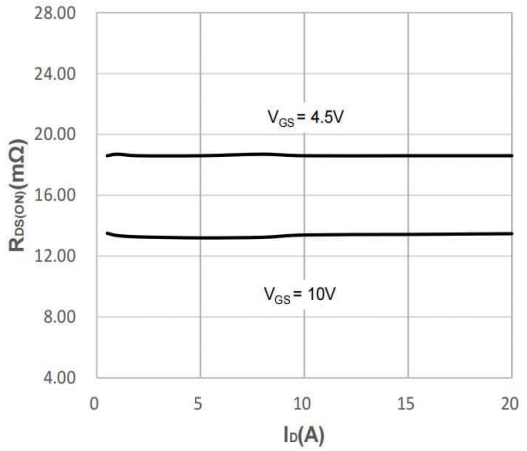


Figure 8: Body Diode Characteristics

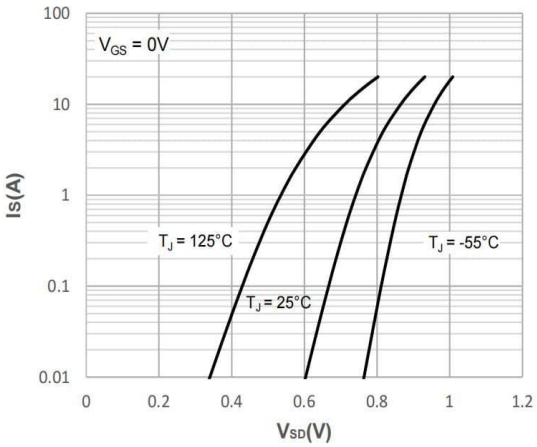


Figure 9: Gate Charge Characteristics

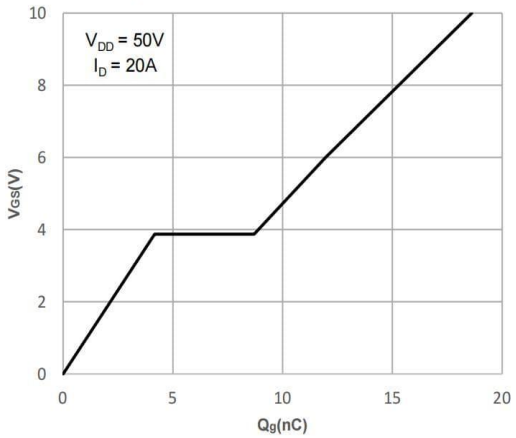
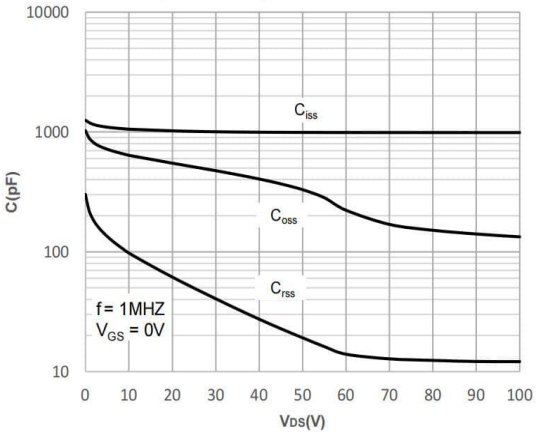


Figure 10: Capacitance Characteristics



RATING AND CHARACTERISTIC CURVES

Figure 11: Normalized Breakdown voltage vs. Junction Temperature

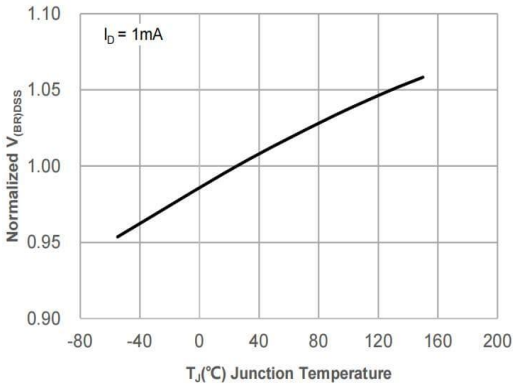


Figure 12: Normalized on Resistance vs. Junction Temperature

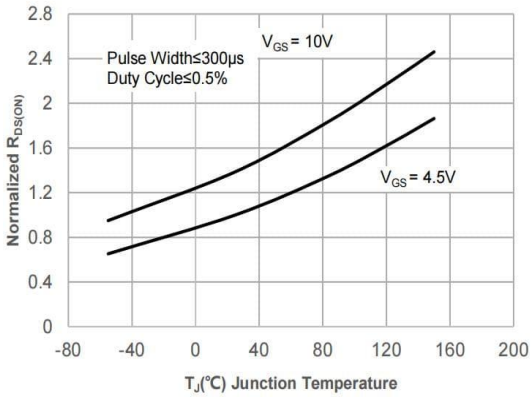


Figure 13: Normalized Threshold Voltage vs. Junction Temperature

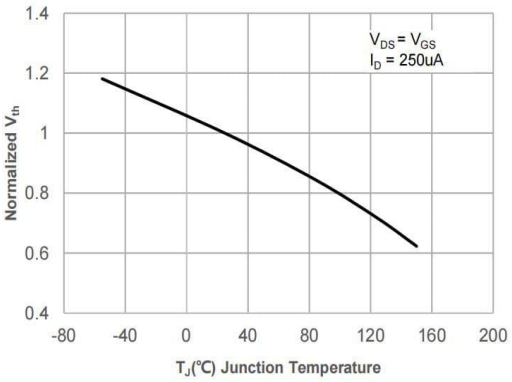


Figure 14: $R_{DS(ON)}$ vs. V_{GS}

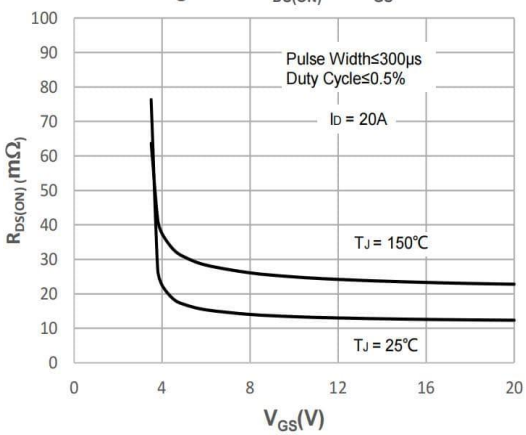
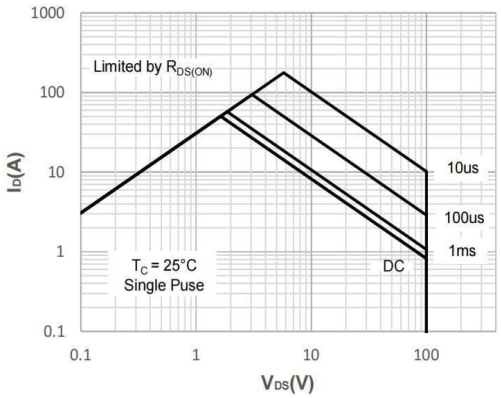


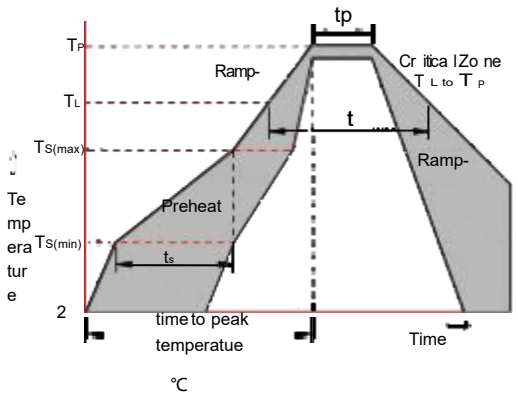
Figure 15: Maximum Safe Operating Area



Soldering parameters

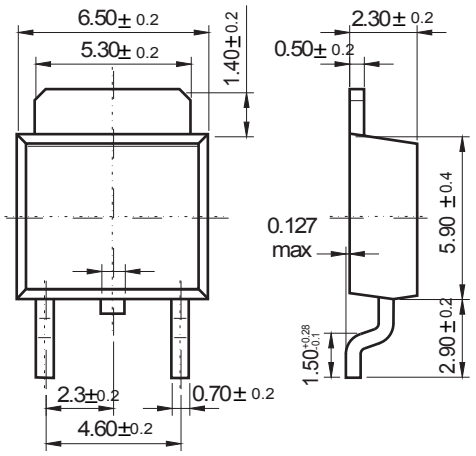
Reflow Condition		Pb-Free assembly (see as bellow)
Pre Heat	-Temperature Min ($T_{s(min)}$)	+150℃
	-Temperature Max($T_{s(max)}$)	+200℃
	-Time (Min to Max) (ts)	60-180 secs.
Average ramp up rate (Liquid us Temp (T_L) to peak)		3℃/sec. Max
$T_{s(max)}$ to T_L - Ramp-up Rate		3℃/sec. Max
Reflow	-Temperature(T_L)(Liquid us)	+217℃
	-Temperature(t_L)	60-150 secs.
Peak Temp (T_p)		+260(+0/-5)℃
Time within 5℃ of actual Peak Temp (t_p)		30 secs. Max
Ramp-down Rate		6℃/sec. Max
Time 25℃ to Peak Temp (T_P)		8 min. Max
Do not exceed		+260℃

FIG5: Reflow condition

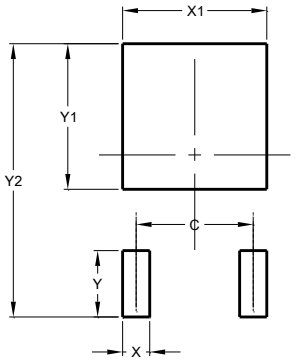


Package Dimensions & Suggested Pad Layout

TO-252



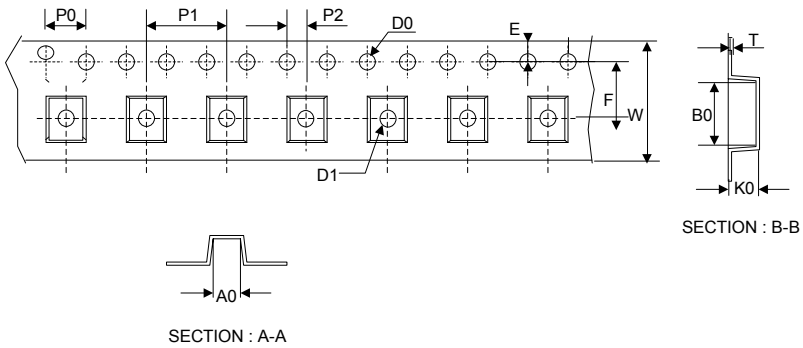
Dimensions in inches and (millimeters)



Dimensions	Value (in mm)
C	4.55
X	1.50
X1	5.80
Y	2.70
Y1	6.00
Y2	10.90

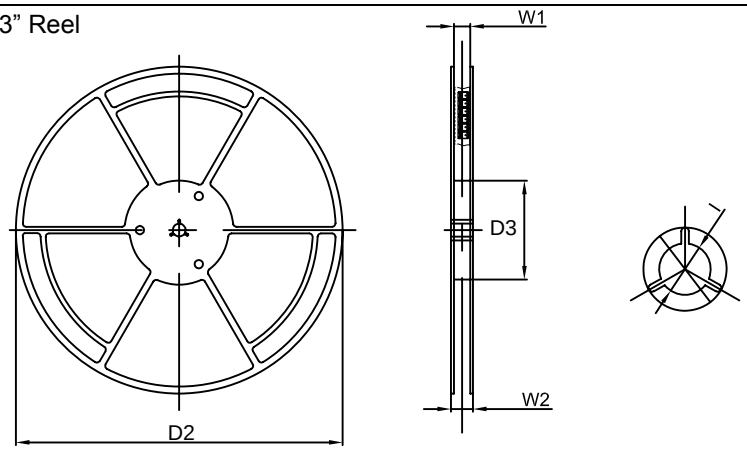
Tape & rell specification

Tape



Symbol	Dimension (mm)
P0	4.00±0.20
P1	8.00±0.20
P2	2.00±0.20
D0	1.55±0.15
D1	1.55±0.20
E	1.75±0.20
F	7.50±0.20
W	16.00±0.20
A0	7.10±0.20
B0	10.50±0.20
K0	2.70±0.20
T	0.30±0.10

13” Reel



D2	330.0±5.0
D3	100.0±4.0
W1	20.0±5.0
W2	25.0±5.0
I	13.0±2.0

Quantity: 2500PCS